tcanta Hedge HedgeVery tolerant of maritime exposure, it can be grown as an informal hedge in exposed positions[75].

dwatta Astringent Cancer DysenteryThe unripe fruit is astringent and is eaten in the treatment of bloody dysentery[272]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Himalayas. ksacta Shrubberies, 1500 - 3000 metres, from Afghanistan to S.W. China[51]. Forest openings at elevations of 1300 - 3000 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate in late winter or early spring, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils that are well-drained[11. 2001. Prefers a soil that is only moderately fertile, succeeding in very poor soils and in dry soils[11, 200]. Prefers a light sandy loam and a sunny position[11]. Dislikes shallow chalk soils[98]. Plants are very drought resistant[1] and very tolerant of maritime exposure[75]. A very hardy plant, tolerating temperatures down to at least -40°c[200]. Somewhat similar to E. multiflora, but flowering a few weeks later[182]. The flowers are rich in nectar and very aromatic, they are much visited by bees. This species is notably resistant to honey fungus[88, 200]. Plants can fruit in 6 years from seed[160]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[160, 200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%

# 4.1.7 Elaeagnus umbellata

Autumn Olive

tfo2n 3 tlin 7 cyuc 4 kcak 3 tcan 2 dwat 4.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus umbellata is a deciduous Shrub growing to 4.5 m (14ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

poista  $\dot{E}$ . umbellata has the potential of becoming one of the most troublesome adventive shrubs in the central and eastern United States.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[2, 46, 105]. Juicy and pleasantly acid, they are tasty raw and can also be made into jams, preserves etc[160, 183, 194]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The fruit contains about 8.3% sugars, 4.5% protein, 1% ash[194]. The vitamin C content is about 12mg per 100g[194]. Mature bushes in the wild yield about 650g of fruit over 2 - 3 pickings[194]. The harvested fruit stores for about 15 days at room temperature[194]. The fruit is about 8mm in diameter[200] and contains a single large seed[K].

Seed - raw or cooked[194]. It can be eaten with the fruit though the seed case is rather fibrous[160].

tcanta Companion Fodder Fuel Hedge HedgeVery tolerant of maritime exposure, it makes a good informal hedge, succeeding even in very exposed positions[75]. The plants make a reasonable wind-protecting screen, they are about as wide as they are tall. They make a good companion hedge, enriching the soil and fertilizing neighbouring plants[K]. The wood is a good fuel[146].

dwatta Astringent Cancer Cardiac Pectoral Stimulant Vitamin CThe flowers are astringent, cardiac and stimulant[240]. The seeds are used as a stimulant in the treatment of coughs[240]. The expressed oil from the seeds is used in the treatment of pulmonary affections[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - China, Japan, Himalayas. ksacta Thickets and thin woods in the lowland and hills[58].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate in late winter or early spring, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Layering in September/October. Takes 12 months[78].

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: dard Minor Global CropSucceeds in most soils that are welldrained[11, 200], though it dislikes shallow chalk soils[98]. It prefers a soil that is only moderately fertile, succeeding in very poor soils and in dry soils[11, 200]. Prefers a light sandy loam and a sunny position[11]. Established plants are very drought resistant[1]. A very hardy plant, tolerating temperatures down to at least -40°c[200]. This species is somewhat similar to E. multiflora, but it flowers a few weeks later[182]. Sometimes cultivated for its edible fruit, there are some named varieties[183]. 'Cardinal' and 'Red Wing' are very good fruiting forms (developed for ornament and not for fruit quality)[182]. 'Jazbo' has been bred for its edible fruits which are said to be ripe when 'they drop into your hand'[214]. This makes them valuable in breeding programmes to develop easily harvested fruits[214]. Flowers are rich in nectar and very aromatic, they are much visited by bees. Polymorphic[11, 275]. This species is notably resistant to honey fungus[88, 200]. Plants can fruit in 6 years from seed[160]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[160, 200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and

# 4.1.8 Glycyrrhiza lepidota

American Liquorice

tfo2n 3 tlin 8 cyuc 4 kcak 3 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Glycyrrhiza lepidota is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and

neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Root Seed SeedpodEdible Uses: Tuber - raw or cooked[1, 2, 27, 55, 62, 63]. A delicious flavour somewhat like roasted sweet potatoes, it always receives very high marks in taste trials with us[K]. The tuber can also be dried and ground into a powder then used as a thickening in soups etc or can be added to cereal flours when making bread[132, 257]. Tubers contain 17% crude protein. this is more than 3 times that found in potatoes[183]. The tubers can be harvested in their first year but they take 2 -3 years to become a sizeable crop[160]. They can be harvested at any time of the year but are at their best in the autumn[160]. The tubers can also be harvested in the autumn and will store until at least the spring[K]. Yields of 2.3 kilos of tubers per plant have been achieved[222]. Seed cooked[62]. Rather small and not produced very freely[K], they are used like peas and beans[183, 213]. A good source of protein, they can be ground into a powder and added to cereals when making bread etc[257]. Young seedpods[55, 62, 95 1771

tcanta Companion LatexThere is one report that the plant contains a latex which could be used in the production of rubber[269].

dwatta The tubers were used in folk remedies for that cancerous condition known as "Proud Flesh" in New England. Nuts were boiled and made into a plaster, "For to eat out the proud flesh they (the Indians) take a kind of earth nut boyled and stamped" [269].

nrakta N. America - Pennsylvania. Occasionally naturalized in S. Europe[50]. Sasacta Usually found in low damp bottomland or riparian woods and thickets, it is also often found round ancient Indian campsites[43, 62, 269].

propta Seed - pre-soak for 3 hours in tepid water and sow February/March in a cold frame. The seed usually germinates in 1 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for their first winter, planting them out in late spring or early summer. Division can be carried out at almost any time of the year, though spring is probably the best time. Simply dig up the roots, harvest the tubers and replant them where you want the plants to grow. It is also possible to harvest the tuber in winter, store them in a cool fairly dry but frost-free place over the winter and then plant them out in the spring. The tubers lose moisture rapidly once they have been harvested, so make sure that you store them in a damp medium such as leafmold.

nwatta Agroforestry Services: Nitrogen Edible Beans Management: Standard New Crop for Tubers Staple Crop: ProteinPrefers a light rich soil and a sunny position[1, 27]. When grown in a warm dry situation in a well-drained sandy soil, the plants will be long lived with the tuberous roots increasing in size and number each year[245]. Another report says that the plant prefers light dappled shade[200]. It tolerates acid soils[160]. Dislikes windy situations[K]. Groundnut is reported to tolerate an annual precipitation in the range of 97 to 117cm, an average annual temperature range of 9.9 to 20.3°C and a pH in the range of 4.5 to 7.0[269]. It tolerates a range of climatic conditions and produces well in cool temperate zones as well as the subtropical conditions of South Florida[269]. Whilst most reports suggest that this species should be cold hardy in all parts of Britain one report says that the plants may require protection in severe winters[134]. The groundnut has occasionally been cultivated for its edible root and has the potential to become a commercial crop[95, 183]. Cultivars have been selected in the past for higher yields and larger tubers, it is said that the yields from some of these cultivars can rival potato crops[95, 183]. Some of these cultivars are gradually becoming available in Britain[K]. The best yields are obtained when the plant is left in the ground for at least two growing seasons. Yields of 30 tonnes per hectare have been achieved from weed crops growing in a field of cranberries[269]. This species has been grown in the past in S. Europe[46, 50] and has been suggested as a nitrogenfixing edible ornamental for permaculturalists[222]. The plant forms long thin roots which enlarge at intervals along their length to form the tubers, the effect is somewhat like a necklace[K]. Plants can be invasive once they are established[200] and have become a weed of cultivated cranberry

crops in N. America[269]. A climbing plant, twining around the thin branches of other plants for support[K]. The flowers have a scent of violets[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shruh etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Herbaceous. A suckering vine sending up suckers some distance main plant [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 4.1.5 Hedysarum boreale mackenzii

Liquorice Roo

tfo2n 3 tlin 7 cyuc 4 kcak 0 tcan 0 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hedysarum boreale mackenzii is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade, It prefers moist soil.

pcista The root is said to be slightly toxic.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[177]. Long and sweet[46, 61] with a liquorice-like flavour[183]. Used in spring, the root is crisp and juicy but it becomes tough and woody as the season advances[2, 183].

nrakta Western N. America - Colorado. ksacta Calcareous gravels and slopes[172].

propta Seed - sow in a cold frame as soon as it is ripe or in the spring[200]. Stored seed should be pre-soaked for 24 hours in warm water. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Great care is needed since the plant dislikes root disturbance[200].

nwatta Easily grown in ordinary garden soil in a sunny position, preferring a deep well-drained sandy loam[1, 200]. Plants strongly resent root disturbance and should be placed in their permanent positions as soon as possible[1]. Does well in the rock garden or border[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 4.1.6 Elaeagnus parvifolia

Autumn olive

tfo2n 3 tlin 7 cyuc 4 kcak 2 tcan 2 dwat 4.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus parvifolia is a deciduous Shrub growing to  $4.5 \mathrm{~m}$  (14ft) by  $3 \mathrm{~m}$  (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw, cooked or added to curries[2, 105, 183]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly underripe it will be quite astringent - though children seem to love it at the slightly unripe stage[K]. The fruit is about 8mm in diameter[200] and contains a single large seed[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous.

institutes for their nutrient-rich fruits that can promote the general health of the body (see edible and medicinal uses below)[214]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[113, 186, 200]. Plants produce abundant suckers, especially when grown on sandy soils[186]. Dioecious. Male and female plants must be grown if seed is required. The sexes of plants cannot be distinguished before flowering, but on flowering plants the buds of male plants in winter are conical and conspicuous whilst female buds are smaller and rounded[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Naturalizing, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

# 4.1.3 Apios Americana

Ground Nut

tfo2n 3 tlin 7 cyuc 5 kcak 3 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Apios Americana is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from April to November, in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It refers moist soil

kcakta Edible Parts: Root Seed SeedpodEdible Uses: Tuber - raw or cooked[1, 2, 27, 55, 62, 63]. A delicious flavour somewhat like roasted sweet potatoes, it always receives very high marks in taste trials with us[K]. The tuber can also be dried and ground into a powder then used as a thickening in soups etc or can be added to cereal flours when making bread[132, 257]. Tubers contain 17% crude protein, this is more than 3 times that found in potatoes[183]. The tubers can be harvested in their first year but they take 2 -3 years to become a sizeable crop[160]. They can be harvested at any time of the year but are at their best in the autumn[160]. The tubers can also be harvested in the autumn and will store until at least the spring[K]. Yields of 2.3 kilos of tubers per plant have been achieved[222]. Seed cooked[62]. Rather small and not produced very freely[K], they are used like peas and beans[183, 213]. A good source of protein, they can be ground into a powder and added to cereals when making bread etc[257]. Young seedpods[55, 62,

tcanta Companion LatexThere is one report that the plant contains a latex which could be used in the production of rubber[269].

dwatta The tubers were used in folk remedies for that cancerous condition known as "Proud Flesh" in New England. Nuts were boiled and made into a plaster, "For to eat

out the proud flesh they (the Indians) take a kind of earth nut boyled and stamped"[269].

nrakta N. America - Pennsylvania. Occasionally naturalized in S. Europe[50]. ksacta Usually found in low damp bottomland or riparian woods and thickets, it is also often found round ancient Indian campsites[43, 62, 269].

propta Seed - pre-soak for 3 hours in tepid water and sow February/March in a cold frame. The seed usually germinates in 1 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for their first winter, planting them out in late spring or early summer. Division can be carried out at almost any time of the year, though spring is probably the best time. Simply dig up the roots, harvest the tubers and replant them where you want the plants to grow. It is also possible to harvest the tuber in winter, store them in a cool fairly dry but frost-free place over the winter and then plant them out in the spring. The tubers lose moisture rapidly once they have been harvested, so make sure that you store them in a damp medium such as leafmold.

nwatta Agroforestry Services: Nitrogen Edible Standard New Crop for Tu-Beans Management: bers Staple Crop: ProteinPrefers a light rich soil and a sunny position[1, 27]. When grown in a warm dry situation in a well-drained sandy soil, the plants will be long lived with the tuberous roots increasing in size and number each year[245]. Another report says that the plant prefers light dappled shade[200]. It tolerates acid soils[160]. Dislikes windy situations[K]. Groundnut is reported to tolerate an annual precipitation in the range of 97 to 117cm, an average annual temperature range of 9.9 to 20.3°C and a pH in the range of 4.5 to 7.0[269]. It tolerates a range of climatic conditions and produces well in cool temperate zones as well as the subtropical conditions of South Florida[269]. Whilst most reports suggest that this species should be cold hardy in all parts of Britain, one report says that the plants may require protection in severe winters[134]. The groundnut has occasionally been cultivated for its edible root and has the potential to become a commercial crop[95, 183]. Cultivars have been selected in the past for higher yields and larger tubers, it is said that the yields from some of these cultivars can rival potato crops[95, 183]. Some of these cultivars are gradually becoming available in Britain[K]. The best yields are obtained when the plant is left in the ground for at least two growing seasons. Yields of 30 tonnes per hectare have been achieved from weed crops growing in a field of cranberries[269]. This species has been grown in the past in S. Europe[46, 50] and has been suggested as a nitrogenfixing edible ornamental for permaculturalists[222]. The plant forms long thin roots which enlarge at intervals along their length to form the tubers, the effect is somewhat like a necklace[K]. Plants can be invasive once they are established[200] and have become a weed of cultivated cranberry crops in N. America[269]. A climbing plant, twining around the thin branches of other plants for support[K]. The flowers have a scent of violets[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Herbaceous. A suckering vine sending up suckers some distance main plant [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 4.1.4 Apios americana

Ground Nut

tfo2n 3 tlin 7 cyuc 5 kcak 3 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Apios americana is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from April to November, in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid,

# Plants For a Future 2021CE Hardiness Zone 7, Damp soil

pfaf.org

2021

# Contents

	11111	ouucu	UП																	J
	1.1	Pronu	nciat	io	n	gι	110	de												3
	1.2	vocabi	ılary	7																3
2	1 tlin															3				
	2.1	bwon																		3
	2.2	mran																		4
3	2 tlin														6					
	3.1	bwon																		6
	3.2	mran																		11
4	3 tl	in																		36
	4.1	bwon																		36
	4.2	mran																		50
5	4 tl	4 tlin 2														241				
	5.1	bwon																		241
	5.2	mran																		270
6	5 tlin 7														709					
	6.1	bwon																		709
	6.2	mran																		731
7	6 tlin 10														1031					
	7.1	bwon																		103
	7.2	mran																		104
8	7 tl	in																	1	1271
	8.1	bwon																		127
	8.2	mran																		

# 1 Introduction

This is a book of plant information harvested from pfaf.org the goal is for future generations to have access to this valuable plant information. This book does Not contain any plant identification material, so you will need to use other references for actually identifying the plant. This book does contain information on how to grow the plants and their edible and other uses.

The plants are sorted by nitrogen-fixing ability, edibility, plant height, other uses, medicinal uses, and latin name. They start with nitrogen fixers because those are typically the easiest to establish pioneer plants.

Summaries are given in the Cosmic Language (KsomPyash). Long descriptions are in English.

# 1.1 Pronunciation guide

a /a/, b /b/, c /ʃ/, d /d/, e /e/, f /f/, g /g/, h /h/, i /i/, j /ʒ/, k /k/, l /l/, m /m/, n /n/, o /o/, p /p/, q /g/, r /r/, s /s/, t /t/, u /u/, v /v/, v /v/, v /v/, v/, v

# 1.2 vocabulary

tlin/tlin/cold hardiness, cyuc /[juʃ/ heat hardiness, kcak /kʃak/ food rating, tcan /tʃan/ other uses rating, dwat /dwat/ medicinal rating, hkuc /hkuʃ/ adult height, hsi2n /hsi1n/ adult width.

pcim/pjim/full (shade), hmim/hmim/ medium (shade), htut/htut/no (shade), cyut/jjut/shade. li/li/realis-mood (end of sentence). ta/ta/topic-case.

hgat /hgat/ drought (tolerant), kyuc /kjuʃ/ dry, tcup /tʃup/ damp, hja7n /hʒa1n/ wet, hs6s /hsəs/ puddle, hwic /hwiʃ/ water (requirement).

hyis /hjis/ poor (soil), hras /hras/ sandy, jlut /ʒlut/ loamy, nyik /njik/ mud (silt/clay loam), frip /frip/ pottery (heavy clay), hpa7t /hpa1t/ topsoil.

frus/frus/corrosive (very acid), flat/flat/acid, prik/prik/passive (neutral), lwis/lwis/alkaline, slip/slip/slippery (very alkaline), hsom/hsom/salt (saline), hpa7tmwat/hpa1tmwat/topsil/table)

fyif/fjif/ self (fertile), xre7t /xre1t/, nyanhjen /njanhʒen/ male-female (dioecious, distinct male and female plants), hjon /hʒon/ sex.

hmuc /hmuʃ/ purpose, pcis /pʃis/ danger, trot /trot/ temperature, prop /prop/ fertile, tcan /tʃan/ other, hyum /hjum/ uses, dwat /dwat/ medicine, drut /drut/ description, kcec /kʃeʃ/ region, tfo2n /tfo1n/ nitrogen-fixing, xhutkfam /kʃlut,kfam/ plant quantity, bwon /bwon/ bean, mran /mran/ corn/grain non-nitrogen-fixing plant, nrak /nrak/ continent (of origin), ksac /ksaʃ/ circumstances/habitat.

7 hmuctrotkcec tcup hmuchwic 3597 xlutkfam

# 2 1 tlin

# $\frac{1}{2}$ 2.1 bwon

#### 2.1.1 Phaseolus coccineus

Runner Bean, Scarlet runner

tfo2n 1 tlin 12 cyuc 4 kcak 3 tcan 0 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Phaseolus coccineus is a ANNUAL/PERENNIAL growing to 3 m (9ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 10 and is frost tender. It is in leaf from May to October, in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Large quantities of the raw mature seed are poisonous[10, 65]. The toxins play a role in protecting the plant from insect predation.

kcakta Edible Parts: Flowers Leaves Root Seed Seed-pdeEdible Uses: Immature seedpods-raw or cooked[1, 2, 37, 46]. They have a pleasant mild flavour and are widely used as a vegetable in many areas of the world. They can be added to salads, cooked as a vegetable or added to soups, stews tet[183]. The immature seed is used like shelled beans as a vegetable[183]. The protein-rich mature seeds can be dried

and stored for future use. They need to be thoroughly cooked before being eaten in order to destroy a toxic principle. They are soaked for 12 hours prior to use and are eaten boiled or added to soups etc. The seed can also be ground into a powder and added to cereal flours for making protein-enriched bread etc[183]. Flowers - raw. A bean-like taste[177, 183]. Young leaves - cooked and used as a potherb[183]. Root - cooked. Rich in starch[183]. Another report says that the root is poisonous[2]. Carbon Farming - Staple Crop: protein. tcanta Nitrogen. Carbon Farming - Agroforestry Services: nitrogen. Attracts humminobirds.

nrakta Southern N. America - Mexico. ksacta Not known propta Pre-soak the seed for 12 hours in warm water and sow in mid spring in a greenhouse. Germination should take place within 10 days. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts. The seed can also be sown in situ in late spring though it may not ripen its seed in a cool summer

nwatta Agroforestry Services: Nitrogen Management: Standard Minor Global Crop Staple Crop: ProteinAs an annual suites hardiness zones 1-12. Heat zone: 12-1. As a perennial hardiness zones 10-12. Requires a warm sheltered sunny position in a rich well-drained soil with plenty of moisture in the growing season[1, 16, 37, 200]. Dislikes heavy, wet or acid soils[16]. Prefers a pH in the range 6 to 7[200]. The runner bean is commonly cultivated in many parts of the world for its edible seeds and immature seedpods, there are many named varieties[183]. Most varieties are climbing plants but some dwarf forms have been developed[200]. Plants are perennials but are often grown as annuals, especially in the temperate zone. Plants flower under long day conditions, which is ideal for temperate regions[200]. When grown for their edible pods, the immature pods should be harvested regularly in order to promote extra flower production and therefore higher yields[200]. The perennial roots will survive mild winters outdoors in many parts of the country, especially if given a protective mulch in late autumn, they will then give an earlier but lighter crop the following year. They can also be dug up in late autumn and stored like dahlias in a cool but frost free place over winter and replanted in the following spring. The plants might need some protection from slugs since these creatures adore the young shoots in the spring[K]. Runner beans grow well with carrots. cauliflowers, cucumbers, cabbage, leek and celeriac[18, 20]. They are inhibited by alliums and fennel growing nearby [18, 20]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Carbon Farming - Cultivation: regional crop. Management: standard. Phaseolus coccineus ssp.polyanthus (Cache Bean) is also worth considering as a carbon farming plant. It is similar to Phaseolus coccineus but more suited to tropical highlands and semi-arid conditions.

#### 2.2 mran

# 2.2.1 Pinus contorta

Beach Pine, Lodgepole pine, Bolander beach pine, Beach pine, Sierra lodgepole pine, Yukon pine, Shor

1 tlin 7 cyuc 3 kcak 0 tcan 2 dwat 15 m hkuc

htut cyutli hgatkyuctcuphja7n hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus contorta is an evergreen Tree growing to 15 m (49ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in May, and the seeds ripen from January to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate maritime

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222]. kcakta Edible Parts: Inner bark Sap SeedEdible Uses: Condiment GumInner bark - raw or cooked[2, 94, 105, 161,

257]. It can be used fresh or dried. It is mashed into a pulp and made into cakes then baked[94]. Harvested in early spring, the taste is not unpleasant, but it develops a strong taste of turpentine as the season advances[2]. The inner bark is ready to harvest when the male cones are producing pollen[257]. A famine food, it is only used when all else fails. Sap - collected in spring and used as a drink[161, 177]. Seed - raw or cooked[257]. A gum is made from the pitch obtained from the trunk. It is allowed to harden and used for chewing[257]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Adhesive Dve Fuel Gum Herbicide Pitch String Waterproofing WoodA tan or green dye is obtained from the needles[168]. The roots have been braided by the N. American Indians to make a rope[226]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. A pitch obtained from this tree is used for waterproofing canoes, baskets, shoes etc and as a glue[64, 99, 226, 257]. It has also been used to preserve wood baskets etc[257]. The pitch is not a commercially important crop[64]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4. 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - straight but coarse-grained, light, hard, strong, brittle[60, 82]. It varies from light and soft to hard and heavy[229]. Easily worked, it is used for general construction, posts, poles, pulp etc[60, 82, 99, 171, 226, 229]. It makes a good fuel, burning well even when green because it is rich in pitch[99, 226].

dwatta Antiseptic Blood purifier Cathartic Diuretic Pectoral Poultice Salve TB Tonic VD VulneraryBeach pine was widely employed medicinally by several native North American Indian tribes who used it especially for its antisentic and healing properties on wounds, infections etc, and also for its beneficial effects upon the chest and lungs[257]. It is little, if at all, used in modern herbalism. The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient, vermifuge and vulnerary[4, 257]. It is a valuable remedy when taken internally in the treatment of kidney and bladder complaints and can be used both internally and externally in the treatment of rheumatic affections[4, 257]. It is also used in treating diseases of the mucous membranes and respiratory complaints[4, 257]. Externally it is used in the form of liniment plasters and poultices in treating a range of skin complaints, wounds, boils etc[4, 257]. A decoction of the young shoots has been used in the treatment of stomach pains[257]. The young buds have been chewed in the treatment of a sore throat [257]. The inner bark has been eaten as a blood purifier, diuretic and cathartic[257]. A decoction has been used as a tonic and in the treatment of coughs, colds. consumption and gonorrhoea[257].

nrakta Western N. America - Alaska to California. ksacta Coastal dunes and sphagnum covered bogs to montane dry or moist areas[60, 82]. Trees growing inland are much larger than those growing near the coast[60].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This

on in a greenhouse for their first winter. Plant out in late spring into their permanent positions. Male seedlings, in spring, have very prominent axillary buds whilst females are clear and smooth at this time[78]. Cuttings of half-ripe wood, June/July in a frame[200]. Difficult[113]. This is the easiest method of vegetative propagation[214]. Cuttings of mature wood in autumn[200]. Difficult[113]. The cuttings should be taken at the end of autumn or very early in the spring before the buds burst. Store them in sand and peat until April, cut into 7 - 9cm lengths and plant them in a plastic tent with bothom heat[214]. Roting should take place within 2 months and they can be put in their permanent positions in the autumn[214]. Division of suckers in the winter. They can be planted out direct into their permanent positions and usually establish well and quickly[K]. Layering in autumn[200].

nwatta Succeeds in most soils so long as they are not too dry[200]. Grows well by water[1, 11]. A fast-growing and very wind-resistant tree, it is an excellent pioneer species for re-establishing woodlands[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -10°c[200]. Members of this genus are attracting considerable interest from breeding institutes for their nutrient-rich fruits that can promote the general health of the body (see edible and medicinal uses below)[214]. The deeply cleft bark favours the growth of epiphytes[146]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Dioecious. Male and female plants must be grown if seed is required.

# 4.1.2 Hippophae rhamnoides

Sea Buckthorn, Seaberry tfo2n 3 tlin 7 cyuc 5 kcak 5 tcan 5 dwat 6 m hkuc htut cyutli hgatkyuctcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien hjonli

drutta Hippophae rhamnoides is a deciduous Shrub growing to 6 m (19ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Some reports suggest that the fruit is poisonous[13, 100], whilst it may be very acid it is most definitely not poisonous[65]. Avoid during pregnancy.

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit - raw or cooked. Very rich in vitamin C (120mg per 100g)[74] and vitamin A[183], they are too acid when raw for most peoples tastes[11, 158], though most children seem to relish them[K]. Used for making fruit juice, it is high in vitamins and has an attractive aroma[141]. It is being increasingly used in making fruit juices, especially when mixed with other fruits, because of its reputed health benefits[214]. The fruits of some species and cultivars (not specified) contain up to 9.2% oil[214]. The fruit is very freely borne along the stems[K] and is about 6 - 8mm in diameter[200]. The fruit becomes less acid after a frost or if cooked[74]. The fruit is ripe from late September and usually hangs on the plants all winter if not eaten by the birds. It is best used before any frosts since the taste and quality of frosted berries quickly deteriorates[214].

tcanta Charcoal Cosmetic Dye Fodder Fuel Oil Pioneer Soil stabilization WoodVery tolerant of maritime exposure[29, 49, 75, 182], it can be used as a shelter hedge. It dislikes much trimming[75]. A very thorny plant, it quickly makes an impenetrable barrier. Sea buckthorn has an extensive root system and suckers vigorously and so has been used in soil conservation schemes, especially on sandy soils. The fibrous and suckering root system acts to bind the sand[186, 244]. Because the plant grows quickly, even in very exposed conditions, and also adds nitrogen to the soil, it can be used

as a pioneer species to help the re-establishment of woodland in difficult areas. Because the plant is very light-demanding it will eventually be out-competed by the woodland trees and so will not out-stay its welcome[K]. The seeds contain 12 - 13% of a slow-drying oil[240]. The vitamin-rich fruit juice is used cosmetically in face-masks etc[9]. A yellow dye is obtained from the fruit[74]. A yellow dye is obtained from the stems, root and foliage[4]. A blackish-brown dye is obtained from the young leaves and shoots[74]. Wood - tough, hard, very durable, fine-grained. Used for fine carpentry, turning etc[46, 61, 74]. The wood is also used for fuel and charcoal[146].

dwatta Astringent Cancer Cardiac Eczema Poultice Tonic Vermifuge Vitamin CThe twigs and leaves contain 4 - 5% tannin[240]. They are astringent and vermifuge[7, 100]. The tender branches and leaves contain bio-active substances which are used to produce an oil that is quite distinct from the oil produced from the fruit. Yields of around 3% of oil are obtained[240]. This oil is used as an ointment for treating burns[214]. A high-quality medicinal oil is made from the fruit and used in the treatment of cardiac disorders. it is also said to be particularly effective when applied to the skin to heal burns, eczema and radiation injury, and is taken internally in the treatment of stomach and intestinal diseases[214]. The fruit is astringent and used as a tonic[9] 254]. The freshly-pressed juice is used in the treatment of colds. febrile conditions, exhaustion etc[9]. The fruit is a very rich source of vitamins and minerals, especially in vitamins A. C and E. flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The juice is also a component of many vitamin-rich medicaments and cosmetic preparations such as face-creams and toothpastes[9]. A decoction of the fruit has been used as a wash to treat skin irritation and eruptions[254].

nrakta Europe, including Britain, from Norway south and east to Spain and Asia to Japan and the Himalayas. ksacta Usually found near the coast, often forming thickets on fixed dunes and sea cliffs[9, 17, 244].

propta Seed - sow spring in a sunny position in a cold frame[78]. Germination is usually quick and good although 3 months cold stratification may improve the germination rate. Alternatively the seed can be sown in a cold frame as soon as it is ripe in the autumn. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a greenhouse for their first winter. Plant out in late spring into their permanent positions. Male seedlings, in spring, have very prominent axillary buds whilst females are clear and smooth at this time[78]. Cuttings of half-ripe wood, June/July in a frame[200]. Difficult[113]. This is the easiest method of vegetative propagation[214]. Cuttings of mature wood in autumn[200]. Difficult[113]. The cuttings should be taken at the end of autumn or very early in the spring before the buds burst. Store them in sand and neat until April, cut into 7 - 9cm lengths and plant them in a plastic tent with bottom heat[214]. Rooting should take place within 2 months and they can be put in their permanent positions in the autumn[214]. Division of suckers in the winter. They can be planted out direct into their permanent positions and usually establish well and quickly[K]. Layering in autumn[200].

nwatta Agroforestry Services: Alley crop Agroforestry Nitrogen Agroforestry Services: break Fodder: Bank Industrial Crop: Biomass Management Coppice Management: Standard Other Systems: Strip intercrop Staple Crop: OilLandscape Uses:Border, Seashore, Specimen. Succeeds in most soils[200], including poor ones[186], so long as they are not too dry[182, 200]. Grows well by water and in fairly wet soils[182]. Established plants are very drought resistant[186]. Requires a sunny position[3], seedlings failing to grow in a shady position and mature shrubs quickly dying if overshadowed by taller plants[186]. Does well in very sandy soils[1, 186]. Very tolerant of maritime exposure[75]. Plants are fairly slow growing[75]. Although usually found near the coast in the wild. they thrive when grown inland[11] and are hardy to about -25°c[184]. A very ornamental plant[1, 11], it is occasionally cultivated, especially in N. Europe, for its edible fruit, there are some named varieties[183]. 'Leikora' is a free-fruiting form, developed for its ornamental value. Members of this genus are attracting considerable interest from breeding propta Propagate by seed, or clump division in early spring. Can be cut back regularly during its growing season.

nwatta A North American native low maintenance sedge. Prefers a sandy or gravelly soil with a neutral to alkaline pH. Prefers a medium moisture, well-drained soil but will tolerate dry conditions. Very tough tolerating heat and drought. It handles dry conditions best when planted in shade. Light: Sun: Part shade to full shade. USDA Hardiness Zone: 2 to 8. Bloom Time: April. Tolerate: Deer, Heavy Shade. Plants spread slowly by rhizomes. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

# 3.2.47 Gymnocarpium dryopteris

Northern oak fern 2 tlin 7 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc pcimhmim cyutli kyuctcuphja7n hwicli hrasjlut hpa7tli frusflatpriklwis hpa7tmwatli hionli

drutta Gymnocarpium dryopteris is a deciduous Fern growing to 0.3~m (1ft) by 0.3~m (1ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil.

pcista None Known

kcakta None Known

tcanta A good medium density groundcover for a woodland garden; their lush, bright green fronds brighten a dark forest floor. Grizzly Bear and Elk have been observed eating Oak Fern. Locations: Accent: Good Texture/Form. Flower borders and beds. Ground Cover. Cottage and Informal. Garden Architectural. Massed. Wild Flower. Woodland. Cut Flower (leaf). Containers.

nrakta Widespread across much of North America and Eurasia. It has been found in Canada, the United States, Greenland, China, Japan, Korea, Russia, and most of Europe. ksacta Shady, moist woods, streambanks and wet cliffs preferring mixed coniferous forests. It is equally likely to occur in wetlands or non-wetlands.

propta Sow spores at 15°C (59°F) when ripe or divide in spring

nwatta A small deciduous Mat forming fern with a slender creeping rhizome, and much-divided, triangular to ovate fronds. USDA Hardiness Zones: 2 - 7. Soil pH: 4.5 - 6.4. Growth Rate: Slow to moderate. Life Span: Long. Texture: Fine. Sun: Partial Shade, Shade. Prefers a neutral to acid, leafy, moist soil, enriched with garden compost, in deep shade. Soil Type: Loamy. Soil Moisture: Moderate. Minimum Root Depth: 12 inches (30cm), Root Type: Long Rhizome. Seasonal Interest: Spring-Fall. The broadly triangular leaves are divided into 3 approximately equal primary divisions, each turned to a heavily horizontal position. Sprawling, it often shows slightly twisted leaves and leaflets. Requires cool, moist, acidic soil. Good ground cover. Drought: Intolerant. Flood: Moderate. Salt: Sensitive. Soil Compaction: Intolerant. Mowing: Intolerant. Fire Damage: Intolerant. Cold Injury: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Plant Concerns: Oak fern can interfere with the growth of Engelmann spruce (Picea engelmannii) seedlings. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

# 4 3 tlin

# **4.1** bwon

# 4.1.1 Hippophae salicifolia

Willow-Leaved Sea Buckthorn

tfo2n 3 tlin 7 cyuc 5 kcak 5 tcan 3 dwat 15 m hkuc htut cyutli kyuctcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Hippophae salicifolia is a deciduous Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 46]. A very nutritious food, and possibly the most nutritious fruit that can be grown in temperate climates. It is very rich in vitamins, especially vitamin C, plus minerals and bioflavonoids, and is also a source of essential fatty acids[214]. It comes ripe in late summer, though it can be eaten for about a month before this, and will hang on the tree until mid-winter, by which time the flavour has become much milder, though it has also become very soft and difficult to pick[K]. We and many of our visitors really like this fruit, however the flavour is somewhat like a sharp lemon and a lot people find this too acid for them[K]. It also makes a good salad dressing[K]. The fruits of some species and cultivars (not specified) contain up to 9.2% oil[214]. The fruit is used for making preserves[105, 183]. It is being increasingly used in making fruit juices, especially when mixed with other fruits, because of its reputed health benefits[214]. The fruit becomes less acid after a frost or if cooked[74].

tcanta Fuel Pioneer Soil stabilization WoodThe plant is very fast growing, even in areas exposed to maritime winds, and it makes an excellent pioneer species for providing shelter and helping to establish woodland conditions. The plant is very light-demanding and so will eventually be shaded out by the woodland trees, thus it will never out-stay its welcome[K]. The trees have an extensive and vigorous root system and sucker freely once established. They are thus excelent for stabilising the soil, especially on slopes, and are often planted in the Himalayas to prevent land slips on the mountain slopes and create conditions for the re-establishment of woodlands[K]. The wood is very tough and hard - it can be used for many purposes including wheel hubs and other applications where toughness is essential[K]. It is also used for fuel 1461.

dwatta Cancer Cardiac Eczema Poultice Vitamin CThe tender branches and leaves contain bio-active substances which are used to produce an oil that is guite distinct from the oil produced from the fruit. This oil is used as an ointment for treating burns[214]. A high-quality medicinal oil is made from the fruit and used in the treatment of cardiac disorders, it is also said to be particularly effective when applied to the skin to heal burns, eczema and radiation injury, and is taken internally in the treatment of stomach and intestinal diseases[214]. The fruit is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Himalayas. ksacta Alluvial gravel, wet landslips and riversides to 3500 metres[51].

propta Seed - sow spring in a sunny position in a cold frame[78]. Germination is usually quick and good although 3 months cold stratification may improve the germination rate. Alternatively the seed can be sown in a cold frame as soon as it is ripe in the autumn. Prick out the seedlings into individual pots when they are large enough to handle and grow

method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses:Alpine garden, Screen, Seashore, Specimen, Woodland garden. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Tolerates water-logged soils[81]. Succeeds in exposed maritime positions[49, 81]. Established plants tolerate drought[200]. The coastal form of this species is a very fast growing tree, especially when young, with new growth of 1 metre or more per year[185]. The forms from coastal Washington and Oregon do best in Britain. The subspecies P. contorta latifolia is normally slower growing than the species type though it is sometimes faster in some inland sites at higher altitudes[185]. New growth takes place from mid-April until early July[185]. Trees are long-lived, with specimens 600 years old recorded[229]. Extensively cultivated for timber in N. Europe[50, 200], this is an aggressive colonizing species that can form huge pure stands following a forest fire or clear-felling an area for timber[226]. Trees can be shrubby in habit when they are grown on poor sites[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow below the tree[18]. There are some named forms, selected for their ornamental value[188]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. This species hybridises in the wild with P. banksiana where their ranges overlap[226]. Trees come into flower at an early age. usually between 6 and 10 years[229]. Good seed crops are produced every 1 - 3 years[229]. The cones are 2 - 5cm long[82], they open and shed their seed whilst still attached to the tree[226], though many of the cones will remain unopened on the tree, preserving the vitality of the seeds until they are stimulated to open by excessively hot weather or a forest fire[82, 229]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American

# 2.2.2 Equisetum scirpoides

Dwarf scouring rush

1 tlin 9 cyuc 2 kcak 3 tcan 2 dwat 0.2 m hkuc pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Equisetum scirpoides is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista None Known

kcakta Edible Parts: Root StemEdible Uses: The root tubercles can be eaten raw. Sterile stems are dried, ground to a powder and used for thickening or to make a mush. This powder has also been used to make a tea, and is sold in some grocery stores. Underground stems and roots are eaten raw, with or without lard, and are sometimes put in Indian icecream. Underground stems and roots are food to some native American groups. They are collected in the spring by water, and are sweet and juicy then, much relished as the first fruit of the season (flora.dempstercountry.org).

tcanta Groundcover: A medium density moderately good groundcover. The coarse green stems are used to scrub pots and clean dishes. Larger horsetails have the ability to absorb heavy metals from soil and are often used in remediation projects involving heavy metal contaminants. Wildlife Benefits: Amphibians, Cover, Fish, Food, Nesting, Waterfowl. Containers. Dynamic Accumulator.

dwatta We found no specific reference to this species but in general horsetails have an unusual chemistry compared to most other plants; they are rich in silica, more than 35%, contain several alkaloids (including nicotine) and various minerals. Horsetail is very astringent and makes an excellent clotting agent, staunching wounds, stopping nosebleeds and reducing the coughing up of blood. It helps speed the repair of

damaged connective tissue, improving its strength and elasticity. Horsetail provides a naaturally occurring source of organic silica. It is therefore a remedy for conditions where there is an inability to absorb and retain silica. When this occurs there are weaknesses in the hard structures of the body. The hair becomes thin, fails to thrive, and fizzles away into split ends. The nails are often weak, breaking easily, with hangnails and lingering infections about the nail. In homeopathy, silica is known as the "homeopathic scalpel," because of its ability to act like a blade, like flint, to cut, to bring matters to the surface and to heal charitably. It cuts in, opens tissues, and releases pus and corrupted material, while cleansing and reincarnating flesh. It has a centripetal effect, removing heavy, unneeded materials to the surface and out.

nrakta Native to northern Eurasia and America. ksacta Tundra, mossy places, and woods. Stems often partly buried in humus. Part shade, shade; moist woods, peat bogs, shady, mossy wetlands.

propta Rhizome sections. Horsetail plants produce the best rhizomes for propagation in the spring. Lengths of these underground stems, typically about 6 inches, with healthy shoots emerging from their joints produce the healthiest new plants.

nwatta A Long-lived perennial evergreen with fibrous roots and the smallest living horsetail. Can be used as an aquatic fern. Light requirement: Sun , Part Shade , Shade. Soil moisture: moist or wet (recommended water depth over crown of plant: 0 - 3cm (0 - 1 inch)). Water quality: pH 5.6-6.5. Useful for winter interest in a small pond, barrel, or tub garden, especially in shady areas. Pond Zone: flood plain -Upland. High marsh - saturated, soil spores shed from July through August, or persisting unopened until the following summer. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Evergreen. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. Not a flowering plant. Reproduces by spores contained within sporangia borne on peltate sporophylls.

# 2.2.3 Ambrosia trifida

Giant Ragweed, Great ragweed, Texan great ragweed, Bitterweed, Bloodweed, Buffalo Weed, Horse Cane 1 tlin 11 cyuc 1 kcak 1 tcan 3 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ambrosia trifida is a ANNUAL growing to 2 m (6ft 7in) at a medium rate. It is in flower from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista The pollen of this plant is a major cause of hayfever in N. America[222]. Ingesting or touching the plant can cause allergic reactions in some people[222].

kcakta Edible Parts: OilEdible Üses: OilThis plant was cultivated by the pre-Columbian N. American Indians, seeds found in pre-historic sites are 4 · 5 times larger than those of the present-day wild plant, which seems to indicate selective breeding by the Indians[207]. The following report is for A. artemesifolia, it quite possibly also applies to this species[K]. An oil is obtained from the seed. It has been suggested for edible purposes because it contains little linolenic acid[61, 183]. The seed contains up to 19% oil[61], it has slightly better drying properties than soya bean oil[183].

tcanta Dye OilA red colour is obtained from the crushed heads[207]. (This probably refers to the seed heads[K].) The sap of the plant can stain the skin red[274]. A positive impact may be seen with a noted decrease in the numbers of plant-parasitic nematodes found in soyabean fields where A. trifida is present (Wang et al., 1998).

dwatta Antidote Astringent Emetic Poultice Skin Women's complaintsThe leaves are very astringent, emetic

and febrifuge[222, 257]. They are applied externally to insect bites and various skin complaints, internally they are used as a tea in the treatment of pneumonia, fevers, nausea, intestinal cramps, diarrhoea and mucous discharges[222]. The juice of wilted leaves is disinfectant and is applied to infected toes[257]. A tea made from the roots is used in the treatment of menstrual disorders and stroke[222]. The pollen is harvested commercially and manufactured into pharmaceutical preparations for the treatment of allergies to the plant[222].

nrakta Eastern N. America - Quebec to Florida, west to Manitoba, Colorado and Mexico. ksacta Alluvial waste places, sometimes forming vast pure stands[222].

propta Seed - we have no details for this species but suggest sowing the seed in situ in April.

nwatta We have very little information on this species but suggest growing it in a sunny position in a well-drained soil[K]. This plant is sometimes cultivated by the N. American Indians for food and medicine[207]. Special Features: North American native, Invasive, Inconspicuous flowers or blooms.

# 3 2 tlin

# **3.1** bwon

# 3.1.1 Caragana arborescens

Siberian Pea Tree, Siberian peashrub tfo2n 2 tlin 7 cyuc 5 kcak 4 tcan 1 dwat 6 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Caragana arborescens is a deciduous Shrub growing to 6 m (19ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Reports that this plant contains toxins have not been substantiated[65]. The occurrence of cystine in the seeds is doubtful[65].

kcakta Edible Parts: Oil Seed SeedpodEdible Uses: OilSeed - cooked[2, 105]. Small but produced in abundance[11], there are 4 - 6 seeds per pod[202]. A bland flavour, it is best used in spicy dishes[183]. The raw seed has a mild pea-like flavour, though we are not sure if it should be eaten in quantity when raw[K]. The seed contains 12.4% of a fatty oil and up to 36% protein[183, 269], it has been recommended as an emergency food for humans[65]. More than just an emergency food, this species has the potential to become a staple crop in areas with continental climates[K]. Young pods - cooked and used as a vegetable[46, 61, 105, 177, 183, 2691,

tcanta Companion Dye Fibre Hedge Hedge Oil Shelterbelt Soil stabilizationA fibre obtained from the bark is used for making cordage[46, 61, 74, 269]. A blue dye is obtained from the leaves[74, 269]. The seed contains 12.4% of a fatty oil[74]. The plant can be grown as a hedge[160]. It is quite wind-resistant and can also be planted in a shelterbelt[200]. The plant has an extensive root system and can be used for erosion control, especially on marginal land[160]. Because of its nitrogen-fixing capacity, it is valued as a soil-improving plant[269].

dwatta Cancer EmmenagogueThe whole plant, known as ning tiao, is used in the treatment of cancer of the breast, and the orifice to the womb, and for dysmenorrhoea and other gynaecological problems[269].

nrakta E. Asia - Siberia to Mongolia. Occasionally naturalized in Europe in France[50]. ksacta River banks, pebbles, sands, open forests and forest edges, gully slopes and stony slopes[74].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It usually germinates in 2 weeks[K]. Stored seed should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen then scarify it and re-soak for another 12 hours before sowing[138]. Germination usually takes place within 2 - 3 weeks at 20°c[138]. Good percentage[11]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. There are approximately 40,000 seeds per kilo[269]. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[113]. Layering in spring.

nwatta Agroforestry Services: Living fence Agroforestry Nitrogen Agroforestry Services: break Industrial Crop: Biomass Management: pice Management: Standard Minor Global Crop Staple Crop: ProteinSucceeds in most well-drained soils, preferring full sun and a light sandy dry or well-drained soil[1, 11, 200]. Tolerates very alkaline soils[202]. Plants do not require a rich soil[1, 11, 108], succeeding on marginal land[160]. Established plants are drought resistant[160]. Fast growing[188]. Dormant plants are hardy to about -30°c[184], they prefer a continental climate and do not grow so well in areas that do not have very cold winters[200]. They grow and fruit very well in the eastern half of the country, even in northern areas, though they do not do so well in the wetter west[K]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. The Siberian pea shrub has an excellent potential to become a staple food crop. The seed is nutritious and wholesome, although rather small it is often very freely borne and is easily harvested[K]. This species has also been recommended as a nitrogen-fixing windbreak and ground cover plant that binds the soil and produces fibre and dye stuffs[218]. C. boisii and C. fruticosa are closely related to this species[182] and can probably be used similarly[K]. A very ornamental plant, some named forms have been developed for their ornamental value[182]. 'Nana' is a very compact dwarf form[183] that grows slowly[11]. 'Pendula' has stiffly pendent branches but is otherwise the same as the type species[11]. A good bee plant[74]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

### 3.1.2 Phaseolus vulgaris

French Bean, Kidney bean

tfo2n 2 tlin 11 cyuc 5 kcak 2 tcan 2 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli fvifxre7t hionli

drutta Phaseolus vulgaris is a ANNUAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is frost tender. It is in leaf from May to October, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

pcista Large quantities of the raw mature seed are poisonous[10, 65]. Children eating just a few seeds have shown

nrakta Eurasia - European Russia, Ukraine, Moldova, Romania, Bulgaria, Russian Caucasus, western Siberia, Kazakhstan, Kyrgyzstan, western China ksacta Shrub thickets among feather-grass steppes and steppelike meadows, dry slopes, riverside terraces, shore cliffs, forest margins, and mixed or pine forests[74].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It usually germinates in 2 weeks[K]. Stored seed should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen then scarify it and re-soak for another 12 hours before sowing[138]. Germination usually takes place within 2 - 3 weeks at 20°c[138]. Good percentage[11]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, mid summer in a frame[113]. Layering in spring.

nwatta Caragana frutex prefers a continental climate with its hot summers, cold winters and usually a clear movement from one season to another. The dormant plant can tolerate temperatures down to at least -30°c, but in more maritime climates it is often tempted to come into growth early and this new growth can easily be damaged by late spring frosts[200]. Prefers full sun and a light sandy dry or well-drained soil[1, 11, 200]. Does not require a rich soil, succeeding on marginal land[11]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Profusely-branched, deciduous shrub; it can grow 50 - 150cm tall, occasionally to 300cm[11, 74]. The plant produces long, often erect, supple branches, that are not much divided except near the ends[11]. The plant produces suckers and can spread to form a thicket of growth[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1). For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

# 3.2.44 Helianthus decapetalus

Thinleaf sunflower

2 tlin 8 cyuc 0 kcak 2 tcan 0 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Helianthus decapetalus is a PERENNIAL growing to 1.2 m (4ft) by 1.2 m (4ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known kcakta None Known

tcanta Cut Flowers or Dried Flowers. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2].

nrakta Native to the Eastern and Central United States and Canada, from New Brunswick west to Iowa, Wisconsin, and Ontario, south as far as Georgia and Louisiana. ksacta Open woodlands, woodland borders, savannas, partially shaded areas along rivers, meadows, and thickets, Widespread in beech, maple, and red oak forests, especially at borders and openings.

propta

nwatta An attractive upright rhizomatous perennial wildflower. Prefers partial sun or dappled sunlight, moist to mesic conditions, and a rich loamy soil. Like other perennial sunflowers, this species may spread aggressively in some situations. Time to full growth: 2 to 5 years. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their

# 3.2.45 Polytrichum commune

Common haircap. Great golden maidenhair. 2 tlin 10 cyuc 0 kcak 3 tcan 1 dwat 0.2 m hkuc pcimhmimhtut cyutli tcuphja7n hwicli hyishrasjlutnyik

hpa7tli frusflat hpa7tmwatli hjonli drutta Polytrichum commune is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. The

flowers are pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista None Known kcakta None Known

tcanta A low to medium density groundcover with a mat forming habit. An Ornamental for shady, damp areas. It is used by some people to make a tea to dissolve kidney and gall bladder stones (borealforest.org). Good for hair, Made into a tea to rinse to strengthen hair. Stems have been woven and used to make baskets (tolweb.org).

dwatta Used by some people to make a tea to dissolve kidney and gall bladder stones (borealforest.org).

nrakta Widely distributed throughout temperate and boreal latitudes in the Northern Hemisphere and also found in Mexico, several Pacific Islands including New Zealand, and also in Australia. ksacta Typically grows in bogs, wet heathland and along forest streams.

propta Spores. During the summer spores are released and carried by the wind.

nwatta Prefers lightly shaded areas with moist slightly acidic soil, it can also survive in areas of full sunlight provided the soil is moist. Can also grow in areas of poor soil and slow drainage. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2].

# 3.2.46 Carex eburnea

Bristleleaf sedge

2 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc

pcimhmim cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Carex eburnea is an evergreen Perennial growing to 0.3 m (1ft) by 0.3 m (1ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Wind, Insects, Suitable for: light (sandy). medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

pcista None Known

tcanta Ground cover. An attractive first-rate ground cover. Shade and drought tolerant. Good for forest gardens, Rock gardens and shade gardens. An effective accent for smaller gardens. Lawn Alternative.

dwatta None Known

35

nrakta Eastern and central North America ksacta Commonly occurs in conifer or mixed forests crevices of limestone bluffs in the Ozark, US. It is also known to grow in drier sandy soils, particularly on limestone outcroppings and glades.

are also used in allopathic medicine[244]. However, because of the plants potential toxic properties it should never be used without expert advice[9]. All parts of the plant are antispasmodic, cardiotonic, strongly diuretic, emetic, febrifuge, laxative and sedative[4, 7, 9, 21, 46, 165, 222, 254]. The plant is usually harvested when in flower and can be dried for later use[4], though it is stronger acting when fresh[238]. The inflorescence is said to be the most active medicinally and is often harvested separately[4]. An infusion of the flowers and roots is a digitalis substitute (obtained from Digitalis species), though less powerful, that is especially useful in the treatment of valvula heart diseases, cardiac debility, dropsy and chronic lung problems such as emphysema[4, 222, 254]. Lily of the valley encourages the heart to beat more slowly, regularly and efficiently, at the same time it is strongly diuretic, reducing blood volume and lowering blood pressure[254]. Its effect is less cumulative than digitalis which makes it safer for elderly patients[238]. It is often prescribed combined with the fruits of Crataegus spp[238]. An ointment made from the roots is used in the treatment of burns and to prevent scar tissue[222]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Convallaria majalis: Lily Of The Valley for arrhythmia, cardiac insufficiency, nervous heart complaints (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia to Spain east to N.E. Asia, Greece and the Caucasus. ksacta Dry shady woodland, usually on calcareous soils[7, 13, 17], and especially in ash woodlands[4].

propta Seed - best sown as soon as it is ripe, otherwise in late winter, in a cold frame[164]. Germination, particularly of stored seed can be very slow, taking 2 - 12 months or more at 15°c[164]. Sow the seed thinly so that the seedlings can be allowed to grow on undisturbed in the pot for their first year. Apply a liquid feed during the growing season to ensure that the seedlings are well fed. Divide the young plants into individual pots when they die down in late summer and grow them on in pots in a shady position in a cold frame for at least another year before planting them out into their permanent positions when they are dormant[K]. Division in September[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Erosion control. Ground cover. Massing, Specimen, Woodland, garden Succeeds in almost any situation, including the dense dry shade of large trees[1, 4, 24]. Prefers a position in semishade in a moderately fertile well-drained moist woodland soil[200, 208]. Grows well in heavy clay, sand or chalky soils[208]. Dislikes pure clay soils and boggy sites[233]. Plants are hardy to -20°c or lower[200]. A polymorphic species[200]. It is a very ornamental plant, though it can become very invasive once it is established[28]. Plants can take a couple of years to become established[208]. There are several named varieties, selected for their ornamental value[233]. The flowers are sweetly scented[245]. Lily of the valley is occasionally cultivated as a medicinal plant for herbalists and allopaths. Plants seem to be immune to the predations of rabbits[233]. A good bee plant[4]. Special Features: Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers, Fragrant

# 3.2.42 Salix cinerea

Grev Willow, Large grav willow 2 tlin 7 cyuc 0 kcak 3 tcan 3 dwat 5 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix cinerea is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from March to April, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet

soil. The plant can tolerates strong winds but not maritime

tcanta Pioneer Soil stabilizationLandscape Uses: Border, Massing, Specimen. Plants have an extensive root system and are used to stabilize waste tips and old slag heaps[199]. The seeds are very light and so can travel some distance in the wind. The plant is therefore able to find its way to areas such as cleared woodland where the soil has been disturbed. Seedlings will grow away guickly, even in exposed conditions and the plant will provide good shelter for the establishment of woodland plants. Thus it makes a good pioneer species and, except in wetter and moorlandtype soils, will eventually be largely out-competed by the other woodland trees. It's main disadvantage as a pioneer plant is that it has an extensive root system and is quite a greedy plant, thus it will not help as much in enriching the soil for the other woodland plants as other pioneer species such as the alders. Alnus species[K], Special Features: Not North American native, Wetlands plant, Attractive flowers or blooms. Dynamic accumulator.

dwatta Anodyne Dysentery FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226]. The bark of this species is used interchangeably with S. alba. It is taken internally in the treatment of rheumatism, arthritis, gout, inflammatory stages of autoimmune diseases, diarrhoea, dysentery, feverish illnesses, neuralgia and headache[238]. The bark is removed during the summer and dried for later use[238]. The leaves are used internally in the treatment of minor feverish illnesses and colic[238]. The leaves can be harvested throughout the growing season and are used fresh or dried[238].

nrakta Europe, including Britain, from Scandanavia south and east to France. Siberia and Iran. ksacta Fens etc in E. England, it is often dominant in carr. Occasionally found in damp woods in other areas of England[17].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. A relatively slow-growing but extremely durable plant when growing in very exposed positions[199]. Closely related to S. capreal 111. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is re-

#### 3.2.43 Caragana frutex

2 tlin 7 cvuc 0 kcak 2 tcan 0 dwat 1.2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Caragana frutex is a deciduous Shrub growing to 1.2 m (4ft) by 1.2 m (4ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedpodEdible Uses: Caragana species are in the Legume Family, and well known for producing edible pods and peas. The pods are cylinder shaped and 2-3 cm long (1"). We could find no reference for this species is edible but it is likely!

tcanta Soil stabilizationAgroforestry Uses: The plant is useful for stabilizing soil on slopes[74]. Fixes nitrogen [1-2]. Other uses: Grown as an ornamental in gardens[74].

mild forms of poisoning with nausea and diarrhoea, though complete recovery took place in 12 - 24 hours[269]. The toxins play a role in protecting the plant from insect predation[76].

kcakta Edible Parts: Leaves Seed SeedpodEdible Uses: Coffee Coffee CondimentImmature seedpods - raw or cooked[46, 105]. The green pods are commonly used as a vegetable, they have a mild flavour and should only be cooked for a short time. When growing the plant for its seedpods, be sure to pick them whilst they are still small and tender. This will ensure the continued production of more pods by the plant. Flowering is reduced once the seeds begin to form inside the pods. The immature seeds are boiled or steamed and used as a vegetable[183]. The mature seeds are dried and stored for future use. They must be thoroughly cooked before being eaten and are best soaked in water for about 12 hours prior to this. They can be boiled, baked, pureed, ground into a powder or fermented into 'tempeh' etc[183]. The powdered seed makes a protein-enriching additive to flour, it can also be used in soups etc[K]. The seed can also be sprouted and used in salads or cooked[183]. The roasted seeds have been used as a coffee substitute[7]. Young leaves - raw or cooked as a potherb[177, 183]. The very young laves are sometimes eaten as a salad, the older leaves are cooked[269].

tcanta Biomass Dye Fungicide MiscellanyA brown dye is obtained from red kidney beans[168]. The plant contains phaseolin, which has fungicidal activity[218]. Water from the cooked beans is very effective in reviving woollen fabrics[7]. The plant residue remaining after harvesting the dried beans is a source of biomass[269].

dwatta Antiarthritic Antirheumatic Antitussive Cancer Diuretic Homeopathy Hypoglycaemic Hypotensive Miscellany Narcotic Narcotic UrinaryThe green pods are mildly diuretic and contain a substance that reduces the blood sugar level[218]. The dried mature pod is used according to another report[9]. It is used in the treatment of diabetes[9]. The seed is diuretic, hypoglycaemic and hypotensive[7]. Ground into a flour, it is used externally in the treatment of ulcers[7]. The seed is also used in the treatment of cancer of the blood[218]. When bruised and boiled with garlic they have cured intractable coughs[4]. The root is dangerously narcotic[4]. A homeopathic remedy is made from the entire fresh herb[9]. It is used in the treatment of rheumatism and arthritis, plus disorders of the urinary tract[9].

nrakta S. America? Original habitat is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 12 hours in warm water and sow in mid spring in a greenhouse. Germination should take place within 10 days. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts. The seed can also be sown in situ in late spring though it may not ripen its seed in a cool summer.

nwatta Requires a warm sunny position in a rich welldrained preferably light soil with plenty of moisture in the growing season[27, 37, 200]. Dislikes heavy, wet or acid soils[16, 37]. Prefers a pH in the range 5.5 to 6.5[200]. The French bean is commonly cultivated in the temperate and subtropical zones and in montane valleys of the tropics for its edible mature seeds and immature seedpods. It is often grown to provide a major part of the protein requirement[183, 269]. A very variable plant, there are more than 1,000 named varieties ranging from dwarf forms about 30cm tall to climbing forms up to 3 metres tall[183, 186, 200] 269]. Plants are not frost-tolerant, air temperatures below 10°c can cause damage to seedlings[200]. When grown for their edible pods, the immature pods should be harvested regularly in order to promote extra flower production and therefore higher yields[200]. Yields of green pods averages about 3kg per square metre, though double this can be achieved[200]. French beans grow well with strawberries, carrots, cauliflowers, cucumbers, cabbage, beet, leek and celeriac[18, 20]. They are inhibited by alliums and fennel growing nearby[18, 20]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

# 3.1.3 Elaeagnus angustifolia

Oleaster, Russian olive

tfo2n 2 tlin 7 cvuc 4 kcak 4 tcan 2 dwat 7 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Elaeagnus angustifolia is a deciduous Shrub growing to 7 m (23ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: GumFruit raw or cooked as a seasoning in soups[1, 2, 3, 100, 146, 74]. Dry, sweet and mealy[11, 145, 183]. The fruit can also be made into jellies or sherbets[183]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The oval fruit is about 10mm long[200] and contains a single large seed[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

tcanta Companion Essential Fodder Fuel Gum Hedge Hedge WoodPlants can be grown as a hedge in exposed positions[29], tolerating maritime exposure[200]. It is fairly fastgrowing and very tolerant of pruning, but is rather open in habit and does not form a dense screen[K]. Because the plant fixes atmospheric nitrogen, it makes a hedge that enriches the soil rather than depriving it of nutrients[K]. An essential oil obtained from the flowers is used in perfumery[74]. A gum from the plant is used in the textile industry in calico printing[74]. Wood - hard, fine-grained. Used for posts, beams, domestic items[74, 100], it is also much used for carving[245]. The wood is an excellent fuel[74, 146].

dwatta Cancer Febrifuge PectoralThe oil from the seeds is used with syrup as an electuary in the treatment of catarrh and bronchial affections[240]. The juice of the flowers has been used in the treatment of malignant fevers[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Europe to W. Asia, extending as far north as latitude 55° in Russia. ksacta By streams and along river banks to 3000 metres in Turkey[93].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate in late winter or early spring. though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates guite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Difficult[113]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, October/November in a frame[200]. The cuttings are rather slow and difficult to root, leave them for 12 months[113]. Layering in September/October. Takes 12 months[78]. Root cuttings in the winter[200]

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: pice Management: Standard Minor Global CropLandscape Uses:Screen, Specimen. An easily grown plant, it succeeds in most soils that are well-drained[200], though it dislikes shallow chalk soils[98]. Prefers a light sandy soil that is only moderately fertile[11], succeeding in poor soils and dry soils[11, 200]. Requires a position in full sun, growing very well in hot dry positions[182]. Plants are very drought and wind resistant[1, 166, 200], they tolerate conditions of considerable salinity and alkalinity[227]. A very hardy plant, tolerating temperatures down to about -40°c[184]. However, plants prefer a continental climate[49] and are apt to be cut back in severe winters in Britain because the summer is often not warm enough to have fully ripened the wood[1]. A very variable species[214]. This species is often cultivated in N. Europe for its edible fruits, there are many named varieties and some of these are thornless[214]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[160, 200]. An excellent companion plant. when grown in orchards it can increase yields from the fruit trees by up to 10%. Plants are very tolerant of pruning, they usually resprout freely even when cut right back to the ground. This species is notably resistant to honey fungus[88, 200]. The flowers are sweetly and heavily scented[184]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

# 3.1.4 Caragana boisii

Siberian peatree

tfo2n 2 tlin 9 cyuc 4 kcak 4 tcan 0 dwat 2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Caragana boisii is a deciduous Shrub growing to 2 m (6ft) by 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable H: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The following report belongs to the closely related C. arborescens. Reports that this plant contains toxins have not been substantiated[65]. The occurrence of cystine in the seeds is doubtful[65].

kcakta Edible Parts: Oil Seed SeedpodEdible Uses: OilThe following uses are for the closely related C. arborescens and can probably also be applied to this species[K]. Seed - cooked[2, 105]. Small but produced in abundance[11], there are 4 - 6 seeds per pod[202]. A bland flavour, it is best used in spicy dishes[183]. The raw seed has a mild pea-like flavour, though we are not sure if it should be eaten in quantity when raw[K]. The seed contains 12.4% of a fatty oil and up to 36% protein[183], it has been recommended as an emergency food for humans[65]. Young podscooked and used as a vegetable[46, 61, 105, 177, 183].

tcanta Dye Fibre Hedge Hedge Oil Shelterbelt Soil stabilizationThe following uses are for the closely related C. arborescens and can probably also be applied to this species[K]. A fibre is obtained from the bark, used for cordage[46, 61, 74]. A blue dye is obtained from the leaves[74]. The seed contains 12.4% of a fatty oil[74]. The plant can be grown as a hedge[160]. It is quite wind-resistant and can also be planted in a shelterbelt[200]. The plant has an extensive root system and can be used for erosion control, especially on marginal land[160].

nrakta E. Asia - China. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It usually germinates in 2 weeks[K], Stored seed

should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen then scarify it and re-soak for another 12 hours before sowing[138]. Germination usually takes place within 2 - 3 weeks at 20°c[138]. Good percentage[11]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[113]. Layering in spring.

nwatta Succeeds in most well-drained soils, preferring full sun and a light sandy dry or well-drained soil[1, 11, 200]. Tolerates very alkaline soils[202]. Does not require a rich soil[1, 11, 108], succeeding on marginal land[160]. Established plants are drought resistant[160]. Fast growing[188]. This species is hardy to at least -30°c[184], it prefers a continental climate with hot summers and cold winters so it does not grow so well in the milder western half of Britain[200]. This species is closely related to C, arborescens, differing in the longer teeth of the calyx and in the downy ovary and young fruit[11]. It can probably be used in all the ways C. arhorescens is used and therefore has an excellent notential for human food.[K]. A good bee plant[74]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 3.1.5 Myrica pensylvanica

Northern Bayberry tfo2n 2 tlin 9 cyuc 3 kcak 3 tcan 1 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatprikhsom hpa7tmwatli hionli

drutta Myrica pensylvanica is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid and saline soils. It can grow in semi-shade (light woodland) or no shade. It brefers dv or moist soil.

pcista There is a report that some of the constituents of the wax might be carcinogenic[222].

kcakta Edible Parts: FruitEdible Uses: CondimentFruit - raw or cooked. The fruit is about 4mm in diameter and contains a single large seed[200]. There is very little edible flesh and this is of poor quality[K]. The leaves and fruit are used as a food flavouring in soups etc[62, 102, 183]. A bay leaf substitute, imparting a delicate aroma and subtle flavour[183]. The herb is removed before the food is served[183].

tcanta Dye Hedge Hedge WaxA wax covering on the fruit is extracted by scalding the fruit with boiling water and immersing them for a few minutes, the wax floats to the surface and is then skimmed off. The fruit is then boiled in water to extract the wax from the pulp and once more the wax is skimmed off. It is then strained through a muslin cloth and can be used to make aromatic candles[46, 106, 171]. Candles made from this wax are quite brittle but are less greasy in warm weather[213]. They are slightly aromatic, with a pleasant balsamic odour[245], and do not smoke when put out, making them much more pleasant to use that wax or tallow candles[213]. The wax is also used in making soaps[213]. A green due is obtained from the leaves[106]. The plant is very wind hardy and can be grown as an informal hedge [200]. Carbon farming - Industrial Crop: wax. Agroforestry Services: nitrogen.

dwatta The root bark is astringent and emetic in large doses[222]. A tea made from the leaves is used in the treatment of fevers and externally as a wash for itchy skin[222].

nrakta Eastern N. America. Possibly naturalized in Britain in the New Forest. ksacta Dry or wet sterile soil near the coast[43]. Coastal dunes, pine barrens, pine-oak forests, old fields, bogs, edges of streams, ponds, and swamps from sea level to 325 metres[270].

ual pots and plant them out in the summer[111]. If you have sufficient seed then it can also be sown in situ outdoors.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Specimen. Succeeds in ordinary garden soil[11]. Prefers a fertile well-drained moisture retentive medium soil[111, 200]. Does well in sandy soils[188]. Requires a sunny position[111, 200]. Established plants are drought resistant[1]. A good bee plant[200]. Special Features: Attracts birds, North American native, Naturalizing, Wetlands plant, Attracts butterflies, Suitable for cut flowers.

# **3.2.40 Pinus mugo**

Dwarf Mountain Pine, Mugo pine, Mountain Pine 2 tlin 7 cyuc 1 kcak 0 tcan 2 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus mugo is an evergreen Tree growing to 4.5 m (14ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Edible Uses: Condimenta vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dve Essential Herbicide Shelterbelt Soil stabilization WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat [201]. Trees are sometimes planted as a shelterbelt at high altitudes[185]. There are a number of dwarf forms that are very useful for covering dry slopes and mounds[11]. An essential oil obtained from the young twigs is used medicinally and also in woody perfumeries[7, 46, 61]. Trees are planted for sand binding and shelter in N. Europe[50]. Oleoresins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - used to make shoes etc[46,

dwatta Antiasthmatic Balsamic Cardiotonic ExpectorantThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4]. The apical branches are antiasthmatic, balsamic, cardiotonic and expectorant[7, 61]. When distilled, the leaves and branches yield an essential oil that is commonly used in pharmaceutical balsamic preparations because of its antiseptic and expectorant qualities[7]. It is used internally and externally in the treatment of upper respiratory tract infections, chronic bronchitis, catarrh and asthma[238]. It is used externally to treat rheumatism and muscular stiffness[238].

nrakta Europe, from the Alps to S. E. Europe.. ksacta Mountainous regions[13].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses:Border, Christmas tree, Pest tolerant, Screen, Seashore, Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Thrives in the poorest of soils[11, 200]. Tolerates strong winds[81], including maritime exposure[200]. A polymorphic species, there are many named varieties[11]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. There are some named forms selected for their ornamental value[188]. Unlike most species of pine. this tree transplants well[11]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Fragrant foliage, Not North American native, Inconspicuous flowers or blooms.

# 3.2.41 Convallaria majalis

Lily Of The Valley, European lily of the valley 2 tlin 7 cyuc 1 kcak 3 tcan 3 dwat m hkuc pcimhmimhtut cyutli kyuctcuphja7n hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Convallaria majalis is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista All parts of the plant are poisonous[7, 10, 19]. However, the toxic principle is very poorly absorbed when taken orally so poisoning is unlikely to occur[65]. The leaves can be a mild skin irritant[22]. Overdose may lead to nausea, vomiting, stupor, colour perception disorders, and cardiac arrhythmias. Internal use preparations no longer considered safe [301].

kcakta A wine can be prepared from the flowers, mixed with raisins[183].

tcanta Dye EssentialAn essential oil is obtained from the flowers[46, 171]. It is used in perfumery and for snuff[238]. A green dye is obtained from the leaves in spring[13, 14, 115]. A yellow dye is obtained from the leaves in autumn[14]. Plants can be grown as a ground cover in woodland shade or in a shrubbery[200, 208]. As a garden ornamental it has gained the Royal Horticultural Society's Award of Garden Marit

dwatta Antianxiety Antiarrhythmic Anticonvulsant Antispasmodic Cardiotonic Diuretic Emetic Febrifuge Laxative Poultice SedativeLijv of the valley has a long and proven reputation in herbal medicine in the treatment of heart complaints. It contains the glycosides convallarin and convallamarin which are powerful cardiac tonics and diuretics and

on wet soils, on poor acid soils and on thin dry soils[11]. It dislikes shade and is intolerant of root or branch competition[200]. A fast-growing but short-lived species[229]. Some forms of this species are tender in Britain[11]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: North American native, Wetlands plant, Inconspicuous flowers or blooms.

#### 3.2.37 Tamarix ramosissima

Tamarisk, Saltcedar

2 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 4.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Tamarix ramosissima is a deciduous Shrub growing to 4.5 m (14ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: MannaEdible Uses: A manna is produced by the plants in response to insect damage to the stems[177]. It is sweet and mucilaginous and is used in confectionery[183].

tcanta Hedge Hedge Soil stabilizationVery tolerant of maritime exposure, it makes a good shelter hedge in coastal gardens[75]. It does not like being trimmed[75]. Plants have an extensive root system and can be used to control the erosion of sand dunes and other sandy soils[200].

nrakta E. Asia - S. Russia to China. ksacta Saline soils[11].

propta Seed - sow spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy[200]. Cuttings of mature wood of the current seasons growth, 15 - 25cm long, planted outdoors in late autumn in a nursery bed or straight into their permanent position. High percentage[11, 200].

nwatta Landscape Uses:Seashore. An easily grown plant, succeeding in most soils and tolerant of saline conditions[11]. This species is not found in saline soils in the wild and so might not be tolerant of them in cultivation[K]. Grows well in heavy clay soils as well as in sands and even shingle[182]. Usually found near the coast, it succeeds inland if given a fairly good deep loam and a sunny position[11, 200]. Tolerant of maritime winds and dry soils when grown near the coast[11], plants require a moister soil and shelter from cold drying winds when they are grown inland in non-saline soils because they use the soil salts that are found in saline soils to help them reduce transpiration[200]. This species flowers on the current year's growth[227]. Any pruning is best carried out in spring, hedges are also best trimmed at this time[188]. Plants are tolerant of severe pruning, sprouting freely from old wood[K]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Invasive, Naturalizing, Attractive flowers

# 3.2.38 Sorbaria sorbifolia

false spiraea

2 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sorbaria sorbifolia is a deciduous Shrub growing to 1.8 m (6ft) by 3 m (9ft) at a fast rate. See above for USDA

hardiness. It is hardy to UK zone 2. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista The leaves and the flowers contain the toxin hydrogen cyanide[240]. Some foods, notably almonds, contain small amounts of hydrogen cyanide. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: LeavesEdible Uses: Budlings and leaves - cooked[105]. Some caution is advised, see the notes above on toxicity.

nrakta E. Ásia - China, Japan, Siberia. ksacta In sparse forests at elevations of 250 - 1500 metres in northern China[266]. A garden escape in N. America where it grows in wasteland and copses[43].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers in the dormant season[188]. Root cuttings in late winter[188].

nwatta Landscape Uses:Border, Erosion control, Massing, Screen, Specimen, Woodland garden. Prefers a rich moist soil[11], but succeeds in any soil of good quality in full sunshine[1]. Tolerates dappled shade[200] but prefers a sunny position[188]. Requires protection from strong winds[200]. Tolerates atmospheric pollution[200]. A freely suckering shrub forming low thickets, it grows well in light woodland[182, 200]. Make sure you have the space for this plant since it can become invasive[200]. The flowers are generous with their sweet perfume whatever the weather[245]. They hold their fragrance for a considerable time[245]. Special Features:Not North American native, Attractive flowers or blooms.

# 3.2.39 Coreopsis tinctoria

Coreopsis, Golden tickseed, Atkinson's tickseed, Dyer's Coreopsis, Plains Coreopsis, Annual Coreops 2 tlin 11 cyuc 1 kcak 1 tcan 1 dwat 0.8 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis

hpa7tmwatli xre7t hionli

drutta Coreopsis tinctoria is a ANNUAL growing to 0.8 m (2ft 7in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from April to November, in flower from June to September, and the seeds ripen from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CoffeeA tea can be made from the dried plant[257]. It was used as a coffee substitute[257].

tcanta DyeA yellow (red with an acid mordant) dye is obtained from the flowers and is used to dye cloth[169, 244, 257]. It is not very good when used on plant fibres[169]. The flowers can be dried for later use[169]. Cultivated as an ornamental plant for gardens, and as a native plant for wildlife gardens and natural landscaping.

dwatta Astringent EmeticA tea made from the roots is emetic and is also used in the treatment of diarrhoea[222, 257]. An infusion of the whole plant without the root has been used by women desiring a female baby[257].

nrakta Central and Eastern N. America - Minnesota to Texas. ksacta Moist low ground[60]. Roadsides and waste places[244].

propta Seed - sow March in a cold frame. When they are large enough to handle, prick the seedlings out into individ-

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Barely cover the seed and keep it moist. Stored seed germinates more freely if given a 3 month cold stratification and then sown in a cold frame. Germination is usually good[78]. Prick out the seedlings into individual pots when they are large enough to handle and grow on in the cold frame for the first winter. Plant out in late spring or early summer[K]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Pot up and overwinter in a cold frame. Fair to good percentage[78]. Cuttings of mature wood in November/December in a frame. Layering in spring[200]. Division of suckers in the dormant season. Plant them out direct into their permanent positions.

nwatta Agroforestry Services: Nitrogen Industrial Crop: Wax Management: Standard Regional CropIt is a temperate plant. Prefers a moist soil. Grows well in an open position in a well-drained soil in sun or light shade[200]. Thrives in any ordinary garden soil[11]. Prefers a lime-free loamy or peaty soil[1]. Does well in dry maritime sites[200]. Hardy to about -40°c[200]. Closely related to M. cerifera and perhaps no more than a hardier northern form of it[11], it has larger fruits than M. cerifera[182]. Where their ranges overlap, Myrica pensylvanica hybridizes guite readily with both M . cerifera and M . Heterophylla[270]. Tolerant of salt spread on roads[200]. Plants in this genus are notably resistant to honey fungus[200]. Many species in this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Carbon Farming - Climate: cold to warm temperate. Humidity: humid. Cultivation: regional crop. Management: standard. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 3.1.6 Myrica gale

Bog Myrtle, Sweetgale tfo2n 2 tlin 9 cyuc 2 kcak 4 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Myrica gale is a deciduous Shrub growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK Zone 1. It is in flower from March to May, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista This plant is an abortifacient and so should not be eaten by pregnant women[4, 172].

kcakta Edible Parts: FruitEdible Uses: Condiment TeaThe aromatic fruits and leaves are used either fresh or dried to flavour soups, stews etc[2, 4, 62, 100, 183]. They are sometimes put in beer and ale to improve the flavour and increase foaming[183]. The fruit is about 3mm in diameter with a single large seed[200]. The dried leaves make a delicate and palatable teal 4, 62, 172, 183].

tcanta Dve Essential Parasiticide Repellent Tannin WaxA wax covering on the fruit and leaves is extracted by scalding the fruit with boiling water and immersing them for a few minutes, the wax floats to the surface and is then skimmed off. The fruit is then boiled in water to extract the wax from the pulp and once more the wax is skimmed off. It is then strained through a muslin cloth and can be used to make aromatic candles[4, 6, 245]. These candles diffuse a delightful odour when burnt[245]. Unfortunately this species does not produce enough wax to make it commercially viable[115]. A vellow dve is obtained from the stem tips [66, 115, 172]. Brown according to another report[257]. A vellow dve is obtained from the seeds[257]. The bark contains tannin and can be gathered in the autumn and used as a yellow dye[4]. The plant repels moths and insects in general[66, 106, 115]. The fragrant leaves are used[4, 100]. A strong decoction of the leaves can be used as a parasiticide to kill external body parasites[172]. A fragrant essential oil is obtained from the fruits[115]. Nitrogen Fixer.

dwatta Abortifacient Antipruritic Aromatic Astringent Emmenagogue Parasiticide StomachicThe leaves are abortifacient, aromatic, astringent, emmenagogue and stomachic[4, 46, 172, 238]. The leaves are normally used as a tea, but they do contain a poisonous aromatic oil, so some caution is advised in their use[4].

nrakta Western Europe, including Britain, from Scandanavia to Portugal, east to N.W. Russia. N. America. ksacta Bogs, marshes, fens and wet heathland in acid soils but plants are occasionally found in calcareous fens[5, 17, 186].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Barely cover the seed and keep it moist. Stored seed germinates more freely if given a 3 month cold stratification and then sown in a cold frame. Germination is usually good[78]. Prick out the seedlings into individual pots when they are large enough to handle and grow on in the cold frame for the first winter. Plant out in late spring or early summer[K]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Pot up and overwinter in a cold frame. Fair to good percentage[78]. Cuttings of mature wood in November/December in a frame. Layering in spring[200]. Division of suckers in the dormant season. Plant them out direct into their permanent positions.

nwatta There is some difference of opinion about the needs of this plant. Most reports say that it prefers a moist soil and that it grows well in an open position in a welldrained soil in sun or light shade. Most reports also say that it prefers or even requires a lime-free loamy or peaty soil[1, 200] but another report says that it succeeds in any ordinary garden soil[11]. In the wild it is usually found in soils with a pH between 3.5 and 6, but it is also sometimes found in fens with a pH as high as 7.5[186]. A suckering shrub, when well sited it can form thickets [186]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. This habit also allows the plant to succeed in water-logged soils[186]. Dioecious. Male and female plants must be grown if seed is required. This plant is occasionally monoecious and also can change sex from year to year[50]. Flowers are produced mainly on one-year old wood[4]. All parts of the plant are pleasantly aromatic[186]. A good food plant for the caterpillars of many species of butterflies[30]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

### 3.1.7 Amorpha canescens

Lead Plant

tfo2n 2 tlin 9 cyuc 2 kcak 3 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Amorpha canescens is a deciduous Shrub growing to 1.2 m (4ft) by 1.5 m (5ft in). See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: OilEdible Uses: Oil TeaAn infusion of the dried leaves makes a pleasant tasting yellow-coloured tea[161, 177, 183, 257].

tcanta Insecticide Miscellany Oil Repellent Shelterbelt Soil stabilizationPlants have an extensive root system, they tolerate poor dry soils and are also wind resistant, they are used as a windbreak and also to prevent soil erosion[200]. Resinous pustules on the plant contain 'amorpha', a contact and stomachic insecticide that also acts as an insect repellent[57, 2001.

dwatta Anthelmintic Eczema Miscellany Salve Skin StomachicAn infusion of the leaves has been used to kill pin worms or any intestinal worms[257]. The infusion is also used to treat eczema, the report does not say it if is used internally or externally[257]. The dried and powdered leaves are applied as a salve to cuts and open wounds[257]. A decoction of the root is used to treat stomach pains[257]. A moxa of the twigs has been used in the treatment of neuralgia and rheumatism[257].

nrakta Eastern N. America - Indiana to Minnesota and Manitoba, south to Kansas and New Mexico. ksacta Dry sandy prairies, hills and woodland[43, 200].

propta Seed - presoak for 12 hours in warm water and sow early spring in a greenhouse[78, 133]. The seed usually germinates in 1 - 2 months at  $20^{\circ}c[133]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, June/July in a frame. High percentage[78]. Cuttings of mature wood of the current seasons growth, autumn, in a sheltered position outdoors. Takes 12 months[78]. Suckers in spring just before new growth begins[200]. Layering in spring .

nwatta Prefers a light well-drained sandy soil in sun or light shade[1, 200]. Tolerant of poor dry soils, plants can be invasive in rich soils[200]. Wind resistant[200]. A very hardy plant, tolerating temperatures down to about -25c[184, 200] but it frequently dies down to ground level in the winter, resprouting from the base in the following spring[182]. A very ornamental plant[1]. A deep rooted plant, it thrives best in hot, droughty seasons[11]. It only ripens its seed in fine autumns[11]. Immune to insect pests, the plant contains its own insecticide[200]. At one time this plant was supposed to indicate the presence of lead in the soil[182]. There is some confusion over the correct author of the Latin name of this plant. It is probably Pursh. as stated on the top of this sheet, but some books cite Nutt. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems

from the crown [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

### 3.1.8 Alnus sinuata

Sitka Alder

tfo2n 2 tlin 9 cyuc 1 kcak 3 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutia Alnus sinuata is a deciduous Shrub growing to 4 m (13ft 1in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from April to June, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The freshly harvested inner bark is emetic but is alright once it has been dried[172].

kcakta Edible Parts: FlowersEdible Uses: Catkins - raw or cooked. A bitter flavour[172].

tcanta Fuel Pioneer Soil stabilization Tannin WoodThis is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc[226]. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K]. The bark and the strobils are a source of tannin[82]. The tree has an extensive root system and can be planted to control banks from erosion[226, 229]. Wood - soft, straight-grained, very durable in water[82]. The tree is too small to be of use as a source of lumber, but the wood is used locally for fuel[226, 229].

dwatta Astringent Emetic Haemostatic Stomachic TonicThe bark is astringent, emetic, haemostatic, stomachic and tonic[172].

nrakta Western N. America - Alaska to California - east to Idaho and Montana. ksacta Moist woods, stream banks, margins of ponds, to open but moist montane slopes at or near the timber line[60].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn outdoors in sandy soil

mwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. This species is closely related to A. viridis and is included as a sub-species of A. viridis by many botanists[11]. A fast-growing but short-lived species, rarely living longer than 50 years[229]. It is a pioneer species of logged or burnt land, often forming dense thickets in low wet areas[229]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together

10

maritime exposure, it can be grown as a shelterbelt[75]. The plant's rapid growth and wind tolerance make it a very good pioneer species to use in establishing woodland conditions in difficult sites. Spacing cuttings about every 5 metres will soon provide shelter and a suitable environment for planting out woodland trees that are not so wind tolerant. The main disadvantage in using this species is that the roots are farranging and the plant is quite greedy, so it will not as much effect as species such as the alders (Alnus species) in enriching the soil and thus feeding the woodland plants[K]. Wood - elastic, soft, easy to split, does not splinter. Used for construction, turnery, poles, tool handles etc[11, 46, 61]. The wood is also used to make charcoal[11], which has medicinal uses[7]. Dynamic accumulator.

dwatta Anodyne Antiinflammatory Antiperiodic Antirheumatic Antiseptic Astringent Diaphoretic Diuretic Dysentery Febrifuge Hypnotic Sedative TonicJustly famous as the original source of salicylic acid (the precursor of aspirin), white willow and several closely related species have been used for thousands of years to relieve joint pain and manage fevers[254]. The bark is anodyne, anti-inflammatory. antiperiodic, antiseptic, astringent, diaphoretic, diuretic, febrifuge, hypnotic, sedative and tonic[4, 7, 9, 21, 165]. It has been used internally in the treatment of dyspepsia connected with debility of the digestive organs[4], rheumatism, arthritis, gout, inflammatory stages of auto-immune diseases, feverish illnesses, neuralgia and headache[238]. Its tonic and astringent properties render it useful in convalescence from acute diseases, in treating worms, chronic dysentery and diarrhoea[4]. The fresh bark is very bitter and astringent[222]. It contains salicin, which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[213]. The bark is harvested in the spring or early autumn from 3 - 6 year old branches and is dried for later use[7, 9]. The leaves are used internally in the treatment of minor feverish illnesses and colic[238]. An infusion of the leaves has a calming effect and is helpful in the treatment of nervous insomnia[7]. When added to the bath water, the infusion is of real benefit in relieving widespread rheumatism[7]. The leaves can be harvested throughout the growing season and are used fresh or dried[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Salix / Willow for diseases accompanied by fever, rheumatic ailments, headaches (see [302] for critics of commission E).

nrakta Europe, including Britain, from Norway south and east to N. Africa, Siberia, Himalayas, Israel. ksacta By streams and rivers, marshes, woods and wet fens on richer soils[17].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Branches of older wood as long as 2.5 metres can be used[1]. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta A very easily grown plant, it succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200] and dislikes poor thin soils[186]. Very tolerant of maritime exposure and atmospheric pollution[75, 186]. Trees respond well to coppicing or pollarding[186]. Best planted into its permanent position as soon as possible, trees respond badly to transplanting unless they are moved regularly. The root system is rather aggressive and can cause problems with drains[200]. A very important food plant for the caterpillars of many species of butterflies[30] and a good bee plant, providing an early source of nectar and pollen[11]. A very good wildlife habitat, more than 200 species of insects are associated with this tree[24]. There are many sub-species and cultivars in this species[182]. S. alba caerulea is the cricket bat willow, cultivated for its wood[11, 131]. S. alba vitellina, (L.)Stokes, has been cultivated for its very tough stems that are used as tie rods in basket making[123, 131]. The cultivar 'Cardinal' is also grown for its use in basket making[131]. This species is used commercially in papermaking[189]. Hybridizes freely with other members of this genus, especially S. fragilis, to which it is closely related[11]. Trees cast a relatively light

shade. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attractive foliage, Not North American native, Wetlands plant, Inconspicuous flowers or blooms.

# 3.2.36 Populus fremontii

Cottonwood, Fremont cottonwood, Fremont Poplar, Western Cottonwood

2tlin 9 cyuc 1 kcak 3 tcan 2 dwat 25 m h<br/>kuc

htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Populus fremontii is a deciduous Tree growing to 25 m (82ft 0in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from March to April, and the seeds ripen in April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Inner barkEdible Uses: GumCatkins - raw or cooked[106, 229]. Eaten as a snack[257]. The young green seedpods have been chewed as a gum[257]. Inner bark[106]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread.

tcanta Basketry Fuel Gum Rooting hormone WoodStrips of the inner bark have been used in garments[229]. This report does not make clear if this was merely for ornament, or whether the bark had a functional use[K]. An extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. The young twigs are peeled and split then used in basket making[61, 229, 257]. Wood soft, weak, light, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11, 229]. Used locally for fence posts, the trees are also frequently pollarded for fuel[82, 229].

dwakta Anodyne Antiinflammatory Antiscorbutic FebrifugeThe inner bark was consumed by various native North American Indian tribes in order to prevent scurvy[61, 229]. The bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238]. An infusion of the bark and leaves has been used to wet a cloth which is then tied around the head as a treatment for headaches[257]. The infusion has also been used as a wash on cuts, bruises, wounds and insect stings[257]. A poultice of the boiled bark and leaves has been used to treat swellings caused by muscle strain[257].

nrakta South-western N. America - California to Texas. ksacta Banks of streams and other moist places[71, 82].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in travs in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be nossible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta Landscape Uses:Aggressive surface roots possible. An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Tolerates extremely alkaline soils[200]. Growth is much less

drutta Tagetes patula is a ANNUAL growing to  $0.5~\mathrm{m}$  (1ft 8in) by  $0.3~\mathrm{m}$  (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is frost tender. It is in flower from July to October, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Colouring Condiment DrinkThe flowers are used in refreshing drinks[177, 183]. The leaves are used as a food flavouring[183, 238]. No further details are given. The essential oil is used as a food flavouring, though it is inferior to the oil obtained from T. minuta[238]. The dried flowers are an adulterant of saffron(Crocus sativus), used for colouring foods yellow[183, 238].

tcanta Companion Dye Essential Insecticide Repellent-Landscape Uses: Border, Container, Foundation, Massing, Seashore, Specimen. A very ornamental plant[1]. Special Features: North American native, Fragrant foliage, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. Secretions from the roots of growing plants have an insecticidal effect on the soil, effective against nematodes and to some extent against keeled slugs[18, 20, 200, 218]. These secretions are produced about 3 - 4 months after sowing[200]. The whole plant is harvested when in flower and distilled for its essential oil[218, 238]. The oil is used in perfumery, it is blended with sandalwood oil to produce 'attar genda' perfume[238]. About 35 kilos of oil can be extracted from 1 hectare of the plant (yielding 2,500 kilos of flowers and 25,000 kilos of herbage)[218]. The whole plant contains substances that are toxic to cockroaches[218]. The growing plant repels whitefly and can be grown near tomatoes to keep that crop free of the insect[18, 20]. A yellow dye is obtained from the flowers[169]. It is used to colour foods and textiles[238]. The flowers are sometimes used as an adulterant of saffron (obtained from Crocus sativus)[238]. Dynamic accumulator

dwatta Aromatic Digestive Diuretic Dysentery SedativeThe whole herb is aromatic, digestive, diuretic and sedative[238]. It is used internally in the treatment of indigestion, colic, severe constipation[238], coughs and dysentery[218]. Externally, it is used to treat sore eyes and rheumatism[238]. The leaves are harvested as required for immediate use during the growing season, whilst the flowering plant can be dried and stored for later use[238].

nrakta Southern N. America - Mexico. ksacta The pineoak forest zone[181]. Naturalized in California where it grows on waste ground[71].

propta Seed - sow March in a greenhouse. Only just cover the seed. Germination usually takes place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts.

nwatta Requires a well-drained moderately fertile soil in a sunny position[200]. Grows well in heavy clay soils and in sandy soils[188]. A very ornamental plant[1], there are many named varieties[188]. A good butterfly plant[30]. Removing dead flowers before the seed is formed will extend the flowering season[188]. The bruised leaves emit a refreshing pungent smell[245]. Plants are prone to slugs, snails and botrytis[188]. The French marigold is often used as a companion plant, especially for growing amongst tomatoes and potatoes where it helps to repel pests[238]. See 'Other uses' below for more details.

# 3.2.34 Tagetes tenuifolia

Lemon Marigold, Striped Mexican Marigold, Signet Marigold 2 tlin 11 cyuc 2 kcak 3 tcan 0 dwat 0.8 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Tagetes tenuifolia is a ANNUAL growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and

drutta Tagetes patula is a ANNUAL growing to 0.5 m can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. liness. It is hardy to UK zone 3 and is frost tender. It is in the shade it prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe flowers of some cultivars have a pleasant citrus-like flavour and can be used sparingly as a flavouring in salads, sandwiches, wines etc or used as a garnish[183].

tcanta Companion Landscape Uses: Border, Container, Specimen. There are some named forms, selected for their ornamental value [183]. Special Features: Attractive foliage, North American native, Fragrant foliage, Suitable for cut flowers, Suitable for dried flowers. Secretions from the roots of growing plants have an insecticidal effect on the soil, effective against nematodes and to some extent against keeled slugs, they also have an effect against some persistent weeds such as couch grass[18, 20, 200]. The plant also has an effect on asparagus beetle and bean weevils. These secretions are produced about 3 - 4 months after sowing. A yellow dye is obtained from the flowers[169]. Dynamic accumulator.

nrakta C. and S. America - Mexico to Guatemala. ksacta Not known

propta Seed - sow March in a greenhouse. Only just cover the seed. Germination usually takes place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts.

nwatta Requires a well-drained moderately fertile soil in a sunny position[200]. Grows well in heavy clay soils and in sandy soils[188]. There are some named forms, selected for their ornamental value[183]. The bruised foliage is perhaps more refreshingly aromatic than any other plant[245]. The lemon verbena-like smell remaining on the fingers for an hour or more after touching the plant[245]. Removing dead flowers before the seed is formed will extend the flowering season[188]. Plants are prone to slugs, snails and botrytis[188]. Grows well with tomatoes[20].

### 3.2.35 Salix alba

White Willow

2 tlin 8 cyuc 1 kcak 4 tcan 3 dwat 25 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix alba is a deciduous Tree growing to 25 m (82ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from April to May, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

pcista Gastrointestinal bleeding and kidney damage possible. Avoid concurrent administration with other aspirin-like drugs. Avoid during pregnancy. Drug interactions associated with salicylates applicable [301].

kcakta Edible Parts: Inner bark LeavesEdible Uses: TeaInner bark - raw or cooked. It can be dried, ground into a powder and added to cereal flour then used in making bread etc[2]. A very bitter flavour, especially when fresh[2, 115], it is used as a famine food when all else fails[172]. Leaves and young shoots - raw or cooked[2, 177]. Not very palatable[172]. They are used only in times of scarcity[105]. The leaves can be used as a tea substitute[61].

tcanta Basketry Charcoal Paper Pioneer Shelterbelt String WoodLandscape Uses: Aggressive surface roots possible, Pollard, Specimen. The young stems are very flexible and are used in basket making[13, 46, 61]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The bark can be used for tying plants[61]. A fibre obtained from the stems is used in making paper[189]. The stems are harvested in spring or summer, the leaves are removed and the stems steamed until the fibres can be stripped. The fibres are cooked for 2 hours with lye and then beaten with mallets or put through a blender. The paper is red/brown in colour[189]. A fast growing tree and tolerant of

for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 3.1.9 Lathyrus odoratus

Sweet Pea, Wild Pea,Vetchling tfo2n 2 tlin 11 cyuc 1 kcak 3 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lathyrus odoratus is a ANNUAL CLIMBER growing to 2 m (6ft 7in) at a fast rate. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light wooldand) or no shade. It prefers moist soil.

pcista The seed contains a toxin that is easily extractable in cold water or alcohol[114]. This toxin causes symptoms different to lathyrism (a disease of the nervous system caused by eating the seeds of certain members of this genus)[240]. Symptoms include reproduction failure and degenerative arthritis[2401].

kcakta The seeds are rich in vitamin A[240], though the report does not say that the seeds are edible[K].

tcanta EssentialAn essential oil obtained from the flowers is used in perfumery[46, 61]. Nitrogen Fixer.

nrakta S. Europe - Italy, Sicily and Crete. ksacta Not

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can be sown in situ in mid spring[200]. The seed can also be sown in situ in the autumn[1, 134].

nwatta Landscape Uses:Arbor, Border, Container, Ground cover, Screen. An easily grown plant, succeeding in any moderately good well-drained garden soil[200], whether acid or alkaline[202]. Prefers a position in full sun[200] but it also does well in partial shade[1]. A very ornamental plant, the sweet pea is often cultivated for its sweet smelling flowers, there are many named varieties[1]. Plants climb by means of tendrils[188]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Fragrant flowers.

# **3.2** mran

# 3.2.1 Rubus arcticus

Arctic Bramble, Arctic raspberry, Dwarf raspberry 2 tlin 7 cyuc 5 kcak 1 tcan 0 dwat 0.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Rubus arcticus is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 1. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers FruitEdible Uses: TeaFruit - raw or cooked[2, 61, 105, 257]. Very sweet, juicy and palatable with a pineapple-like aroma[1, 101, 172, 183]. Delicious when eaten out of hand, they are also used in making cakes, jams etc[183]. Unfortunately, they are often not produced very prolifically in a garden situation in Britain, probably because they prefer colder winters. Flowers - raw. Sweet and delicious[172]. The fresh or dried leaves are used as a tea substitute[61, 105, 183].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]

nrakta Northern N. America, N. Europe and N. Asia. Formerly native to Britain in the Scottish highlands[17] ksacta Damp peats or gravels, especially on calcareous soils[43].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Division in early spring or just before leaf-fall in the autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Easily grown in a good well-drained loamy soil in a sunny position[1, 11]. A very variable species, it is sometimes divided into three species, viz.:- R. arcticus, R. acaulis and R. stellatus[101]. Suitable for growing in containers. Most often in acidic soils rich in organic matter. Rubus arcticus subsp. x stellarcticus G.Larss. is an unresolved name

This name is unresolved, but some data suggest that it is synonymous with Rubus  $\times$  stellarcticus (G.Larss.) H.E.Weber , but some data suggest that it is an infraspecific name of Rubus arcticus L.

#### 3.2.2 Cucurbita moschata

Squash, Crookneck squash 2 tlin 11 cyuc 5 kcak 1 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Cucurbita moschata is a ANNUAL CLIMBER growing to 0.6 m (2ft) by 4 m (13ft 1in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is monecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The sprouting seed produces a toxic substance in its embryo[65].

kcakta Edible Parts: Flowers Fruit Leaves Oil SeedEdible Uses: OilFruit - cooked[2, 27, 46, 105]. Some cultivars have a delicious flavour when baked, rather like a sweet potato[K]. The flesh can be dried and ground into a powder then used in making breads etc[183]. Some varieties can be stored for up to 9 months. Seed - raw or cooked[57, 86, 105]. Rich in oil with a pleasant nutty flavour[183] but very fiddly to use because the seed is small and covered with a fibrous coat[K]. An edible oil is obtained from the seed[183]. Leaves and young stems - cooked and used as a potherb or added to soups, stews etc[105, 135, 183]. Flowers - cooked[105, 135, 183].

tcanta OilAn edible oil is obtained from the seed[183].

dwatta Anthelmintic GalactogogueThe seed is vermifuge[147]. It is eaten fresh or roasted for the relief of abdominal cramps and distension due to intestinal worms[218]. About 800 peeled seeds is said to make a safe and effective treatment for tape worm[218]. They are ground into a fine flour, then made into an emulsion with water and eaten. It is then necessary to take a purge in order to expel the tapeworms or other parasites from the body[7]. The boiled root is galactogogue[218].

nrakta Origin is obscure. ksacta Not known in the wild. propta Seed - sow early to mid spring in a greenhouse in a rich soil. Germination should take place within 2 weeks. Sow 2 or 3 seeds per pot and thin out to the best plant. Grow them on fast and plant out after the last expected frosts, giving them cloche or frame protection for at least their first few weeks if you are trying them outdoors.

nwatta Requires a rich, well-drained moisture retentive soil and a very warm, sunny and sheltered position[1, 37, 86]. Prefers a pH of 5.5 to 5.9, but tolerates up to 6.8[86].

Moderate rainfall favours growth, but the roots of most cultivars are sensitive to high soil-water levels[200]. The squash is a frost-tender annual plant that is widely cultivated, especially in warm temperate and tropical areas, for its edible fruit[27]. There are very many named varieties widely differing in size shape and taste[27, 183]. Some varieties are used in the summer and autumn whilst others are harvested in the autumn and can be stored for several months. Succeeds outdoors most years in Britain[27]. Plants are more suited to warmer climates than Britain[200] and are only really successful in good summers in this country, they do not do well in the north[86]. Most cultivars are day-length neutral[200]. This species only hybridizes with other members of the genus under controlled conditions[86, 135]. Grows well with sweetcorn, radishes and nasturtium but dislikes potatoes[18, 20]. Squashes and pumpkins can be differentiated from each other by their fruit stalk, it is angular and polygonal in pumpkins but thick, soft and round in squashes[132].

# 3.2.3 Brassica oleracea italica

Broccoli

2 tlin 11 cyuc 5 kcak 2 tcan 0 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Brassica oleracea italica is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers LeavesEdible Uses: Young flowering stems and leaves - raw or cooked[33, 46]. The shoots of sprouting broccoli are harvested when about 10cm long, and before the flowers open, the shoots look somewhat like a small white or purple cauliflower and have a delicious flavour[K]. They are considered to be a gourmet vegetable. When picking the stems, make sure that you leave behind a section of the stem with leaves on it, since the plants will often produce new side shoots from the leaf axils[ $\check{K}$ ]. Calabrese and Romanesco plants produce a central inflorescence rather like a small cauliflower, which are sometimes followed by a number of smaller flowering shoots. They usually come into bearing in the late summer or autumn and are very productive if they are regularly harvested. Sprouting broccoli plants come into production in late winter to early spring and can be very heavy bearing over a period of two months or more so long as all the flowering stems are harvested before coming into flower

tcanta CompanionA good companion for celery and other aromatic plants since these seem to reduce insect predations[18, 20]. Grows badly with potatoes, beet and onions[20]. Grows well with potatoes, beet and onions according to another report[201].

nrakta A cultivated form of B. oleracea. ksacta Not known in the wild.

propta Seed - sow sprouting broccoli in a seedbed outdoors in March to May. Plant out in June. Do not let the seedlings get overcrowded or they will soon become leggy and will not make such good plants. If your seedlings do get leggy, it is possible to plant them rather deeper into the soil - the buried stems will soon form roots and the plant will be better supported. Romanesco and calabrese are often sown in situ in the spring.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[16, 200]. Tolerates a pH in the range 4.3 to 8.3. Prefers a heavy soil[16]. Succeeds in any reasonable soil[33]. Succeeds in maritime gardens[200]. Some forms are very cold-hardy, tolerating temperatures down to about -17°c(200]. Broccoli is closely related to the cauliflowers (C. oleracea botrytis) and is often grown for its edible young flowering stems which, by careful selection of varieties, can be available almost all year round from early summer right round to late spring. There are many named varieties and these can be classified into three main groups:Calabrese, which matures in summer and autumn, is the

least cold-hardy form. It produces green, or sometimes purple, flowering heads[264]. Some forms will produce a number of side shoots once the main head has been harvested, though other forms seem unable to do this[264]. Romanesco matures in late summer and the autumn. It has numerous yellowish-green conical groups of buds arranged in spirals[264]. Given a little protection from the cold, it is possible to produce a crop throughout the winter. Unlike the other types of broccoli, romanesco seems unable to produce side shoots once the main head has been harvested[264]. Sprouting broccoli is the most cold-hardy group. It does not form a central head like the other two groups but instead produces a mass of side shoots from early spring until early summer. The more you harvest these shoots, especially if you do so before the flowers open, then the more shoots the plant produces[K]. A good companion for celery and other aromatic plants since these seem to reduce insect predations [18, 20]. Grows badly with potatoes, beet and onions[20]. Grows well with potatoes, beet and onions according to another re-

# 3.2.4 Cucurbita maxima

Winter Squash

2 tlin 11 cyuc 5 kcak 2 tcan 3 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli fvif hionli

drutta Cucurbita maxima is a ANNUAL CLIMBER growing to 0.6 m (2ft) by 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista The sprouting seed produces a toxic substance in its embryo[65].

kcakta Edible Parts: Flowers Fruit Leaves Oil Oil SeedEdible Uses: Oil OilFruit - cooked[2, 27, 46, 97]. A delicious flavour when baked, rather like a sweet potato[K]. The flesh can be dried, ground into a powder and used with cereals in making bread, cakes etc[7, 183]. Some varieties can be stored for up to 9 months. Seed - raw or cooked[7, 57, 183]. Rich in oil with a very pleasant nutty flavour but very fiddly to use because the seed is small and covered with a fibrous coat[K]. The seed can also be ground into a powder and used with cereals in making breads etc[183]. An oil is obtained from the seed[21, 86]. Young flowers - raw or cooked[7, 135, 183]. They are often dipped in batter and fried. Young leaves and stems - cooked[135, 183]. The leaves contain up to 5% protein[183].

tcanta Cosmetic Oil OilThe seed contains 34 - 54% of a semi-drying oil[61, 86]. Used for lighting[21]. A nourishing face-mask can be made from the fruit that is effective for dry skins[7]

dwatta Diuretic Nervine Poultice Tonic VermifugeThe seeds are diuretic, tonic and vermifuge[7, 88, 240]. The complete seed, together with the husk, is used as a vermifuge. This is ground into a fine flour, then made into an emulsion with water and eaten. It is then necessary to take a purgative afterwards in order to expel the tapeworms or other parasites from the body[7]. As a remedy for internal parasites, the seeds are less potent than the root of Dryopteris felix-mas, but they are safer for pregnant women, debilitated patients and children[238]. The oil from the seed is used as a nerve tonic[240]. The fruit pulp is used as a soothing poultice on burns, inflammations and boils[240].

nrakta Origin is obscure, possibly derived in cultivation from C. andreana. ksacta Not known in the wild.

propta Seed - sow early to mid spring in a greenhouse in a rich soil. Germination should take place within 2 weeks. Sow 2 or 3 seeds per pot and thin out to the best plant. Grow them on fast and plant out after the last expected frosts, giving them cloche or frame protection for at least their first few weeks if you are trying them outdoors.

nwatta Requires a rich, well-drained moisture retentive soil and a very warm, sunny and sheltered position[37,

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminasel 1721.

kcakta Edible Parts: Leaves RootEdible Uses: Young fronds - raw or cooked[62, 102, 116, 172]. Used before they fully unroll, they are thick and succulent[183]. Sometimes sold in speciality markets, the flavour can be compared to asparagus[200]. Another report says that they are a famine food that is only used in times of need in China[177]. Rootstock - peeled and roasted[106, 172, 183].

tcanta Miscellany Plants make a good ground cover[200] when spaced about 60cm apart each way[208]. They spread slowly and the fronds tend to die off earlier in the autumn than most ferns[208].

dwatta Birthing aid MiscellanyA decoction of the leaf stalk base from sterile fronds has been taken in the treatment of back pain and also to help speed up the expulsion of the afterbirth[257].

nrakta N. Temperate zone. Occasionally naturalized in Britain. ksacta Light shade on rocky stream banks, forming extensive colonies[187]. Wooded ravines in Turkey, 650 - 1200 metres[93].

propta Spores - surface sow as soon as they are ripe in mid-winter and keep the soil moist. It is best to keep the pot in a sealed plastic bag to hold in the moisture. Pot up small clumps of the young plants as soon as they are large enough to handle and grow on in light shade until large enough to plant out. Division during the dormant season between October and March[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Specimen, Woodland garden. Requires a moist but well-drained position and light shade[1, 187]. Grows well in heavy clay soils. Dislikes full sun, the leaves turning yellow and burning in such a situation[200]. Prefers a pH between 5 and 6.5[200]. Dormant plants are hardy to at least -20°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1], it establishes rapidly[187]. It has a short rhizome but produces long stolons, by which it spreads rapidly once established[187], and it can be invasive[200]. Fertile fronds are produced after the first flush of vegetative fronds and persist throughout the following winter. The spores are shed in mid-winter[200]. Grown commercially for its decorative fronds[106]. These fronds are also available as a food from speciality markets[183, 200]. Plants can be forced in the winter to provide an early supply of the young shoots[183]. Special Features: Attractive foliage, North American native, Invasive, There are no flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 3.2.32 Coptis trifolia

Goldthread, Threeleaf goldthread 2 tlin 7 cyuc 2 kcak 2 tcan 2 dwat 0.2 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flat hpa7tmwatli xre7t hjonli drutta Coptis trifolia is an evergreen Perennial growing to  $0.2\,\mathrm{m}$  (0ft 8in) by  $0.5\,\mathrm{m}$  (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention of toxicity has been found for this species, it belongs to a family that contains many species that are mildly toxic and so it is wise to treat this plant with some caution.

kcakta Edible Parts: LeavesEdible Uses: CondimentThe whole plant is said to be eaten[105, 177], or it can be mixed with sassafras-root bark and Irish moss and brewed into a kind of herbal root beer[183]. This plant contributes a bitter flavour and a yellow colour to the beverage[183]. Some caution is advised, see the notes above on toxicity.

tcanta DyeA yellow dye is obtained from the leaves and stems[207]. Can be grown as a ground cover plant in the peat garden[200].

dwatta Antibacterial Antiinflammatory Antiphlogistic Astringent Sedative Skin Stomachic TonicGoldenthread is a very bitter tasting herb that was formerly highly valued and widely used in North America by the native Indians and white settlers alike, though it is little used in modern herbalism[254]. It was employed mainly to treat any soreness in the mouth[254]. The dried roots, stems and leaves are antiphlogistic, highly astringent, sedative, stomachic, tonic[4, 21, 46, 61, 207, 222]. The plant is valued as a local application in the treatment of thrush in children[4]. It is also used in the treatment of ulcerated mouths and as a gargle for sore throats or mouths[21, 46, 61, 207, 213]. It is said to be useful in the treatment of dyspepsia and helpful in combating the drink habit[4]. The plant contains the alkaloid 'berberine'. which is a mild sedative[213], anti-inflammatory and antibacterial[222]. The root is collected in the autumn and dried for later use[213].

nrakta North, eastern and western N. America through northern Asia to Japan. ksacta Wet to mesic, coniferous and mixed forests, bogs, willow scrub, and tundra, often associated with mosses from sea level to 1500 metres

propta Seed - best sown in a greenhouse as soon as it is ripe in an ericaceous compost [164]. Seal the pot in a polythene bag until germination takes place, which is usually within 1 - 6 months at  $10^{\circ}c[164]$ . Stored seed should be sown as early in the year as possible. Four weeks cold stratification may be beneficial[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a shady part of the greenhouse for at least their first winter. Plant them out in mid-autumn or in spring. Division in spring[200].

nwatta Requires a light moist humus-rich slightly acidic soil with a northerly aspect or light shade[1, 200]. A very ornamental plant[1]. The sub-species C. trifolia groenlandica (Syn C. groenlandica) is the form used medicinally in N. America[222]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length Ĭ1-21

# 3.2.33 Tagetes patula

29

French Marigold, Dwarf French Marigold 2 tlin 11 cyuc 2 keak 4 tcan 2 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli of a woman after she has given birth[257]. Both of the above uses are for the sub-species V. dentatum lucidum. Ait.[257].

nrakta Eastern N. America - New Brunswick to Ontario and New York, south to Georgia and Florida. ksacta Moist soils[235].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Massing, Screen, Seashore, Specimen, Woodland garden. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Special Features:Attracts birds, North American native, Attracts butterflies, Blooms are very showy.

### 3.2.30 Cornus sericea

Red Osier Dogwood, Western dogwood 2 tlin 7 cyuc 2 kcak 4 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cornus sericea is a deciduous Shrub growing to 2.5 m (8th) by 4 m (13th) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Édible Parts: Fruit Oil Oil SeedEdible Uses: Oil OilFruit - raw or cooked[105, 161, 257]. Juicy[101]. Bitter and unpalatable according to some reports[2], it was mixed with other fruits such as juneberries (Amelanchier spp) and then dried for winter use by native North Americans[257]. The fruit can cause nausea[172]. The fruit is up to 9mm in diameter[200]. Seed[101]. No more details are given, but the seeds are quite small and woody, looking rather less than edible[Kl. An edible oil is obtained from the seed[41].

tcanta Basketry Dye Fibre Fodder Miscellany Oil Oil TeethA fibre obtained from the bark is used as cordage[99]. The bark can be twisted into a rope[257]. The powdered bark has been used as a toothpowder to preserve the gums and keep the teeth white[4]. An oil obtained from the seed burns well and can be used in lighting[4]. A red dye can be obtained from the bark mixed with cedar ashes[257]. The branches are pliable, they are used as rims in basket making[99, 257]. The stem wood is very tough and flexible[212]. Plants can be grown as a tall ground cover for colonising large areas. The cultivar 'Flaviramea' has been recommended[208]. Red osier is noted as a good Carbon Farming Solution plant. It can be coppiced, used as fodder and act as a living fence. It is a industrial biomass crop.

dwatta Analgesic Astringent Febrifuge Miscellany Poultice Purgative Skin Stimulant TonicRed osier dogwood was widely employed by several native North American Indian tribes who valued it especially for its astringent and tonic bark, using it both internally and externally to treat diarrhoea, fevers, skin problems etc[257]. It is little used in modern herbalism. The bark and the root bark are analgesic, astringent, febrifuge, purgative, slightly stimulant and tonic[4, 172, 257]. Drying the bark removes its tendency to purge[172]. A decoction has been used in the treatment of headaches, diarrhoea, coughs, colds and fevers[257]. Externally, the decoction has been used as a wash for sore eyes. styes and other infections and also to treat skin complaints such as poison ivy rash and ulcers[257]. The bark shavings have been applied as a dressing on wounds to stop the bleeding[257]. A poultice of the soaked inner bark, combined with ashes, has been used to alleviate pain[257]. The plant is said to have cured hydrophobia[4].

nrakta N. America - Newfoundland to New York, west to Alaska and California. Naturalized in Britain[17]. ksacta Shores and thickets[43]. Along streams, rivers and moist sites, 450 - 2700 metres[229].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164], Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Agroforestry Services: Living fence Fodder: Bank Industrial Crop: Biomass Management: Coppice Regional CropAn easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Prefers a moist soil and a position in sun or partial shade[108]. Succeeds in poorly drained soils[200]. Plants are hardy to about -35°c[184]. A rampant suckering shrub[1]. A number of cultivars have been developed for their ornamental value[182]. This species is closely allied to C. alba[11]. The flowers are very attractive to bees[108]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

# 3.2.31 Matteuccia struthiopteris

Ostrich Fern

2 tlin 7 cyuc 2 kcak 2 tcan 1 dwat 1 m hkuc hmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatprik hpa7tmwatli hionli

drutta Matteuccia struthiopteris is a FERN growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

86]. Prefers a pH of 5.5 to 5.9, but tolerates up to 6.8[86]. Dry periods with a relatively low humidity favour the best growth[200]. A frost-tender annual plant, it is widely cultivated in tropical and temperate zones for its edible fruit, there are very many named varieties differing considerably in their fruits [183]. Most of the winter squashes derive from this species, including Hubbard, Butternut, Acorn, Argentine and Boston[86]. Many forms require a temperature range of 20 - 27°c during the growing season, but there are some forms that tolerate cooler conditions and these succeed outdoors most years in Britain[200, K]. Most cultivars are relatively insensitive to day-length[200]. Squashes and pumpkins can be differentiated from each other by their fruit stalk, it is angular and polygonal in pumpkins but thick, soft and round in squashes[132]. This species hybridizes readily with C. andreana but can only be crossed with other species under controlled conditions[86, 135]. Some modern works see C. andreana as being no more than a subspecies of this species, classifying it as C. maxima andreana (Naudin.)Filov. Grows well with sweetcorn and thornapple but dislikes potatoes[18,

# **3.2.5** Zea mays

Sweet Corn, Corn 2 tlin 11 cyuc 5 kcak 3 tcan 3 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik

hpa7tmwatli hjonli drutta Zea mays is a ANNUAL growing to 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is frost tender. It is in flower from July to October, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil Oil Pollen Seed StemEdible Uses: Coffee Oil OilSeed - raw or cooked. Corn is one of the most commonly grown foods in the world. The seed can be eaten raw or cooked before it is fully ripe[1, 2, 33, 34] and there are varieties especially developed for this purpose (the sweet corns) that have very sweet seeds and are delicious[183, K]. The mature seed can be dried and used whole or ground into a flour. It has a very mild flavour and is used especially as a thickening agent in foods such as custards[183]. The starch is often extracted from the grain and used in making confectionery, noodles etc[183]. The dried seed of certain varieties can be heated in an oven when they burst to make 'Popcorn'[183]. The seed can also be sprouted and used in making uncooked breads and cereals[183]. A nutritional analysis is available[218]. The fresh succulent 'silks' (the flowering parts of the cob) can also be eaten[55, 183]. An edible oil is obtained from the seed, it is an all-purpose culinary oil that is frequently used as a food in salads and for cooking purposes[13, 46, 183, 238]. The pollen is used as an ingredient of soups[183]. Rich in protein, it is harvested by tapping the flowering heads over a flat surface such as a bowl. Harvesting the pollen will actually help to improve fertilisation of the seeds[K]. The roasted seed is a coffee substitute[183]. The pith of the stem is chewed like sugar cane and is sometimes made into a syrup[183].

tcanta Adhesive Fuel Oil Oil Packing PaperA glue is made from the starch in the seed[13]. This starch is also used in cosmetics and the manufacture of glucose[61]. A semi-drying oil is obtained from the seed[57]. It has many industrial uses, in the manufacture of linoleum, paints, varnishes, soaps etc[21, 61]. The corn spathes are used in the production of paper, straw hats and small articles such as little baskets[74, 171]. A fibre obtained from the stems and seed husks is used for making paper[189]. They are harvested in late summer after the seed has been harvested. they are cut into usable pieces and soaked in clear water for 24 hours. They are then cooked for 2 hours in soda ash and then beaten in a ball mill for 11/2 hours in a ball mill. The fibres make a light greenish cream paper[189]. Be careful not to overcook the fibre otherwise it will produce a sticky pulp that is very hard to form into paper[189]. The dried cobs are used as a fuel[171]. The pith of the stems is used as a packing material[171].

dwatta Cancer Cholagogue Demulcent Diuretic Hypoglycaemic Hypotensive Lithontripic Stimulant Vasodilator WartsA decoction of the leaves and roots is used in the treatment of strangury, dysuria and gravel[218]. The corn silks are cholagogue, demulcent, diuretic, lithontripic, mildly stimulant and vasodilator[4, 9, 165, 176, 218]. They also act to reduce blood sugar levels and so are used in the treatment of diabetes mellitus[9, 218] as well as cystitis, gonorrhoea, gout etc[222]. The silks are harvested before pollination occurs and are best used when fresh because they tend to lose their diuretic effect when stored and also become purgative[9]. A decoction of the cob is used in the treatment of nose bleeds and menorrhagia[218]. The seed is diuretic and a mild stimulant[4]. It is a good emollient poultice for ulcers, swellings and rheumatic pains[4], and is widely used in the treatment of cancer, tumours and warts[218]. It contains the cell-proliferant and wound-healing substance allantoin, which is widely used in herbal medicine (especially from the herb comfrey, Symphytum officinale) to speed the healing process[222]. The plant is said to have anticancer properties and is experimentally hypoglycaemic and hypotensive[218].

nrakta Original habitat is obscure, probably S. America or Mexico. ksacta Not known in the wild.

propta Seed - sow April in individual pots in a greenhouse. Grow on quickly and plant out after the last expected frosts. A direct outdoor sowing, especially of some of the less sweet varieties, can be tried in May.

nwatta Requires a warm position a well drained soil and ample moisture in the growing season[16, 33]. Prefers a pH in the range 5.5 to 6.8[200]. Requires a rich soil if it is to do well[201]. Corn is widely cultivated for its edible seed, especially in tropical and warm temperate zones of the world[200], there are many named varieties[132]. Unfortunately, the plant is not frost tolerant and so needs to be started off under glass in Britain if a reasonable crop is to be grown. There are five main types:- Sweetcorn is of fairly recent development. It has very sweet, soft-skinned grains that can be eaten raw or cooked before they are fully ripe. Cultivars have been developed that can produce a worthwhile crop even in the more northerly latitudes of Britain if a suitable warm sunny sheltered site is chosen[238, K. Popcorn is a primitive form with hard-skinned grains. When roasted, these grains 'explode' to form the popular snack 'popcorn'[238]. Waxy corn is used mainly in the Far East. It has a tapioca-like starch[238]. Flint corn, which shrinks on drying, can have white, yellow, purple, red or blue-black grains[238]. It is not so sweet and also takes longer to mature so is a problematic crop in Britain. There are many other uses for this plant as detailed below. Dent corn has mostly white to yellow grains. This and Flint corn are widely grown for oils, cornflour, cereals and silage crops. Corn grows well with early potatoes, legumes, dill, cucurbits and sunflowers[18, 20, 201], it dislikes growing with tomatoes[20]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1].

#### 3.2.6 Viburnum lentago

Sheepberry, Nannyberry, Nannyberry Viburnum 2 tlin 8 cyuc 4 koak 0 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum lentago is a deciduous Tree growing to 9 m (29ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 55, 62, 65, 257]. It can also be dried for winter use[55]. The fruit is variable in size and quality, the best being about 15mm long, pulpy, very sweet, somewhat juicy and pleasant tasting but with a thick skin and a single large

seed[43, 82, 101, 159, 183]. The fruit is said to be best after a frost[102] but it is sometimes dry[159].

tcanta Hedge Hedge WoodThe plant is grown as a hedge in N. America[226]. Wood - heavy, hard, close grained, malodorous[82, 226]. Of no commercial value due to the small size of the trees[229].

dwatta Antispasmodic Diuretic EmmenagogueThe bark is antispasmodic[102]. A decoction of the roots has been used to treat irregular menstruation and the spitting of blood[257]. An infusion of the leaves has been used in the treatment of measles[257]. An infusion of the leaves has been drunk, or a poultice of leaves applied, in the treatment of dysuria[257].

nrakta Northern N. America - New Brunswick to Saskatchewan, south to Virginia and Nebraska ksacta Rich soils along woodland borders, edges of streams etc, it is also found on rocky hillsides etc[43, 82, 226].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. A very hardy plant, tolerating temperatures down to about -30°c[184]. A fast-growing but short-lived species in the wild[229]. It readily sprouts from the roots and forms thickets, a habit that is undesirable in small gardens[226]. The plants grow well, but do not usually fruit well in Britain[11, 200]. This is probably because they are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Special Features: North American native, Attracts butterflies, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

# 3.2.7 Asparagus officinalis

Asparagus, Garden asparagus 2 tlin 9 cyuc 4 kcak 2 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwissliphsom hpa7tmwatli nyanhien hionli

drutta Asparagus officinalis is a PERENNIAL growing to 1.5 m (5ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in August, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid, very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Large quantities of the shoots can irritate the kidneys[20, 62]. The berries are mildly poisonous[163].

kcakta Edible Parts: Shoots StemEdible Uses: CoffeeYoung shoots - raw or cooked[2, 5, 15, 16, 27, K]. Considered a gourmet food[132], the shoots are harvested in the spring. We find them very acceptable raw in salads, with a hint of onion in their flavour[K]. They are normally boiled or steamed and used as a vegetable[K]. Male plants produce the best shoots[1]. Do not over-harvest the plant because this would weaken it in the following year. The shoots are a good source of protein and dietary fibre[201]. Roasted seeds are a coffee substitute[21, 46, 183].

tcanta InsecticideThe plant contains asparagusic acid, which has nematocidal properties[238].

dwatta Antibiotic Antispasmodic Aperient Cancer Cardiac Demulcent Diaphoretic Diuretic Laxative Sedative Tonic UrinaryAsparagus has been cultivated for over 2.000 years as a vegetable and medicinal herb[238]. Both the roots and the shoots can be used medicinally, they have a restorative and cleansing effect on the bowels, kidneys and liver[238]. The plant is antispasmodic, aperient, cardiac, demulcent, diaphoretic, diuretic, sedative and tonic[4, 21, 165, 201, 240]. The freshly expressed juice is used[4]. The root is diaphoretic, strongly diuretic and laxative[9, 218, 222]. An infusion is used in the treatment of jaundice and congestive torpor of the liver[240]. The strongly diuretic action of the roots make it useful in the treatment of a variety of urinary problems including cystitis[254]. It is also used in the treatment of cancer[218]. The roots are said to be able to lower blood pressure[7, 222]. The roots are harvested in late spring, after the shoots have been cut as a food crop, and are dried for later use[7]. The seeds possess antibiotic activity[222]. Another report says that the plant contains asparagusic acid which is nematocidal and is used in the treatment of schistosomiasis[238]

nrakta Western Europe, including Britain, from N. Germany to S. W. France. ksacta Fertile and sandy soils by the seashore and along river banks[9, 132].

propta Seed - pre-soak for 12 hours in warm water and then sow in spring or as soon as the seed is ripe in early aumn in a greenhouse. It usually germinates in 3- 6 weeks at  $25^{\circ}c[134]$ . Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a sunny position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Division in early spring as the plant comes into growth.

nwatta Easily grown in any good garden soil[16]. Prefers a rich well-drained sandy loam and a sunny position[1, 16, 27, 238]. Prefers a pH of 6.5 or higher[200], though it tolerates a pH in the range 4.3 to 8.2. Asparagus is often cultivated as a luxury vegetable, there are some named varieties[16, 183]. Well-tended plants can be long-lived, an asparagus bed can last for well over 20 years. Asparagus is a good companion plant for tomatoes, parsley and basil[18, 20, 201]. When grown together, tomatoes help to protect asparagus from the asparagus beetle[201]. Asparagus is said to repel the nematodes that can infect tomatoes[201] (see the report below on the plants other uses). A good bee plant[108]. Dioecious. Male and female plants must be grown if seed is required. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 3.2.28 Pinus banksiana

Jack Pine

2 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 12 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus banksiana is an evergreen Tree growing to  $12\ m\ (39\text{ft})\ by 5\ m\ (16\text{ft})\ at\ a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, in flower in May, and the seeds ripen from January to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.$ 

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: Condiment DrinkSeed - raw or cooked[177]. Rich in oil with a slightly resinous flavour[K]. They are very small and fiddly to utilize, being only 2 - 3mm long[200]. Young cones - cooked[177]. Inner bark[257]. No more information is given, but the bark can usually be eaten raw or cooked. It can also be dried, then ground into a powder and used as a thickener in soups or can be mixed with cereal flours when making bread etc[K]. A refreshing drink is made from the leaves[159, 177]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulp-wood[200].

tcanta Dye Herbicide String WoodA tan or green dye is obtained from the needles[168]. Various native North American Indian tribes made a string from the long roots of this species and used it to stitch the bark of their canoes[226. 257]. In a sandy soil, the roots of this species extend near the surface of the soil for perhaps 10 metres and are easy to pull out of the ground for their entire length. When gathered, they were made into coils and sunk beneath the surface of water until the outer bark had loosened from the root. They were then peeled and split in half, each half being a serviceable cord for sewing together canoes and bark strips intended for the roofs of wigwams and other purposes[257]. The needles contain a substance called terpene. this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat [201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher vields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc[257]. Wood - fairly light, soft, coarse, weak[46, 61, 82, 226]. It weighs 27lb per cubic foot[235]. It is mainly used for fuel, though occasionally also for posts, pulp and lumber [46, 61, 82, 2261,

dwatta Antiseptic Diuretic Expectorant Poultice Rubefacient VermifugeThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters. poultices, herbal steam baths and inhalers[4]. A poultice of the inner bark has been used in the treatment of deep cuts[257]. The leaves have been used in a herbal steam bath to clear congested lungs[257]. They have also been used as a fumigant to revive a comatose patient[257].

nrakta Northern N. America - Alaska to Northwest Territory, south to New York, Illinois and Minnesota. ksacta Barren sandy or rocky soils[43], sometimes forming extensive forests[235]. Fire successional in boreal forests, tundra transition, dry flats, and hills, sandy soils, sea level to 800 metres[270].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses:Screen. Thrives in a light well drained sandy or gravelly loam[1]. The trees have an extensive root system and are well adapted for growing in poor sandy soils[11, 226], they are often used as a pioneer tree for reforestation[226]. Dislikes poorly drained moorland soils and shady positions[1]. Starts away well on almost any soil, whether poorly drained or shallow and dry[185]. Established plants tolerate drought[200]. A fast growing tree when young[200], but growth soon slows down and the tree is short-lived in Britain with no tree known to be older than 75 years[185]. New shoots can be almost 1 metre long, though the tree remains spindly[185]. An open-topped tree, though plants sometimes have a shrubby habit of growth[82]. They can start producing seed when only a few years old[82]. The cones are 4-5cm long[82]. They ripen in their second year but can remain un-opened on the tree for a number of years. only opening and shedding their seed after a forest fire has heated them to at least 50°c[226]. This makes them one of the first colonizers of burnt land[226]. Cultivated for timber in C. Europe[50]. Plants are strongly outbreeding, selffertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. This species hybridises in the wild with the closely related P. contorta where their ranges overlap[226, 270]. There are several named varieties selected for their ornamental value[200]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native, Inconspicuous flowers or blooms.

# 3.2.29 Viburnum dentatum

Arrow Wood, Southern arrowwood, Southern Arrowwood Viburnum

2 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 4.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum dentatum is a deciduous Shrub growing to 4.5 m (14ft 9in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasantly sweet flavour, but there is very little edible flesh surrounding a relatively large seed[K]. The fruit is up to 9.5mm in diameter [200].

dwatta Birthing aid ContraceptiveA decoction of the twigs has been taken by women to prevent conception[257]. A poultice of the plant has been applied to the swollen legs

weight and colour. Used for general carpentry, joinery, musical instruments etc. Valued for its use in the pulp industry to make paper[1, 11, 13, 46, 66].

dwatta Antibiotic Antiseptic Balsamic Expectorant Poultice Sedative Vitamin CThe buds, leaves and resin are antibiotic, antiseptic, balsamic, expectorant, sedative[7]. A pitch, or resin, obtained from the trunk is rubefacient and stimulant[240]. It is used externally in plasters etc for its healing and antiseptic properties[7]. A poultice of the sap or gum has been used in the treatment of boil and abscess pain[257]. nrakta N, and C. Europe, ksacta Not known

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame [78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Firewood, Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Succeeds in most soils including those that are wet cold and shallow, but it is not very wind-firm in shallow soils[1]. Intolerant of chalky or poor acid soils[11]. Tolerates poor peaty soils[200]. Prefers a pH between 4 to 6[200]. Dislikes shade[200] according to one report whilst another says that it is moderately shade tolerant[125]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree and is tolerant of saline winds[200]. A very cold-hardy tree when fully dormant, though the young shoots are subject to injury by late frosts[1], though less so than P. sitchensis[125]. A fast growing tree, it is widely planted in cool temperate zones for its wood[200]. Young trees often grow 1 metre or more a year and can sustain an average of 60cm for at least the first 60 years though growth tails off as they grow older[185]. Probably not that long-lived in Britain, about 200 years seems the absolute maximum[185]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by 'acid rain' pollution[200]. There are many named varieties, almost all of them dwarf forms[200]. A food plant for many caterpillars [30]. A very aggressive tree, it is hostile to other trees[18]. Susceptible to attacks by bark beetles so it should be kept away from more valuable trees. A biological control is being introduced (1983)[125]. This species is susceptible to honey fungus[81]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. The seed is shed in spring[1], the cones release their seed whilst they are still on the tree[81]. The bruised leaves emit a delicious musky smell[245]. Special Features: Not North American native. Inconspicuous flowers or blooms.

# 3.2.27 Malus baccata

Chinese Crab, Siberian crab apple 2 tlin 7 cyuc 2 kcak 2 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Malus baccata is a deciduous Tree growing to 15 m (49ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy),

medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 105]. Fruit from the typical species is about 1cm in diameter, though there are sub-species and cultivated forms with considerably larger fruits[200]. A sour taste, but the fruit is palatable[2, K]. It is often dried for winter use[61] and also makes an excellent jelly[183].

tcanta RootstockThe plant can be used as a rootstock for apple cultivars. It produces a vigorous tree that has more cold tolerance and disease resistance[183]. It is commonly used as stock to graft Malus pumila and M. asiatica in N and NE China[266]. The sub-species M. baccata himalaica is more often used for this purpose. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta AnodyneA paste of the fruit is applied to the forehead to relieve headaches[272].

nrakta E. Asia - N. China to the Himalayas. ksacta Open forested areas to elevations of 1800 - 3600 metres[51, 272].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta Landscape Uses:Border, Espalier, Pest tolerant, Standard, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils including heavy ones[1, 98], preferring a moisture retentive well-drained loamy soil[200]. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. A very hardy plant, tolerating temperatures down to about -40°c[160]. The plants are very resistant to disease[34]. This species is cultivated for its edible fruit in China, there are several named varieties[22]. The sub-species M. baccata mandschurica. (Maxim.)Schneid. has slightly larger fruits which ripen earlier than the type[1, 200]. Trees can produce fruit in 4 years from seed[160]. A very ornamental tree[1], the fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

### 3.2.8 Smilacina racemosa

False Spikenard

2 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 1 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Smilacina racemosa is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is poliniated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Fruit - raw, cooked or made into jellies and molasses[2, 46, 55, 85, 102, 183]. The fruit is smaller than a pea but is produced in quite large terminal clusters on the plant and so is easy to harvest. It has a delicious bittersweet flavour, suggesting bitter molasses[85, 183]. The fruit is said to store well[207], it certainly hangs well on the plants and we have picked very delicious fruits in late October[K]. Rich in vitamins[177], the fruit has been used to prevent scurvy[213]. Some caution is advised since the raw fruit is said to be laxative in large quantities, though this is only if you are not used to eating this fruit[85, 102, 159, 183]. Thorough cooking removes much of this laxative element[183]. Young leaves - raw or cooked[102]. The young shoots, as they emerge in spring, can be cooked and used as an asparagus substitute[55, 85, 102, 159, 183]. Root - cooked[85]. It should be soaked in alkaline water first to get rid of a disagreeable taste[85, 102, 159, 183]. It can be eaten like potatoes or pickled[183].

tcanta Plants can be grown as a ground cover when planted about 45cm apart each way[208].

dwatta False spikenard was widely employed by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. The plant is contraceptive and haemostatic[213, 257]. A decoction is used in the treatment of coughs and the spitting up of blood[257]. Half a cup of leaf tea drunk daily for a week by a woman is said to prevent conception[213, 257]. a poultice of the crushed fresh leaves is applied to bleeding cuts[257]. A tea made from the roots is drunk to regulate menstrual disorders[213]. The root is analgesic, antirheumatic, appetizer, blood purifier, cathartic and tonic[257]. A decoction is said to be a very strong medicine, it is used for treating rheumatism and kidney problems and, when taken several times a day it has been used successfully in treating cancer and heart complaints[257]. The fumes from a burning root have been inhaled to treat headaches and general body pain[257]. The fumes have also been used to restore an unconscious natient and to bring an insane person back to normal[257]. The dried powdered root has been used in treating wounds[213]. A poultice of the root has been applied to the severed umbilical cord of a child in order to speed the healing process and is also used to treat cuts, swellings etc[257]. A cold infusion of the root is used as a wash for sore eyes[257].

nrakta N. America - British Columbia to Nova Scotia, suth to Georgia and Missouri. ksacta Moist coniferous and deciduous woods, clearings and bluffs[43, 60, 187], preferring shaded streamsides[159].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be very slow to germinate, often taking 18 months. Stored seed should be sown in a cold frame as soon as possible, it may take 2 years or longer to germinate. Grow the seedlings on in a shady part of a greenhouse for their first year without pricking them out, giving them liquid or foliar feeds as required to ensure that they do not become nutrient deficient. Divide the young plants up into individual pots in the autumn when they are dormant, and grow them on for at least another year in a shady part of the greenhouse. When the plants have reached a sufficient size, plant them out in the autumn whilst they are dormant. Division in spring or early autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta An easy plant to grow[233], it requires a deep

15

fertile humus rich moisture retentive soil, neutral to slightly acid, that does not dry out in the growing season, and a shady position[200]. Requires a lime-free soil[233]. It does well in a woodland garden[200]. Hardy to about -20°c[200]. Plants take a few years to become established[208]. This species can be separated into two sub-species, S. racemosa racemosa being found in the east of the range whilst S. racemosa amplexicaule is found in the west[270]. One report says that the plant is apomictic (producing seeds without sexual fusion), though this needs to be investigated further[270]. The flowers have a gentle sweet perfume[245]. For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their

# 3.2.9 Vaccinium australe

Northern Blueberry

2 tlin 7 cyuc 4 kcak 2 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli dyat hjonli

drutta Vaccinium australe is a deciduous Shrub growing to  $1.5 \mathrm{\,m}$  (5ft) by  $1.5 \mathrm{\,m}$  (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. The flowers are pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista None Known

kcakta Fruit - raw or cooked[2, 3, 43, 62, 161]. It is usually sweet and juicy, though the flavour can be variable[11]. It can be used in pies, pastries, cereals, jellies etc[183]. The fruit can also be dried and used like raisins[183]. The fruit is rich in vitamin C[201]. The fruit is about 15mm in diameter[200]. A tea is made from the leaves and dried fruit[101].

tcanta A good bee plant. Acid soil. A purple dye can be made from the fruit and leaves. Landscape Uses: Border, Massing, Seashore. Special Features: Attracts birds and butterflies. Attractive flowers or blooms. Edible, wetlands plant. dwatta Vitamin CAstringent. pectoral[201].

nrakta Introduced in Europe (Britain, The Netherlands), Asia (Japan), USA, Canada. ksacta Swamps, low wet woods, pine barrens and dry uplands[43].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of greenwood, May/June in a shady position in a compost that contains some peat[113]. Cuttings of half-ripe wood, 5 - 8cm with a heel. August in a frame[78]. Slow and difficult. Cuttings of mature wood, harvested in November and stored in a fridge then planted in a frame in March. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

inwatta Blueberries: In warmer areas grow Southern Highbush and Rabbiteye (low chill) varieties while in cooler areas and areas that experience frost grow Northern Highbush (high chill) varieties. Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Hardy to about -25?c[184]. Often cultivated for its edible fruit in America[183]. It usually blossoms freely in Britain[11]. Plants are at least partially self-sterile, more than one variety is required in order to obtain good yields of fruit[182]. Dislikes

root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. leave the fruit on the shrub until the last minute, as the fruit is very acidic and will not ripen after being picked. Does not grow well with blackberries or raspberries[201]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30?C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 3.2.10 Raphanus sativus

Radish, Cultivated radish 2 tlin 11 cyuc 4 kcak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Raphanus sativus is a ANNUAL growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The Japanese radishes have higher concentrations of glucosinolate, a substance that acts against the thyroid gland. It is probably best to remove the skin[160].

kcakta Edible Parts: Flowers Leaves Oil Oil Root Seed SeedpodEdible Uses: Oil OilYoung leaves - raw or cooked[37, 52, 104, 183]. A somewhat hot taste, and the texture is somewhat coarse[K]. As long as they are young, they make an acceptable addition in small quantities to chopped salads and are a reasonable cooked green[K]. A nutritional analysis is available[218]. Young flower clusters - raw or cooked[183]. A spicy flavour with a crisp pleasant texture, they make a nice addition to salads or can be used as a broccoli substitute[9. K]. Seeds - raw. The seed can be soaked for 12 hours in warm water and then allowed to sprout for about 6 days [244]. They have a hot spicy flavour and go well in salads[183, 244]. Young seedpods - raw[2, 37, 52, 104]. Crisp and juicy with a mildly hot flavour[K]. They must be eaten when young because they quickly become tough and fibrous[183]. Root raw or cooked[2, 37, 52]. Crisp and juicy, they have a hot and spicy flavour and are a very popular addition to salads[183, Kl. The summer crops do not store well and should be used as soon as possible after harvesting[K]. The winter varieties (including the Japanese forms) have much larger roots and often a milder flavour. These store well and can be either harvested in early winter for storage or be harvested as required through the winter[K]. An edible oil is obtained from the seed[2, 183].

tcanta Fodder Green manure Oil Oil RepellentThe growing plant repels beetles from tomatoes and cucumbers[20, 201]. It is also useful for repelling various other insect pests such as carrot root fly[201]. There is a fodder variety that grows more vigorously and is used as a green manure[87].

dwatta Anthelmintic Antibacterial Antifungal Antiscorbutic Antispasmodic Appetizer Astringent Cancer Carminative Cholagogue Digestive Diuretic Expectorant Laxative Poultice Stomachic Radishes have long been grown as a food crop, but they also have various medicinal actions. The roots stimulate the appetite and digestion, having a tonic and laxative effect upon the intestines and indirectly stimulating the

flow of bile[254]. Consuming radish generally results in improved digestion, but some people are sensitive to its acridity and robust action[254]. The plant is used in the treatment of intestinal parasites, though the part of the plant used is not specified[147]. The leaves, seeds and old roots are used in the treatment of asthma and other chest complaints[218]. The juice of the fresh leaves is diuretic and laxative[240]. The seed is carminative, diuretic, expectorant, laxative and stomachic[176, 218, 240]. It is taken internally in the treatment of indigestion, abdominal bloating, wind, acid regurgitation, diarrhoea and bronchitis[238]. The root is antiscorbutic, antispasmodic, astringent, cholagogue, digestive and diuretic[21, 218]. It is crushed and used as a poultice for burns, bruises and smelly feet[218]. Radishes are also an excellent food remedy for stone, gravel and scorbutic conditions[4]. The root is best harvested before the plant flowers[21]. Its use is not recommended if the stomach or intestines are inflamed[21]. The plant contains raphanin, which is antibacterial and antifungal[218, 238]. It inhibits the growth of Staphylococcus aureus, E. coli, streptococci, Pneumococci etc[176]. The plant also shows anti-tumour activitv[218].

nrakta A plant of cultivation, the origin of which is obscure. It probably arose through cultivation. ksacta Not known in the wild.

propta Seed - sow outdoors in situ in succession from late winter to the middle of summer. Germination takes place within a few days of sowing the seed. If you want a constant supply of the roots then you need to sow seed every 2 - 3

nwatta Very easily cultivated fast-growing plants which prefer a rich light soil with ample moisture[16, 52, 264]. They dislike very heavy or acid soils[16, 37]. Plants are susceptible to drought and require irrigation during dry spells in the summer or the root quality will rapidly deteriorate and the plant will go to seed. Radishes are widely cultivated for their edible roots. There are many named varieties[183] that are able to supply edible roots all year round. Over the centuries a number of distinct groups have evolved through cultivation, these have been classified by the botanists as follows. A separate entry has been made for each group:- R. sativus. The common radish. Fast maturing plants with small roots that can be round or cylindrical and usually have red skins. They are grown primarily for their roots which in some varieties can be ready within three weeks from sowing the seed and are used mainly in salads. These are mainly grown for spring, summer and autumn use and can produce a crop within a few weeks of sowing. R. sativus caudatus. The rattailed radishes. This group does not produce roots of good quality, it is cultivated mainly for the edible young seedpods which are harvested in the summer. R. sativus niger. The Oriental and Spanish radishes. These are grown for their larger edible root which can be round or cylindrical and can be available throughout the winter. R. sativus oleiformis. The fodder radishes. These are grown mainly for their leaves and oil-rich seeds, they are used as a green manure or stock feed though they can also be eaten by people. The roots of these plants soon become fibrous, though they make acceptable eating when young. Radishes are a good companion plant for lettuces, nasturtiums, peas and chervil, tomatoes and cucumbers[18, 20]. They are said to repel cucumber beetles if planted near cucumber plants and they also repel the vine borers which attack squashes, marrows and courgettes[238]. They grow badly with hyssop[18, 20] and with grape vines[201].

# 3.2.11 Anethum graveolens

2 tlin 11 cyuc 4 kcak 2 tcan 3 dwat 0.8 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anethum graveolens is a ANNUAL growing to 0.8 m (2ft 7in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf from May to November, in flower from April to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic

for drying they are harvested when fully open and need to scurvy[212]. The roots, stems and leaves are cooked and be dried quickly in the shade[4]. A tea of the petals tones up the circulation and, taken regularly, can ease varicose veins[201]. An application of the crushed stems to corns and warts will soon render them easily removable [7]. The leaves, blossoms and buds are used to make a homeopathic remedy[232]. It is used internally in order to speed the healing of wounds[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Calendula officinalis for inflammation of the mouth and pharynx (throat), wounds and burns(see [302] for critics of commission E).

nrakta S. Europe. A garden escape in Britain[17]. ksacta The original habitat is obscure but it is found as a garden escape on waste, cultivated and arable land and along roadsides[200].

propta Seed - sow in situ from spring to early summer and again in September. The seed germinates best in darkness and usually within 1 - 2 weeks at 21°c[138]. The plant often self-sows freely.

nwatta Landscape Uses: Border, Container, Massing, Rock garden. An easily grown plant, it succeeds in any well-drained soil[200, 268], though it prefers a good loam and requires a sunny or at least partially sunny position[4, 15, 200, 268]. Plants flower best when they are grown in a poor soil[108]. Tolerates a pH in the range 4.5 to 8.3. The pot marigold is a very ornamental plant that is commonly grown in the flower garden, and occasionally as a culinary herb, there are some named varieties[183]. When well-sited it usually self-sows freely and will maintain itself if allowed[1, 4]. The flowers are sensitive to variations in temperature and dampness, closing when it is dark and when rain is expected[7, 244]. All parts of the plant are pungently scented[245]. The growing plant attracts hoverflies to the garden, the young of which are fairly efficient eaters of aphids[24, 201]. The flowers are attractive to bees[108]. Marigolds are good companion plants, they grow well with tomatoes[14]. Cucumber mosaic disease and powdery mildew can cause problems with this plant[188]. Special Features: Edible, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 3.2.25 Oxyria digyna

Mountain Sorrel, Alpine mountainsorrel 2 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Oxyria digyna is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 46, 62, 85, 257]. A pleasing acid taste[183] and an excellent potherb[1]. A very nice addition to salads[K]. The leaves can be fermented into a sauerkraut for winter use[183]. Use in moderation, see notes at top of sheet.

dwatta Antiscorbutic Astringent Dysentery Vitamin CThe leaves are rich in vitamin C and are used to treat eaten in the treatment of dysentery[272].

nrakta Mountains of the northern temperate zone, including Britain. ksacta Damp rocky places on mountains, especially by streams, avoiding acid soils[17]. Locally common on enriched soils below bird roosts[200].

propta Seed - sow spring in a cold frame and only just cover the seed. The seed germinates within 2 weeks. It can also be sown as soon as it is ripe, when it germinates within a few days. Prick the seedlings out into individual pots as soon as they are ripe and plant them out into their permanent positions in early summer. Division in the spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a moist well-drained rocky soil in a sunny position or partial shade[200]. Requires a lime free soil[200]. There is some controversy here since the plant is said to avoid acid soils in the wild[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 3.2.26 Picea abies

Norway Spruce

2 tlin 7 cvuc 2 kcak 4 tcan 1 dwat 30 m hkuc

htut cyutli tcuphja7n hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Picea abies is an evergreen Tree growing to 30 m (98ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. Inner bark - dried, ground into a powder and used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food, used when all else fails. Seed - raw. Rich in oil and with a pleasant slightly resinous flavour, but too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172]. These tips are also used in making spruce beer[183].

tcanta Adhesive Essential Pitch Shelterbelt Tannin Varnish WoodThe tree is a source of pitch (Burgundy pitch) and turpentine (Jura turpentine)[1, 7, 46, 64]. Burgundy pitch is used as a varnish and in medicinal plasters[57]. It is a strong adhesive[61, 64]. The turpentine is a waterproofer and wood preservative. They are obtained by incisions in the trunk, the resin is scraped out some months later[64]. An essential oil from the leaves is used in perfumery[46, 61]. The seed contains 30% of a fatty oil, this is used in the production of a varnish[74]. The bark contains some tannin[171]. Both the bark and bark extract have been widely used in Europe as a source of tannin, the bark containing up to 13% tannin[223]. Yields of tannin have been doubled by heating or steaming the bark as soon as possible after the tree has been felled[223]. A fairly wind resistant tree and fast growing. it can be planted in shelterbelts to provide protection from the wind[200]. The dwarf cultivar 'Inversa' can be grown as a ground cover plant in a sunny position[188]. The cultivars 'Reflexa' and 'Procumbens' can also be used[208]. They are best spaced about 1 metre apart each way[208]. Wood - medium hard, fairly elastic, durable under water, light in conjunctivitis and sore eyes[218, 272]. The root is laxative[272].

nrakta Southern N. America - Mexico. ksacta Grows in the pine-oak forest zone[181]. A garden escape in the USA where it grows along the sides of roads[43].

propta Seed - sow March in a greenhouse. Only just cover the seed. Germination usually takes place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts.

nwatta Requires a well-drained moderately fertile soil in a sunny position[200]. Grows well in heavy clay soils and in sandy soils[188]. Although not very frost resistant, it can be grown as a tender annual in Britain, sowing the seed in a greenhouse in the spring and planting out after the last expected frosts. The flowers are often sold in local markets in Nepal and used as an offering to the Gods[272]. A number of named forms have been developed for their ornamental value[183]. The cultivar 'Yellow Climax' has mild flavoured edible flowers that can be used as colourful garnishes[183]. All parts of the plant emit an unpleasant smell similar to that of stale urine when they are bruised[245]. Removing dead flowers before the seed is formed will extend the flowering season[188]. Plants are prone to attacks by slugs, snails and botrytis[188]. Special Features: North American native, Fragrant foliage, Suitable for cut flowers, Suitable for dried flow-

# 3.2.23 Ribes alpinum

Alpine Current

2 tlin 7 cyuc 3 kcak 4 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ribes alpinum is a deciduous Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Flies, bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Sweet and not very acid, but less palatable than R. rubrum, the red currant[2]. An insipid fruit[100], it is not palatable[1, 11]. The only fruits we have eaten have been good size red currants with a fair flavour[K]. The fruit is about 5mm in diameter and can be freely borne when male and female plants are grown[K].

tcanta Hedge HedgeThe cultivar 'Green Mound' makes a good dwarf hedge[182]. Plants can be grown as a tall ground cover when spaced about 2 metres apart each way[208]. The cultivars 'Aureum' and 'Pumilum' are smaller growing and should be spaced about 1 metre apart[208].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, Italy, Montenegro, Bulgaria ksacta Cliffs and rocky woods on limestone[17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 0 - 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cutings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 2001.

nwatta Landscape Uses:Erosion control, Foundation, Ground cover, Massing, Rock garden, Seashore. Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. This species succeeds on poor soils[11]. Does well in shade though it does not fruit so well in such a position[11]. A very hardy plant, tolerating temperatures down to about -25°c[184]. A number of named

varieties have been developed for their ornamental value. The flowers are sweetly fragrant[208]. Plants are dioecious. At least one male plant must be grown in the vicinity of up to 5 females if fruit is required. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

#### 3.2.24 Calendula officinalis

calendula. Pot Marigold

2 tlin 11 cyuc 3 koak 4 tcan 5 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli frusflat-

priklwisslip hpa7tmwatli hjonli drutta Calendula officinalis is a ANNUAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to November, and the seeds ripen from August to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Low potential for sensitization and contact dermatitis. Possible allergies if allergic to daisy family plants. Topical use may cause rash [301].

kcakta Edible Parts: Flowers LeavesEdible Uses: Colouring TeaLeaves - raw[14, 21]. When eaten they first of all impart a viscid sweetness, followed by a strong penetrating taste of a saline nature[4]. They are very rich in vitamins and minerals and are similar to Taraxacum officinale (Dandelion) in nutritional value[179]. Fresh petals are chopped and added to salads[183]. The dried petals have a more concentrated flavour and are used as a seasoning in soups, cakes etc[183]. High in vitamins A and C[218]. An edible vellow dye is obtained from the petals[46]. A saffron substitute[21], it is used to colour and flavour rice, soups etc[2, 14, 27, 33]. It is also used as a hair rinse, adding golden tints to brown or auburn hair[201]. A tea is made from the petals and flowers, that made from the petals is less bitter[183]. There is no record of the seed being edible, but it contains up to 37% protein and 46% oil[218].

tcanta Compost Cosmetic Dye Essential Repellent Weather forecasting The growing plant acts as an insect deterrent[14], it reduces the soil eelworm population[24]. The flowers are used cosmetically. They can be used in skin lotions and when added to hair shampoos will lighten the hair colour[244]. The flowers are an alternative ingredient of 'Quick Return' compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. A yellow dve is obtained from the boiled flowers[2, 4, 46]. An essential oil is obtained from the plant[7]. It is used rather sparingly, in view of the difficulty in obtaining it, in perfumes that have a rather sharp tang[7]. The flowers close when wet weather is likely to occur and they can therefore be used as a rough means of weather forecasting[7].

dwatta Antiphlogistic Antiseptic Antispasmodic Aperient Astringent Cholagogue Diaphoretic Emmenagogue Homeopathy Skin Stimulant Vulnerary WartsPot marigold is one of the best known and versatile herbs in Western herbal medicine and is also a popular domestic remedy[4, 254]. It is, above all, a remedy for skin problems and is applied externally to bites and stings, sprains, wounds, sore eyes, varicose veins etc[4, 254]. It is also a cleansing and detoxifving herb and is taken internally in treating fevers and chronic infections[4, 254]. Only the common deep-orange flowered variety is considered to be of medicinal value[4]. The whole plant, but especially the flowers and the leaves. is antiphlogistic, antiseptic, antispasmodic, aperient, astringent, cholagogue, diaphoretic, emmenagogue, skin, stimulant and vulnerary[4, 7, 9, 21, 46, 165, 201]. The leaves can be used fresh or dried, they are best harvested in the morning of a fine sunny day just after the dew has dried from them[4]. The flowers are also used fresh or dried,

(mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

pcista Dill is said to contain the alleged 'psychotroph' myristicine[218]. There are also reports that dill can cause photosensitivity and or dermatitis in some people[218]. Avoid dill oil during pregnancy.

kcakta Edible Parts: Leaves SeedEdible Uses: Condiment TeaLeaves - raw or cooked[2, 4, 9, 14, 21]. Used as a flavouring in salads etc[132, 183]. The leaves lose their flavour if the are cooked for any length of time and so are best used raw or added to cooked dishes only a few minutes before the cooking is complete[244]. The leaves can be harvested at any time the plant is growing, but are best just before the plant flowers[244]. Per 100g, the plant contains 253 calories, 7.2g water, 20g protein, 4.4g fat, 55.8g carbohydrate, 11.9g fibre, 12.6g ash, 1784mg calcium, 543mg phosphorus, 48.8mg iron, 451mg magnesium, 208mg sodium, 3,308mg potassium, 3.3mg zinc, 0.42mg thiamine, 0.28mg riboflavin, 2.8mg niacin and 1.5mg vitamin B6[218]. Seed - raw or cooked. Very pungent and bitter in taste[4]. It is used as a flavouring in salads, preserves etc[2, 7, 9, 21, 46, 183]. its chief uses being perhaps in making dill vinegar and as a flavouring in pickled gherkins[4]. It can also be sprouted and used in breads, soups and salad dressings[183]. Per 100g, the seed contains 305 calories, 7.7g water, 14.5g fat (0.73g saturated, 124mg phytosterol and no cholesterol), 55.2g carbohydrate, 21g fibre, 6.7g ash, 1,516mg calcium, 277mg phosphorus, 16.3mg iron, 256mg magnesium, 20mg sodium, 1.186mg potassium, 5.2mg zinc, 53IU vitamin A, 0.42mg thiamine and 0.28mg riboflavin[218]. An essential oil from the seed is used as a flavouring in the food industry[46, 105]. A tea is made from the leaves and/or the seeds[183].

tcanta Essential InsecticideThe seed contains up to 4% essential oils[244]. It is used in perfuming soaps[4], medicines and as a food flavouring[244]. Some compounds of dill (d-carvone is mentioned as one of them), when added to insecticides, have greatly increased the effectiveness of the insecticides[218].

dwatta Antihalitosis Aromatic Carminative Diuretic Galactogogue Stimulant StomachicDill has a very long history of herbal use going back more than 2,000 years. The seeds are a common and very effective household remedy for a wide range of digestive problems. An infusion is especially efficacious in treating gripe in babies and flatulence in young children. The seed is aromatic, carminative, mildly diuretic. galactogogue, stimulant and stomachic[4, 21, 46, 165]. It is also used in the form of an extracted essential oil[243]. Used either in an infusion, or by eating the seed whole, the essential oil in the seed relieves intestinal spasms and griping, helping to settle colic[254]. Chewing the seed improves bad breath[254]. Dill is also a useful addition to cough, cold and flu remedies, it can be used with antispasmodics such as Viburnum opulus to relieve period pains[254]. Dill will also help to increase the flow of milk in nursing mothers and will then be taken by the baby in the milk to help prevent colic[254]

nrakta W. Asia. Naturalized in Europe in the Mediterranean[100]. ksacta Fields, waste places etc in the Mediterranean[100].

propta Seed - sow April to early summer in situ and only just cover[200, 238]. The seed germinates in 2 weeks if the soil is warm. A regular supply of leaves can be obtained if successional sowings are made from May to the end of June[89, 200]. Autumn sowings can succeed if the winters are mild[4]. Dill is very intolerant of root disturbance and should not be transplanted because it will then quickly run to seed.

nwatta Landscape Uses:Border, Container. An easily grown plant[4], it prefers a moderately rich loose soil and full sun[14, 27, 88]. Requires a well-drained soil[27] and shelter from the wind[200]. Tolerates a pH in the range 5.3 to 7.8. Dill is a commonly cultivated herb, especially in warm temperate and tropical zones. It is grown mainly for its edible leaves and seeds, though it is also used medicinally. There are many named varieties[142, 183]. Bouquet' is an American cultivar that has a prolific production of seeds[238]. The sub-species A. graveolens sowa from India has a slightly different flavour to the type species[238]. The plant quickly runs to seed in dry weather[200]. It often self-sows when growing in a suitable position[37, 88]. A good companion for corn and cabbages, also in moderation for cucumbers, letuce and onions, but it inhibits the growth of carrots[14, 18.

20]. Dill reduces a carrot crop if it is grown to maturity near them[201]. However, the young plant will help to deter carrot root fly[201]. The flowers are very attractive to bees[14, 18, 20]. Special Features:Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers.

#### 3.2.12 Coriandrum sativum

Coriander - Dhania - Cilantro, Coriander 2 tlin 11 cyuc 4 kcak 4 tcan 4 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifkre7t hjonli

drutta Coriandrum sativum is a ANNUAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The plant can have a narcotic effect if it is eaten in very large quantities[201]. Powdered coriander and oil may cause allergic reactions and photosensitivity. Use dry coriander sparingly if suffering bronchial asthma and chronic bronchitis [301]

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Condiment OilLeaves - raw or cooked. They are used as a flavouring in salads, soups etc[2, 4, 21, 37, 61] and the fresh leaves are probably the most widely used flavouring herb in the world[268]. The leaves have an aromatic flavour[183]. It is foetid according to another report[4], whilst another says that the fresh leaves have a strong bedbug-like smell[244]. The leaves should not be eaten in large quantities[132]. The fresh leaves contain about 0.012% oxalic acid and 0.172% calcium[240]. Seed - cooked. It is used as a flavouring in many dishes including cakes, bread and curries, it is also widely used to flavour certain alcoholic liquors[2, 4, 5, 21, 27, 37]. The fresh seed has a disagreeable and nauseous smell, but when dried it becomes fragrant, the longer it is kept the more fragrant it becomes [4, 132]. Plants yield about 134 tonnes per acre of seed[4]. The root is powdered and used as a condiment[161]. An essential oil from the seed is used as a food flavouring[21, 46, 61, 105]

tcanta Essential Fuel Fungicide Insecticide Oil RepellentAn essential oil from the seed is used as a food flavouring, in perfumery, soap making etc[21, 46, 61, 74, 105]. It is also fungicidal and bactericidal[238]. The growing plant repels aphids[14, 20, 201]. A spray made by boiling of one part coriander leaves and one part anise seeds in two parts of water is very effective against red spider mites and woolly aphids[201]. An oil from the seed is used for making soap[74]. The report does not make it clear if the essential oil or the fixed oil is used[K]. The seed contains about 20% fixed oil[240], this has potential for industrial use in Britain, it could become an alternative to oilseed rape though the oil content is a bit on the low side at present (1995). The oil can be split into two basic types, one is used in making soaps etc, whilst the other can be used in making plastics[234]. The dried stems are used as a fuel[74].

dwatta Antidiarrhoeal Antihalitosis Appetizer Aromatherapy Aromatic Carminative Depurative Expectorant Narcotic Stimulant StomachicCoriander is a commonly used domestic remedy, valued especially for its effect on the digestive system, treating flatulence, diarrhoea and colic[9, 244]. It settles spasms in the gut and counters the effects of neryous tension[254]. The seed is aromatic, carminative, expectorant, narcotic, stimulant and stomachic[4, 9, 21, 46, 147, 178, 201, 238]. It is most often used with active purgatives in order to disguise their flavour and combat their tendency to cause gripe[4, 244]. The raw seed is chewed to stimulate the flow of gastric juices and to cure foul breath[240, 268] and will sweeten the breath after garlic has been eaten[254]. Some caution is advised, however, because if used too freely the seeds become narcotic[4]. Externally the seeds have been used as a lotion or have been bruised and used as a poultice to treat rheumatic pains[254, 268]. The essential oil is used in aromatherapy. Its keyword is 'Appetite stimulant'[210]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Coriandrum sativum (Coriander - Dhania) for dyspepsia, loss of appetite (see [302] for critics of commission E).

nrakta S. Europe. Naturalized in Britain[17]. ksacta Waste places and arable land, often by the sides of rivers[4, 9]

propta Seed - sow April in situ[1, 37]. The seed is slow to germinate and so on a garden scale it can also be sown in March in a cold frame. Sow a few seeds in each pot and then plant them out when they are growing away strongly in May[4]. The seed can also be sown in situ in the autumn[1]. Autumn sown plants will grow bigger and produce more seed.

nwatta Prefers a warm dry light soil[4, 27, 37]. Plants grown mainly for their seeds do well in partial shade, but when growing for the seed or essential oil a sunny position is preferred[238]. The plants dislike constant moisture[14] or too much nitrogen[200]. Another report says that coriander grows best when a cool damp spring is followed by a hot dry summer[238]. Coriander tends to run quickly to seed if the plants are too dry at the seedling stage[238]. Plants tolerate a pH in the range 4.9 to 8.3. Coriander is often cultivated, both on a garden scale and commercially, for its edible seed[4, 142], there are some named varieties[183]. The plant is fast-growing, ripening its seed without difficulty in Britain and it seems to be free of pests and diseases[234]. The seeds have been used medicinally and as a food flavouring since ancient times, and were introduced into Britain by the Romans[244]. In the Middle Ages they were added to love potions because of their reputation as aphrodisiacs[244]. The plants flowers are very attractive to pollinating insects[14, 18, 2011. Coriander is in general a good companion plant in the garden, helping to repel aphis and carrot root fly[238]. It grows well with anise, improving the germination rate when the two species are sown together [14, 18, 20, 238], but it grows badly with fennel, where it acts to reduce the seed yield of the fennel[14, 18, 20, 201, 238]. Coriander also grows particularly well with dill and chervil[201].

# 3.2.13 Cucurbita pepo

Pumpkin, Field pumpkin, Ozark melon, Texas gourd 2 tlin 11 cyuc 4 kcak 2 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hionli

drutta Cucurbita pepo is a ANNUAL CLIMBER growing to  $0.6~\mathrm{m}$  (2ft) by  $5~\mathrm{m}$  (16ft  $5\mathrm{in}$ ) at a fast rate. See above for USDA hardiness. It is hardy to UK zone  $3~\mathrm{and}$  is frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The sprouting seed produces a toxic substance in its embryo[65].

kcakta Edible Parts: Flowers Fruit Leaves Oil Oil Root SeedEdible Uses: Oil OilFruit - cooked[2, 27, 46, 105]. Used as a vegetable, it has a very mild flavour and is very watery[K]. It is often harvested when still very young when it is called courgettes. The fruit has very little flavour of its own and so is often used as a base for making savoury dishes, the seeds being scooped out of the fruit and a filling being put in its place - this can then be baked[K]. A nutritional analysis is available[218], Seed - raw or cooked[57, 86, 183], The seed can also be ground into a powder and mixed with cereals for making bread etc[183]. Rich in oil with a pleasant nutty flavour but very fiddly to use because the seed is small and covered with a fibrous coat[K]. A nutritional analysis is available[218]. The seeds can also be sprouted and used in salads etc[183]. Some caution is advised here, see notes above on toxicity. An edible oil is obtained from the seed[46, 105, 117, 183]. Leaves and young stems - cooked as a potherb[135, 183]. A nutritional analysis is available[218]. Flowers and

flower buds - cooked or dried for later use[135, 183]. A nutritional analysis is available[218]. Root - cooked[179]. We have some doubts on this report[K].

tcanta Miscellany Oil OilThe seed contains 34 - 54% of a semi-drying oil. Used for lighting[46].

dwatta Anthelmintic Miscellany Poultice UrinaryThe pumpkin has been much used as a medicine in Central and North America. It is a gentle and safe remedy for a number of complaints, especially as an effective tapeworm remover for children and pregnant women for whom stronger acting and toxic remedies are unsuitable[254]. The seeds are mildly diuretic and vermifuge[7, 88, 254]. The complete seed, together with the husk, is used to remove tapeworms. The seed is ground into a fine flour, then made into an emulsion with water and eaten. It is then necessary to take a purgative afterwards in order to expel the tapeworms or other parasites from the body[7]. As a remedy for internal parasites, the seeds are less potent than the root of Dryopteris felix-mas, but they are safer for pregnant women, debilitated patients and children[238]. The seed is used to treat hypertrophy of the prostate[218]. The seed is high in zinc and has been used successfully in the early stages of prostate problems[254]. The diuretic action has been used in the treatment of nephritis and other problems of the urinary system[254]. The leaves are applied externally to burns [240]. The sap of the plant and the pulp of the fruit can also be used[254]. The fruit pulp is used as a decoction to relieve intestinal inflammation[254].

nrakta C. America? The origin is obscure[86]. ksacta Not known in the wild.

propta Seed - sow April in a greenhouse in a rich soil. Germination should take place within 2 weeks. Sow 2 or 3 seeds per pot and thin out to the best plant. The seed requires a minimum temperature of 13°c to germinate[200]. Grow them on fast and plant out after the last expected frosts, giving them cloche or frame protection for at least their first few weeks outdoors until they are growing strongly.

nwatta Requires a rich, well-drained moisture retentive soil and a very warm, sunny and sheltered position[1, 16, 37, 86]. Prefers a pH of 5.5 to 5.9, but tolerates up to 6.8[86]. Plants are tolerant of light shade[86] (This comment is probably more applicable to warmer climates than Britain[K].). A frost-tender annual plant, the pumpkin or marrow is widely cultivated in temperate and tropical zones for its edible fruit. It has long been grown as a domestic plant and a number of different groups have been developed. Botanists have tried to classify these groups, though there is considerable overlap and clear distinctions are not always possible. Since they are very similar in their cultivation needs, we have treated all the groups together in this entry. The botanists classification is as follows:- C. pepo pepo. This includes the vegetable marrows, zucchinis, pumpkins and ornamental gourds. There are many named varieties and these can vary considerably in size, shape and flavour[27, 183, 200]. The cultivars with larger and rounder fruits are usually called pumpkins, the fruits are harvested in the autumn and can be stored for a few months. The marrows are smaller than pumpkins and generally sausage-shaped. These can also be harvested in the autumn and stored for a few months, but it is more usual to eat them whilst they are still very small, when they are known as courgettes. Harvesting the fruits of the marrows when very small stimulates the plant into making more flowers (and hence fruits) so it can be a very productive way of using the plant. Pumpkins and marrows succeed outdoors most summers in Britain[27], in fact many of these varieties are well adapted to cool growing conditions and therefore do well in the British climate[200]. C. pepo pepo fraterna. This is the probable progenitor of the marrows and so is of potential value in any breeding programmes. C. pepo ovifera. This group includes various summer squashes including the acorn, crookneck and patty pan squashes. C. pepo ovifera ozarkana. A probable ancestor of the summer squashes, it could be of value in breeding programmes. C. pepo texana. The texas gourd, or wild marrow, is another form that could be of value in breeding programmes. Plants produce both male and female flowers. These are insect pollinated but in cool weather it is worthwhile hand pollinating[200]. Most cultivars are day-length neutral and so are able to flower and fruit throughout the British summer[200]. A fastgrowing plant, trailing forms can be used to provide a summer screen[86]. This species does not hybridize naturally with other edible members of this genus[135]. Squashes and pumpkins can be differentiated from each other by their fruit

them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Foundation, Massing, Screen, Specimen, Winter interest. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It grows well in heavy clay soils. Established plants are drought tolerant[160]. Prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. This species is considered by some botanists to be no more than a superior fruiting form of V. opulus that was taken to America by early settlers[11]. Occasionally cultivated for its edible fruit. there are some named varieties[183]. The fruit is very attractive to birds[160]. Some reports say that this species is selffertile[17, 200] whilst others say it is self-incompatible[11]. It is probably best to grow at least two different cultivars in order to produce fruit and fertile seed[11, 200]. Special Features: North American native, Attracts butterflies, Blooms are very showy. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

# 3.2.21 Viburnum cassinoides

Withe Rod, Appalachian Tea, Witherod Viburnum, Witherod, Wild Raisin Viburnum

2 tlin 8 cvuc 3 kcak 0 tcan 1 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli dyatxre7t hjonli

drutta Viburnum cassinoides is a deciduous Shrub growing to 2.5 m (8ft 2in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[3, 46, 62, 65, 101]. The scant flesh is sweet and well flavoured, hanging on the plant well into the winter[183]. The oval fruit is about 10mm long and contains a single large seed[235, K]. The leaves are used as a tea substitute[46, 61]. A pleasant taste[183]. The leaves are steamed over boiling water, rolled between the fingers, allowed to stand overnight and then dried in an oven to be used as required[183].

dwatta Antispasmodic Diaphoretic Febrifuge Mouthmash TonicThe bark and root bark is antispasmodic, diaphoretic, febrifuge and tonic[257]. An infusion has been used to treat recurrent spasms, fevers, smallpox and ague[257]. The infusion has also been used as a wash for a sore tongue[257].

nrakta Eastern N. America - Newfoundland to Manitoba, Minnesota, New Jersey, Georgia and Alabama. ksacta Thickets, clearings, swamps and borders of woods[43].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out [113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months/781.

nwatta Landscape Uses:Border, Hedge, Massing, Screen. Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It dislikes chalk, growing best on lime-free soils[3, 182]. Prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in the spring[200]. This species is closely allied to V. nudum[11]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fertile seed[11, 200]. There is at least one named variety, selected for its ornamental value[200]. 'Nanum' has a dwarf habit and the leaves have a rich autumn colouring[200]. Special Features: North American native, Fragrant flowers, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

### 3.2.22 Tagetes erecta

African Marigold, Aztec marigold, Big Marigold, American Marigold

2 tlin 11 cyuc 3 kcak 3 tcan 3 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tagetes erecta is a ANNUAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: Colouring CondimentThe petals of the flowers of some varieties can be eaten [183]. The fresh receptacle is eaten by children [272]. A yellow dye obtained from the flowers can be used as a saffron substitute for colouring and flavouring foods [183]. The plant is used as a condiment [177]. (This probably refers to the use of the flowers as an edible dye)

tcanta Companion Dye Insecticide RepellentLandscape Uses:Border, Container, Foundation, Massing, Seashore, Specimen. Secretions from the roots of growing plants have an insecticidal effect on the soil, effective against nematodes and to some extent against keeled slugs. These secretions are produced about 3 - 4 months after sowing[200]. The flower petals also have nematacidal properties[218]. The growing plant is also said to repel insects and can be grown amongst crops such as potatoes and tomatoes. A yellow dye is obtained from the flowers[169, 257]. Dynamic accumulator

dwatta Anthelmintic Aromatic Carminative Digestive Diuretic Dysentery Eczema Emmenagogue Laxative Ophthalmic Sedative Skin StomachicThe whole herb is anthelmintic, aromatic, digestive, diuretic, emmenagogue, sedative and stomachic[61, 238]. It is used internally in the treatment of indigestion, colic, severe constipation[238], coughs and dysentery[218]. Externally, it is used to treat sores, ulcers, eczema. sore eyes and rheumatism[218, 238, 257, 272]. The leaves are harvested as required for immediate use during the growing season, whilst the flowering plant can be dried and stored for later use[238]. A paste of the leavs is applied externally to treat boils, carbuncles and earaches[272]. The flowers are carminitive, diuretic and vermifuge[272]. A decoction is used to treat colds, and mumps[218]. It is applied externally to trea skin diseases,

lent Tannin Thatching Waterproofing WoodThe bark is used 1341. to make drinking vessels, canoe skins, roofing tiles etc. It is waterproof, durable, tough and resinous[11, 61]. Only the outer bark is removed, this does not kill the tree. It is most easily removed in late spring to early summer. The bark was pressed flat and stored until the following spring. When required for making canoes it would be heated over a fire to make it pliable for shaping to the canoe frame[257]. A pioneer species, it readily invades old fields, cleared or burntover land and creates conditions suitable for other woodland trees to become established. Since it is relatively shortlived and intolerant of shade, it is eventually out-competed by these trees[11, 186]. A tar-oil is obtained from the white bark in spring. It has fungicidal properties and is also used as an insect repellent[4, 14, 61, 100]. It makes a good shoe polish[61]. Another report says that an essential oil is obtained from the bark and this, called 'Russian Leather' has been used as a perfume[245]. A glue is made from the sap. Cordage can be made from the fibres of the inner bark. This inner bark can also be separated into thin layers and used as a substitute for oiled paper[4]. A decoction of the inner bark is used to preserve cordage, it is rich in tannin. The bark contains up to 16% tannin[223]. A brown dye is obtained from the inner bark. An oil similar to Wintergreen oil (obtained from Gaultheria procumbens) is obtained from the inner bark[21, 61]. It is used medicinally and also makes a refreshing tea[21]. The young branches are very flexible and are used to make whisks, besoms etc[6]. They are also used in thatching and to make wattles[4]. The leaves are a good addition to the compost heap, improving fermentation[20]. A black paint is obtained from the soot of the plant[61]. A high quality charcoal is obtained from the bark. It is used by artists, painters etc. Wood - soft, light, durable. It is used for a wide range of purposes including furniture, tool handles, carving, toys etc[100, 238]. It is a source of charcoal that is used by artists and is also pulped and used for making paper[238].

dwatta Antirheumatic Antiseborrheic Astringent Bitter Diaphoretic Diuretic Eczema Lithontripic Miscellany Skin UrinaryAnti-inflammatory, cholagogue, diaphoretic[21, 165, 2011. The bark is diuretic and laxative[7]. The inner bark is bitter and astringent, it is used in treating intermittent fevers[4]. An oil obtained from the inner bark is astringent and is used in the treatment of various skin afflictions, especially eczema and psoriasis[4, 238]. The bark is usually obtained from trees that have been felled for timber and can be distilled at any time of the year[238]. The buds are balsamic[7]. The young shoots and leaves secrete a resinous substance which has acid properties, when combined with alkalis it is a tonic laxative[4]. The leaves are anticholesterolemic and diuretic[7]. They also contain phytosides, which are effective germicides[7]. An infusion of the leaves is used in the treatment of gout, dropsy and rheumatism, and is recommended as a reliable solvent of kidney stones[4]. The young leaves and leaf buds are harvested in the spring and dried for later use[238]. A decoction of the leaves and bark is used for bathing skin eruptions[4]. The vernal sap is diuretic[4]. The boiled and powdered wood has been applied to chafed skin[257]. Moxa is made from the yellow fungous excrescences of the wood, which sometimes swell out of the fissures[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Betula species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E).

nrakta Most of Europe, including Britain, east to W. Siberia and central Asia. ksacta Open woodland and heaths, usually on acid soils, from sea level to 830 metres[1, 17, 100].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position [78, 80, 134]. Spring sown seed should be surface sown in a sunny position in a cold frame[113, 134]. If the germination is poor, raising the temperature by covering the seed with glass can help[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it can be sown in an outdoor seedbed, either as soon as it is ripe or in the early spring - do not cover the spring sown seed. Grow the plants on in the seedbed for 2 years before planting them out into their permanent positions in the winter [78, 80, 113,

nwatta Succeeds in a well-drained light loamy soil in a sunny position[11, 200]. Grows well in heavy clay soils. Tolerates a wet position[11, 24], succeeding in poorly drained soils[186]. Fairly wind tolerant[200]. Prefers an acid soil. A very ornamental tree and fast growing, capable of growing 1 metre a year but it is short-lived[186]. It is one of the first trees to colonize open land and it creates a suitable environment for other woodland trees to follow[11]. These trees eventually shade out the birch trees[186]. Trees take about 15 years from seed to produce their own seed[98]. Although closely related, it does not usually hybridize with B. pendula[11]. It hybridizes freely with B. pendula according to another report[186]. A superb tree for encouraging wildlife, it has over 200 associated insect species[24, 30]. A good plant to grow near the compost heap, aiding the fermentation process[14, 20]. It is also a good companion plant, its root activity working to improve the soil[14]. Trees are notably susceptible to honey fungus[200].

### 3.2.20 Viburnum trilobum

American Cranberry, Highbush Cranberry, Cranberrybush, American Cranberrybush Viburnum

2 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 3 m hkuc

hmimhtut cyutli hgattcup hwicli hrasilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Viburnum trilobum is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in June, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista Large quantities of the fruit can cause vomiting and diarrhoeal 10, 651. The fruit is of very low or zero toxicity, it only causes mild upsets when eaten unripe or in large quantities[65, 76].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 11, 161, 257]. Juicy but acid, the taste is best after a frost[62, 101, 102]. The fruits are rich in vitamin C, they are an excellent substitute for cranberries and are used in preserves, jams etc[183]. A jam made from the fruit has a very pleasant flavour that goes well in a porridge[K]. The fruit is about 8mm in diameter and contains a single large seed[200]

dwatta Emetic Febrifuge Laxative Stomachic Vitamin C Women's complaintsAn infusion of the roots has been used in the treatment of prolapse of the uterus[257]. A decoction has been given to babies with fevers[257]. A decoction of the branches has been used to treat a fallen womb after birth[257]. The bark is laxative[257]. An infusion of the roots has been used to make a person vomit in the treatment of bad blood and fevers[257]. An infusion of the inner bark has been used to treat stomach cramps[257].

nrakta N. America - Newfoundland to British Columbia, New Jersey, Michigan, Iowa, South Dakota and Oregon. ksacta Stream banks[62]. Low moist ground[235].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting

stalk, it is angular and polygonal in pumpkins but thick, soft and round in squashes[132]. Pumpkins grow well with sweetcorn and thornapple but they dislike growing near potatoes[18, 20, 201]. They also grow well with nasturtiums, mint, beans and radishes[201].

# 3.2.14 Raphanus sativus niger

Oriental Radish

2 tlin 11 cvuc 4 kcak 3 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Raphanus sativus niger is a ANNUAL growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The Japanese radishes have higher concentrations of glucosinolate, a substance that acts against the thyroid gland. It is probably best to remove the skin[160].

kcakta Edible Parts: Flowers Leaves Oil Root Seed SeedpodEdible Uses: OilYoung leaves - raw or cooked[37, 52, 104, 183]. A somewhat hot taste, and the texture is somewhat coarse[K]. As long as they are young, they make an acceptable addition in small quantities to chopped salads and are a reasonable cooked green[K]. A nutritional analysis is available[218]. Young flower clusters - raw or cooked[183]. A spicy flavour with a crisp pleasant texture, they make a nice addition to salads or can be used as a broccoli substitute[9, K]. Seeds - raw. The seed can be soaked for 12 hours in warm water and then allowed to sprout for about 6 days[244]. They have a hot spicy flavour and go well in salads [183, 244]. Young seedpods - raw[2, 37, 52, 104]. Crisp and juicy with a mildly hot flavour[K]. They must be eaten when young because they guickly become tough and fibrous[183]. Root raw or cooked[2, 37, 52]. Large, crisp and juicy, many varieties have a hot and spicy flavour, though there are also many of the Oriental forms with much milder flavours. They can be sliced and eaten in salads or can be cooked in soups etc. The roots store well and can be either harvested in early winter for storage or be harvested as required through the winter[K]. An edible oil is obtained from the seed[2, 183].

tcanta Fodder Green manure Oil RepellentThe growing plant repels beetles from tomatoes and cucumbers[20, 201]. It is also useful for repelling various other insect pests such as carrot root fly[201]. There is a fodder variety that grows more vigorously and is used as a green manure[87].

dwatta Anthelmintic Antibacterial Antifungal Antiscorbutic Antispasmodic Astringent Cancer Carminative Cholagogue Digestive Diuretic Expectorant Laxative Poultice Stomachic Radishes have long been grown as a food crop, but they also have various medicinal actions. The roots stimulate the appetite and digestion, having a tonic and laxative effect upon the intestines and indirectly stimulating the flow of bile[254]. Consuming radish generally results in improved digestion, but some people are sensitive to its acridity and robust action[254]. The plant is used in the treatment of intestinal parasites, though the part of the plant used is not specified[147]. The leaves, seeds and old roots are used in the treatment of asthma and other chest complaints[218]. The juice of the fresh leaves is diuretic and laxative[240]. The seed is carminative, diuretic, expectorant, laxative and stomachic[176, 218, 240]. It is taken internally in the treatment of indigestion, abdominal bloating, wind, acid regurgitation, diarrhoea and bronchitis[238]. The root is antiscorbutic, antispasmodic, astringent, cholagogue, digestive and diuretic[21, 218]. It is crushed and used as a poultice for burns, bruises and smelly feet[218]. Radishes are also an excellent food remedy for stone, gravel and scorbutic conditions[4]. The root is best harvested before the plant flowers[21]. Its use is not recommended if the stomach or intestines are inflamed[21]. The plant contains raphanin, which is antibacterial and antifungal[218, 238]. It inhibits the growth of Staphylococcus aureus, E. coli, streptococci, Pneumococci etc[176]. The plant also shows anti-tumour activity[218].

nrakta A plant of cultivation, the origin of which is obscure. It probably arose through cultivation. ksacta Not known in the wild.

propta Seed - sow outdoors in situ from spring to late summer. Most cultivars are best sown in late summer in order to provide a crop in the winter and early spring, though there are several cultivars that can be successfully sown in the spring to provide a summer and autumn crop.

nwatta Prefers a rich soil with ample moisture[16, 52]. Dislikes very heavy or acid soils[16, 37]. Some of the Oriental radish cultivars have been selected for growing in clay soils, the swollen part of the root is formed on the soil surface[206]. Plants are susceptible to drought and require irrigation during dry spells in the summer or the root quality will rapidly deteriorate and the plant will go to seed. The Oriental and winter radishes are often cultivated for their large edible roots, which can be available from mid summer. and all through the winter. There are many named varieties. The plants are very winter hardy and can normally be left in the ground all winter to be harvested as required, though slugs might cause some damage to the roots. Radishes are a good companion plant for lettuces, nasturtiums, peas and chervil, tomatoes and cucumbers[18, 20]. They are said to repel cucumber beetles if planted near cucumber plants and they also repel the vine borers which attack squashes, marrows and courgettes[238]. They grow badly with hyssop[18, 20] and with grape vines[201].

# 3.2.15 Cucurbita argyrosperma

Cushaw Pumpkin

2 tlin 11 cyuc 4 kcak 1 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hna7tmwatli fyif hionli

drutta Cucurbita argyrosperma is a ANNUAL CLIMBER growing to 0.5 m (1ft 8in) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 3 and is frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The sprouting seed produces a toxic substance in its embryo[65].

kcakta Edible Parts: Flowers Fruit Leaves Oil SeedEdible Uses: OilFruit - cooked[1, 177]. Used as a vegetable in pies etc. it can be stored for up to 6 months. Generally the fruit is fibrousy, watery and less richly flavoured than C. maxima., C. moschata. and C. pepo[183]. The flesh can be dried, ground into a powder and mixed with cereals for making bread, cakes etc[183]. The fruit is up to 20cm in diameter[200]. Seed - raw, roasted or dried, ground into a powder and mixed with cereals when making bread etc[183]. The seed is rich in oil and has a pleasant nutty flavour. Although relatively large[183], they are very fiddly to use because they are covered with a fibrous coat[K]. An edible oil is obtained from the seed[183]. Leaves - cooked[135]. Flowers

tcanta OilThe seed is rich in oil.

dwatta VermifugeThe seeds are vermifuge[7, 88]. The complete seed, together with the husk, is used. This is ground into a fine flour, then made into an emulsion with water and eaten. It is then necessary to take a purgative afterwards in order to expel the tapeworms or other parasites from the body[7]. As a remedy for internal parasites, the seeds are less potent than the root of Dryopteris felix-mas. but they are safer for pregnant women, debilitated patients and children[238].

nrakta C. America? Origin is uncertain. ksacta Not known in the wild[135].

propta Seed - sow early to mid spring in a greenhouse in a rich soil. Germination should take place within 2 weeks. Sow 2 or 3 seeds per pot and thin out to the best plant. Grow them on fast and plant out after the last expected frosts, giving them cloche or frame protection for at least their first few weeks if you are trying them outdoors.

nwatta Requires a rich, well-drained moisture retentive soil and a very warm, sunny and sheltered position[1]. Plants are tolerant of high temperatures but sensitive to cool conditions, they favour moderate rainfall but the roots are sensitive to water-logging[200]. A frost-tender annual plant, the Cushaw pumpkin has long been cultivated for its edible fruit especially in warmer temperate and tropical areas. There are some named varieties[183] and these are day-length neutral[200]. Plants can succeed outdoors in Britain in most summers so long as they are started off early in a greenhouse and grown on quickly. Over time, various more or less distinct groups of cultivars have been developed and these have been classified by botanists as detailed below. Since they all have similar requirements, and it can be rather difficult to classify some varieties, we have dealt with them all here and not given them separate entries. C. argyrosperma. The Cushaw pumpkin, as dealt with in this entry. It is subdivided into:- C. argyrosperma argyrosperma. The silver-seed gourd. Cultivated mainly for its edible seeds which are larger than in other forms with an attractive silvery edge. C. argyrosperma callicarpa. Japanese pie pumpkin or green-stripe cushaw. C. argyrosperma stenosperma. Cultivated in Mexico, we do not know of a common name. This species does not hybridize naturally with other members of this genus, though crosses have been made under controlled conditions[86, 135]. Squashes and pumpkins can be differentiated from each other by their fruit stalk, it is angular and polygonal in pumpkins but thick, soft and round in squashes[132]. This species is included in C. moschata by some botanists[86].

#### 3.2.16 Cornus canadensis

Creeping Dogwood, Bunchberry dogwood, Bunchberry 2 tlin 7 cyuc 4 kcak 2 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli xra7t hionli

drutta Cornus canadensis is a PERENNIAL growing to  $0.3 \ m$  (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Pectin Pectin-Fruit - raw or cooked[1, 101]. Pleasant but without much flavour[2, 55, 62]. The fruits are rather dry a bit gummy and rather mealy but they have a pleasant slightly sweet flavour, though they are not the type of fruit I would like to eat raw in quantity[K]. They can be added to breakfast cereals or used for making jams, pies, puddings etc[183]. An excellent ingredient for steamed plum puddings[183]. High in pectin[172], so it can be used with pectin-low fruits when making jam[K]. Pectin is said to protect the body against radiation[201]. The fruit is about 6mm in diameter[200] and is borne in small clusters on top of the plants[K].

tcanta Pectin PectinThe fruit is rich in pectin[172]. A good dense ground cover plant, growing well in light woodland[28, 208]. It takes a little while to settle down and needs weeding for the first few years[197] but becomes rampant when established and can then spread 60 - 90cm per year[208].

dwatta Analgesic Cathartic Febrifuge Kidney OphthalmicThe leaves and stems are analgesic, cathartic and febrifuge[257]. A tea has been used in the treatment of aches and pains, kidney and lung ailments, coughs, fevers etc[222]. A strong decoction has been used as an eye wash[222, 257]. The fruits are rich in pectin which is a capillary tonic, antioedemic, anti-inflammatory, antispasmodic and hypotensive[218]. Pectin also inhibits carcinogenesis and protects against radiation[218]. A tea made from the roots has been used to treat infant colic[222]. The mashed roots have been strained through a clean cloth and the liquid used as an eyewash for sore eyes and to remove foreign objects from the eyes[257].

nrakta N. America - Newfoundland to Alaska, south to Virginia and California. ksacta Coniferous woods, thickets and damp clearings in peaty soils[43].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80,

113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Division in spring. This plant can be a bit temperamental when it is being divided. We have found it best to tease out small divisions from the sides of the clump, to avoid the need to disturb the main clump by digging it up. Try to ensure that each division has already produced some roots. Pot them up in light shade in a greenhouse and make sure that they are not allowed to become dry. Once they are rooting and growing away well, which might take 12 months, they can be planted out into their permanent positions.

nwatta Landscape Uses:Rock garden, Specimen, Woodland garden. Succeeds in any soil of good or moderate fertility[1]. Easily grown in a peaty soil in shade or partial shade[187]. Grows well in heavy clay soils. Grows best in sandy soils[208]. Prefers a damp soil[1]. Not suitable for alkaline soils[28, 188]. A very ornamental plant[1], it grows well with heathers[187]. Special Features: Attracts birds, Attractive foliage. North American native, Wetlands plant, The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 3.2.17 Populus hybrids

Hybrid poplar

2 tlin 10 cyuc 3 kcak 4 tcan 3 dwat 50 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwissliphsom hpa7tmwatli hjonli

drutta Populus hybrids is a TREE growing to 50 m (164ft) by 30 m (98ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid, very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista See individual species.

kcakta Edible Parts: Inner bark Leaves SeedEdible Uses: TeaLeaves are rich in protein and have a greater amino-acid content than wheat, corn, rice and barley[226]. Carbon Farming Solutions - Staple Crop: protein (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta Biomass Fodder Plant support Resin Shelterbelt-Like willows (Salix spp.), their close relatives, poplars are known for fast growth and rapid biomass accumulation. Most coppice well and are easy to propagate from cuttings [1-1]. Carbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Agroforestry Services: windbreak, living trellis (Agroforestry is a land use management system in which trees or shrubs are grown around or among

crops or pastureland). Fodder: bank. Other Systems: SRC, irreg. intercrop, strip intercrop. Commonly grown as windbreaks. Intercropped with annuals across northern China. In Italy they are pruned to be living trellises for grape growth.

dwatta Antiinflammatory Antirheumatic Antiscorbutic Antiseptic Antitussive Cathartic Diuretic Expectorant Febrifuge Ophthalmic Skin Stimulant TonicSome. See individual species. For example Balsam poplar has a long history of medicinal use. It was valued by several native North American Indian tribes who used it to treat a variety of complaints, but especially to treat skin problems and lung ailments[257]. In modern herbalism it is valued as an expectorant and antiseptic tonic. The leaf buds are antiscorbutic, antiseptic, diuretic, expectorant, stimulant, tonic[4, 46, 61, 165, 172]. The leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[213]. They are boiled in order to separate the resin and the resin is then dissolved in alcohol[222]. The resin is a folk remedy, used as a salve and wash for sores, rheumatism, wounds etc[222, 257]. It is made into a tea and used as a wash for sprains. inflammation, muscle pains etc[222]. Internally, the tea is used in the treatment of lung ailments and coughs[222]. The buds can also be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The bark is cathartic and tonic[4]. Although no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238]. A tea made from the inner bark is used as an eye wash and in the treatment of scurvy[222].

nrakta Origin: N. Temperate. Widely distributed throughout the northern temperate regions, ranging from North America through Eurasia and northern Africa. ksacta propta Seed. Cuttings

nwatta Agroforestry Services: Living trellis Agroforestry Services: Windbreak Fodder: Bank Global Crop Industrial Crop: Biomass Management: Coppice Management: Standard Other Systems: Irreg. Intercrop Other Systems: SRC Other Systems: Strip intercrop Staple Crop: ProteinClimate: boreal to warm temperate. Humidity: semi-arid to humid. Native to much of the northern temerate region and thrive from boreal through warm temperate climates as well as tropical highlands. Some are adapted to semi-arid sites although most prefer humid conditions [1-1]. Carbon Farming Solutions - Cultivation: global crop. Management: standard, coppice (Describes the non-destructive management systems that are used in cultivation) [1-1].

# 3.2.18 Salix hybrids

Hybrid willows

2 tlin 11 cyuc 3 kcak 5 tcan 3 dwat 25 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Salix hybrids is a deciduous Shrub growing to 25 m (82ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. The flowers are pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista See individual species.

kcakta Edible Parts: Inner bark LeavesEdible Uses: See individual species. In some species the inner bark and leaves are edible

tcanta Basketry Biomass Fencing Filter Fodder Soil stabilization Weaving WoodWastewater treatment - converting wastewater to biomass fuel by taking up excess nutrients in warer for fertilizer. A strong, light flexible wood used for basketry, fencing and natural building. Erosion control and bank stabilization akong streams and rivers [1-1]. Carbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Fodder: bank. The leaves are a

good fodder for livestock. Other Systems: SRC. Dynamic accumulator

dwatta Some. See individual species. Willow bark was the basis for aspirin development. Many cultures have used willow bark for pain relief, thanks to a compound in willow bark called salicin.

nrakta Origin: N. Temperate, Africa, S. America. A wide natural distribution from the tropics to the arctic zones and are extensively cultivated around the world. ksacta Found along streambanks and in wetlands. Willows survive in warm and cold weather zones, although most thrive in moist climates.

propta Seed

nwatta Fodder: Bank Industrial Crop: Biomass Manage Coppice Minor Global Crop Other Systems: SRCClimate:, tropical highlands. Humidity: semi-arid to humid, aquatic. There are tree, shrub, and ground cover willows. Usually coppiced or pollarded when managing. Some coppiced willows have lived to 800 years. Easy to breed and hybridize. Willows are very cross-compatible, and numerous hybrids occur, both naturally and in cultivation. A well-known ornamental example is the weeping willow (Salix × sepulcralis), which is a hybrid of Peking willow (Salix babylonica) from China and white willow (Salix alba) from Europe. Breeding work has increased biomass yields 50% in the last few decades. European breeding emphasises Salix viminalis and four or five others while North America is based on Salix purpurea and others. Carbon Farming Solutions - Cultivation: minor global crop. Management: coppice (Describes the non-destructive management systems that are used in cultivation) [1-1].

# 3.2.19 Betula pubescens

White Birch, Downy birch 2 tlin 9 cyuc 3 kcak 5 tcan 3 dwat 20 m hkuc

thut cyutli kyuctcuphja7n hwicli hyishrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Betula pubescens is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 1. It is in flower in April, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

pcista The aromatic and aliphatic hydrocarbons in birch tar are irritating to the skin. Do not use in patients with oedema or with poor kidney or heart functions [301]

kcakta Edible Parts: Flowers Inner bark Leaves SapEdible Uses: TeaInner bark - cooked or dried, ground into a powder then used with cereals for making bread etc[2, 15, 46]. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[177, K]. Sap - raw or cooked. A sweet flavour[2, 15, 177]. Harvested in early spring, before the leaves unfurl, by tapping the trunk. The flow is best on sunny days following a heavy frost. The sap is often concentrated into a sugar by boiling off the water. Between 4 and 7 litres can be drawn off a mature tree in a day and this will not kill the tree so long as the tap hole is filled up afterwards[115]. However, prolonged or heavy tapping will kill the tree. A beer can be fermented from the sap. An old English recipe for the beer is as follows:-"To every Gallon of Birch-water put a guart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up . . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269]. Young leaves - raw or cooked[15, 177]. Young catkins[15]. No more details are given. A tea is made from the leaves[15] and another tea is made from the essential oil in the inner bark[21].

tcanta Adhesive Besom Charcoal Compost Dye Essential Fibre Fungicide Miscellany Paper Pioneer Polish Repel-

damp open woodland[4, 43].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame. Water lightly in summer, it should germinate in autumn or winter[164, 200]. Stored seed requires a period of cold stratification[164]. Sow as early in spring as possible in a cold frame. Sow the seed thinly so that it will not be necessary to prick them out for their first year of growth. Give an occasional liquid feed to the seedlings to make sure that they do not become nutrient deficient. When the plants are dormant, pot up the small bulbs putting 2 - 3 bulbs in each pot. Grow them on in a shady position in the greenhouse for another 2 3 years and then plant them out into their permanent positions when they are dormant in late summer. Division in summer as the leaves die down. This species does not produce offsets[200].

nwatta Prefers slightly acid soil conditions but succeeds in chalky soils if these contain plenty of humus[164]. Reguires semi-shade, preferably provided by trees or shrubs, and a well-drained soil[42, 164]. Succeeds in almost any light soil, preferring one that is rich in humus[1]. Nonflowering plants far outnumber flowering ones in most populations because of their extensive stolon production[270]. This species does not flower very freely, increasing mainly by its stoloniferous habit[164]. The flowers only open in warm sun[90]. When established in woodland, this species can spread very freely by means of underground roots[258]. Flowers are produced in 3 - 4 years from seed[164]. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. The root pattern is a corm swelling at the stem base [1-2].

# 4.2.50 Brassica oleracea botrytis

Cauliflower

3 tlin 10 cyuc 4 kcak 3 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica oleracea botrytis is a BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers LeavesEdible Uses: Immature flowering head - raw or cooked[1, 16, 37, 46]. A mild cabbage-like flavour, they make an excellent cooked vegetable and are also very acceptable in salads[K]. By careful selection of cultivars, it is possible to produce flowering heads all year round[K]. Leaves - cooked[37]. A mild cabbage flavour, they make a good cooked vegetable[K]. Do not overharvest them, however, since this would adversely affect the production of the flowering head[K].

tcanta Companion FungicideAn extract of the seeds inactivates the bacteria that causes black rot[20, 201]. Grows well with celery and other aromatic plants since these seem to deter insect predations[18, 20, 201]. Grows badly with beet, tomatoes, onions and strawberries[20, 2011.

nrakta A cultivated form of B. oleracea. ksacta Not known in the wild.

propta Seed - sow in a seedbed outdoors in April to June depending on the cultivar. Plant out into their permanent position when the plants are 5 - 10cm tall. Seed of some cultivars can be sown in late winter in a greenhouse in order to obtain a harvest in early summer. Do not let the seedlings get overcrowded or they will soon become leggy and will not make such good plants. If your seedlings do get leggy, it is possible to plant them rather deeper into the soil - the buried stems will soon form roots and the plant will be better supported.

nwatta Succeeds in full sun in a well-drained moistureretentive fertile soil with plenty of lime[37, 200, 264]. Cauliflowers, especially the winter and spring maturing types, should not be given a soil that is too rich in nitrogen since this can encourage soft, sappy growth that is more susceptible to winter cold damage[264]. Prefers a heavy soil[16]. Requires a warm sunny position[16]. Prefers a pH in the range 6 to 7[200], though it tolerates a pH in the range 4.3 to 8.3. Succeeds in maritime gardens[200]. Lack of moisture in the growing season can cause the plant to produce small or deformed curds[264]. Summer varieties are not very cold hardy and will be damaged by light frosts, winter cauliflower plants are more hardy and will tolerate temperatures down to about -6°c, though the curds are more sensitive and can suffer damage at about -2°c[200]. This damage can often be prevented by bending over the leaves so that they cover the curd. Cauliflowers are widely grown for their edible immature flower heads (or curd). There are many named varieties and, by careful selection, it is possible to provide a year round supply. The summer and autumn maturing cultivars are annuals, they need to produce a certain number of leaves before curd development will be initiated. The optimum temperature for this is around 17°c, but at temperatures above 20°c the curds will either be of poor quality or not be produced at all[200]. Winter and spring maturing forms are biennial and need exposure to temperatures below 10°c before they will produce curds and once again, this will not happen unless the plant has reached a certain size[200]. Grows well with celery and other aromatic plants since these seem to deter insect predations[18, 20, 201]. Grows badly with beet, tomatoes, onions and strawberries[20, 201].

# 4.2.51 Mentha spicata

Spearmint

3 tlin 9 cyuc 4 kcak 3 tcan 3 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha spicata is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A strong spearmint flavour, they are used as a flavouring in salads or cooked foods[2, 4, 5, 183]. The leaves are often used in 'mint sauce', which is used as a flavouring in meals[238]. A herb tea is made from the fresh or dried leaves[21, 183]. It has a very pleasant and refreshing taste of spearmint, leaving the mouth and digestive system feeling clean(K]. An essential oil from the leaves and flowers is used as a flavouring in sweets, ice cream, drinks etc[46, 57, 183]. A spearmint flavour[183].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant, the yield is about 4K of oil from 1 tonne of leaves[46, 57]. The oil is used commercially as a food flavouring and oral hygiene preparation[238]. The plant repels insects and was formerly used as an strewing herb[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the

the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Very young growth can be poisonous to animals[212].

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[2, 46, 61, 203]. Long, sweet and fleshy[105], when slow roasted they are said to taste like sweet potatoes[183, 207]. They can be used as a flavouring in other foods and can also be chewed raw as a masticatory[177, 183, 212], making an excellent tooth cleaner and also very good for teething children. The root contains 6% glycyrrhizin, a substance that is 50 times sweeter than sugar[183]. The tender young shoots can be eaten raw in the spring[183, 257].

tcanta Nitrogen fixer. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch

dwatta Birthing aid Foot care Odontalgic Poultice TonicAmerican liquorice was widely employed medicinally by a number of native North American Indian tribes who used it in the treatment of a range of diseases[257]. All parts of the body are medicinal, but the roots are the most active part. This species has properties similar to other liquorices which are widely used medicinally, though this species is rather neglected in modern literature. An infusion of the root is used to speed the delivery of the placenta after childbirth, it is also used to treat coughs, diarrhoea, chest pains, fevers in children, stomach aches etc[207, 257]. It is also used as a wash or poultice on swellings[257]. The chewed root is retained in the mouth as a treatment for toothache and sore throats[207, 257]. The mashed leaves are used as a poultice on sores[207, 257]. The leaves have been placed in the shoes to absorb moisture[257].

nrakta N. America - Saskatchewan to British Columbia, south to California and Mexico. ksacta Cultivated ground, waste places, roadsides, prairies, gravelly river bottoms and moist mountain draws to 2,100 metres[212]. Usually grows in patches, frequently in heavy clay and saline soils[212].

propta Pre-soak the seed for 24 hours in warm water and then sow spring or autumn in a greenhouse[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in a greenhouse. Plant out in late spring or early summer when in active growth. Plants are rather slow to grow from seed[238]. Division of the root in spring or autumn. Each division must have at least one growth bud. Autumn divisions can either be replanted immediately or stored in clamps until the spring and then be planted out[200]. It is best to pt up the smaller divisions and grow them on in a cold frame until they are established before planting them out in the spring or summer.

nwatta Requires a deep well cultivated fertile moistureretentive soil for good root production[200]. Prefers a sandy soil with abundant moisture[238]. Slightly alkaline conditions produce the best plants[238]. A very deep-rooted plant, it can be difficult to eradicate once it is established[238]. Unless seed is required, the plant is usually prevented from flowering so that it puts more energy into producing good quality roots[238]. Plants are growing very well at Kew[K] This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 4.1.9 Hedysarum boreale

Sweet Vetch, Utah sweetvetch, Northern sweetvetch tfo2n 3 tlin 7 cyuc 4 kcak 3 tcan 0 dwat 0.1 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hedysarum boreale is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The sub-species H. boreale mackenzii is said to have a slightly toxic root, but no mention about toxicity for this species has been found.

kcakta Edible Parts: RootEdible Uses: Young tender roots - raw or cooked[183]. Sliced and eaten raw, boiled, baked or added to soups[183]. A sweet carrot[105] or liquorice-like flavour[183].

nrakta Northern N. America - Saskatchewan to Arizona ksacta Calcareous gravels and rocky slopes[204].

propta Seed - sow in a cold frame as soon as it is ripe or in the spring[200]. Stored seed should be pre-soaked for 24 hours in warm water. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Great care is needed since the plant dislikes root disturbance[200].

nwatta Easily grown in ordinary garden soil in a sunny position, preferring a deep well-drained sandy loam[1, 200]. Plants strongly resent root disturbance and should be placed in their permanent positions as soon as possible[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 4.1.10 Gymnocladus dioica

Kentucky Coffee Tree

tfo2n 3 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli nyanhjen hjonli

drutta Gymnocladus dioica is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The ripe seed contains hydrocyanic acid. This toxin can be destroyed by thoroughly heating the seed for at least 3 hours at 150°c[183]. The seed contains saponins[222]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by heat so a long slow baking can destroy them. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Seed SeedpodEdible Uses: CoffeeSeedpod - raw or cooked. The roasted seeds can be eaten like sweet chestnuts[257]. The pulp is sweet[2, 82]. A flavour like caramel[222]. The pods are up to 25cm long and 5cm wide[229]. The roasted seed is a caffeine-free coffee substitute[2, 11, 46, 95, 213]. A bitter flavour[226]. Thorough roasting for at least 3 hours at 150°c is necessary in order to destroy the poisonous hydrocyanic acid that is found in the seed[183]. Seed - roasted and eaten like a nut[161, 213, 2261. The seed contains toxic substances, see notes above.

tcanta Insecticide Miscellany Soap Soil reclamation WoodThe fruit is high in saponins and is used as a soap[200]. The leaves are used as a fly poison[222]. Trees are planted on the spoil tips of mines to stabilize and reclaim the soil[200]. Wood - coarse-grained, heavy though not hard, strong, very durable in contact with the soil, finishes to a fine lustre. A handsome wood, it weighs 43lb per cubic foot and is used for cabinet work, furniture, construction, fencing etc[46, 61, 82, 171, 229, 235].

dwatta Homeopathy MiscellanyThe pulverised root bark is used as an effective enema[213, 222, 257]. A tea made from the bark is diuretic[222]. It is used in the treatment of coughs due to inflamed mucous membranes and also to help speed up a protracted labour[222]. A snuff made from the pulverized root bark has been used to cause sneezing in comatose patients[257]. A tea made from the leaves and pulp from the pods is laxative and has also been used in the treatment of reflex troubles[222]. A decoction of the fresh green pulp of the unripe fruit is used in homeopathic practice[82].

nrakta Eastern and Central N. America - New York to Tennessee, west to Arkansas and South Dakota. ksacta Prefers deep rich soils in bottomlands, deep ravines and moist lower slopes[229].

propta Seed - best sown in a greenhouse as soon as it is ripe[200]. The seed can also be sown in early spring in a greenhouse[78]. Scarification and pre-soaking the seed for 24 hours in warm water, especially if it has been stored, will improve germination[200]. Make sure the seed has swollen after soaking, soak it again if it has not and, if it still does not swell, try filing away some of the seedcoat but be careful not to damage the embryo. As soon as they are large enough to handle, prick the seedlings out into fairly deep individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Consider giving them some protection against the cold for their first couple of winters outdoors Root cuttings 4cm long and 1cm thick in a greenhouse in December[200]. Plant the roots horizontally in pots[78]. Good percentage.

nwatta Landscape Uses:Pest tolerant, Specimen, Street tree. Requires a deep rich soil and a sunny position[1, 200]. Tolerates drought, atmospheric pollution, salt and limestone soils[200]. A very cold-hardy plant, tolerating temperatures down to about -30°c[200]. A very ornamental[1] but slow growing tree[11], it rarely flowers in Britain, requiring more summer heat than it usually gets here[11, 200]. Trees in the wild seldom live longer than 100 years[229]. The tree has a light canopy so does not cast much shade[200], making it a good tree to use for the top canopy of a woodland garden. Dioecious. Male and female plants must be grown if seed is required. Unlike most members of the Leguminosae, his species does not form nodules of nitrogen-producing bacteria on the roots[274]. Special Features: North American native, Fragrant flowers, Inconspicuous flowers or blooms.

# 4.1.11 Shepherdia argentea

Buffalo Berry, Silver Buffaloberry, tfo2n 3 tlin 9 cyuc 3 kcak 4 tcan 1 dwat 4 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Shepherdia argentea is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in March, and the seeds ripen from July to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The fruit contains low concentrations of saponins[101]. Although toxic, these substances are very

poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 2, 11, 61, 161, 257]. It can also be dried and used like currants[3, 46]. A tart but pleasant flavour even before a frost[85, 183], it becomes sweeter after frosts[3, 62, 95]. The fruit is also used for making preserves, pies etc[183]. The fruit should be used in moderation due to the saponin content[101]. The fruit is produced singly or in clusters, it is up to 9mm long and contains a single seed[229].

tcanta Dye Hedge Hedge Soil stabilizationThe plants can be grown as a hedge[160] and windbreak[229]. A red dye is obtained from the fruit[57, 106, 257]. Because it has a wide-ranging root system, forms thickets and is wind tolerant, it is sometimes planted for erosion control[229].

dwatta Febrifuge Laxative StomachicThe berries are febrifuge, laxative and stomachic[257]. They have been eaten in the treatment of stomach complaints, constipation and fevers[257].

nrakta Central N. America - Manitoba to New Mexico. ksacta Banks of streams[43] and open wooded areas, often on limestone[101] and on sandy soils[229].

propta Seed - it must not be allowed to dry out[113]. It is best harvested in the autumn and sown immediately in a cold frame. Stored seed requires 2 - 3 months cold stratification[113]. Prick out the seedlings into individual pots once they are large enough to handle. If sufficient growth is made it will be possible to plant them out in the summer, otherwise grow them on in a cold frame for their first winter and plant them out in the following spring or early summer. Cuttings of half-ripe wood, July/August in a frame sometimes work[113].

nwatta Landscape Uses: Erosion control, Massing, Succeeds in an ordinary well-drained moisture retentive soil[1, 3, 11]. Tolerates poor dry soils[200] and maritime exposure[182]. Established plants are drought resistant[182]. A very cold-tolerant plant[229]. Plants rarely produce fruit in Britain[11]. Occasionally cultivated for its edible fruit, there are some named varieties[183]. 'Xanthocarpa' has yellow fruits[200]. The fruit is difficult to harvest because the shrub is very thorny[3]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Dioecious. Male and female plants must be grown if fruit and seed are required. Special Features: Attractive foliage, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.)

# 4.1.12 Lathyrus japonicus maritimus

tfo2n 3 tlin 7 cyuc 2 kcak 3 tcan 0 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lathyrus japonicus maritimus is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH:

and tonic[4, 37, 57, 61, 171, 238]. Small doses act as an region of the world) [1-1]. Perennial crops are being develastringent tonic to the digestive system, whilst larger doses act as a mild laxative [232]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedv is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232]. nrakta Cosmopolitan ksacta Garden Hybrid

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. This species is a hybrid and will not necessarily breed true to type from seed. However, this does give the opportunity to look for superior plants from amongst the seedlings. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta R. hybridum is an herbaceous perennial plant. A very easily grown plant, tolerant of considerable neglect, it prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200. 2641. It succeeds in most soils provided the drainage is good[200] and will grow in the dappled shade of trees so long as there is sufficient side light[K]. It grows well in heavy clay soils. Tolerates acid conditions but prefers a pH in the range 6.5 to 7[200]. Plants are very cold hardy, tolerating temperatures down to at least -20?c[200]. The plant does not like hot summers, however, and is likely to die in warmer climates[264]. Rhubarb is a long-lived and almost indestructible perennial plant[264]. It is often cultivated for its edible leaf stems, there are many named varieties[74, 183]. Most cultivars produce edible stems from spring to early summer. though 'Glaskin's Perpetual' can be harvested throughout the summer. By digging up the roots in the autumn and exposing them to frost, earlier growth will be initiated. These roots can then be transferred to a cold frame or other protected area where they will produce their edible stems in late winter. It is also possible to produce earlier crops outdoors by covering the plants with a layer of straw and an upturned bucket. This species is probably of hybrid origin, R. rhaponticum x R. palmatum[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

# 4.2.48 Helianthus pauciflorus

Stiff Sunflower, Prairie Sunflower 3 tlin 7 cyuc 4 kcak 1 tcan 0 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Helianthus pauciflorus is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known

kcakta Edible Parts: Oil SeedEdible Uses: OilCarbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular

oped for their oil-seed. The Land Institute see them as part of a perennial polyculture system [1-1].

tcanta OilDrought-tolerant and suitable for xeriscaping. Attractive to bees, butterflies and/or birds

dwatta None Known

nrakta North American. Widespread across the Great Plains, the Rocky Mountains, and the Great Lakes region. Naturalized in the eastern United States and in much of southern Canada (from Alberta to Nova Scotia). ksacta Dry to moderately wet prairies and open areas. Subspecies Helianthus pauciflorus subsp. subrhomboideus occurs in dry, open habitats.

propta An easy plant to grow. Division. Herbaceous stem cuttings. Seed; direct sow outdoors in autumn. Self-

nwatta Management: Standard Staple Crop: Proteinoil Under DevelopmentClimate: boreal to warm temperate. Humidity: semi-arid to humid. Soil pH: 6.1 (mildly acidic) to 7.8 (mildly alkaline). Prefers full sun and mesic to dry conditions. Soil can contain significant amounts of loam, clay loam, sand, or gravelly material. Easy to grow. Carbon Farming Solutions - Cultivation: under development. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1]. Perennial crops are being developed for their oil-seed. The Land Institute see them as part of a perennial polyculture system [1-1]. Several perennial sunflowers are being worked with including prairie natives handling boreal to warm temperate semi-arid conditions: Helianthus maximliani (Maximilian sunflower). Helianthus tuberosus (Ierusalem artichoke). Helianthus pauciflorus (Stiff sunflower). Less tolerant of boreal conditions but good on poor soils is Helianthus cusickii (Cusick's sunflower) [1-1].

# 4.2.49 Erythronium americanum

Trout Lily, Dogtooth violet 3 tlin 7 cyuc 4 kcak 3 tcan 1 dwat 0.2 m hkuc

hmim cvutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Erythronium americanum is a BULB growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from March to April, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland). It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, the following notes have been seen for another member of this genus and so some caution is advised. Skin contact with the bulbs has been known to cause dermatitis in sensitive people[65].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw[106] or cooked[105, 177]. A crisp, chewy and very pleasant taste[183]. The bulb is up to 25mm long and is buried quite deeply in the soil[4]. Leaves - raw or cooked[105, 177]. Added to salads[183]. Eating the leaves will greatly reduce the vigour of the bulb, so can only be recommended in times of emergency[K]. Flowers, flower buds and flower stems - raw or cooked[183].

tcanta Plants spread freely by means of underground stems and make a delightful ground cover in dappled shade[257]. The plants are only in growth from late winter to late spring so the ground cover effect is ephemeral[K].

dwatta Antiscrophulatic Contraceptive Emetic Emollient PoulticeAll parts of the plant, but especially the bulb and the fresh leaves, are strongly emetic and are not used internally[4]. The fresh leaves are also antiscrofulatic and emollient and are used as an infusion or stimulating poultice applied to swellings, tumours and scrofulous ulcers[4, 106, 2541. The juice from crushed leaves has been applied to wounds that are not healing[257]. A poultice of the crushed bulbs has been applied to swellings and to help remove splinters[257]. The raw plant, excluding the roots, has been used by native North American young girls to prevent conception[257].

nrakta Eastern N. America - New Brunswick to Florida, west to Ontario and Arkansas. ksacta Meadows and rich

nwatta Landscape Uses:Border, Erosion control, Foundation, Ground cover, Massing, Seashore, Woodland garden. Succeeds in a well-drained fertile soil in full sun[11, 200]. Tolerates poor soils[169, 200]. Established plants are drought resistant[169]. A very hardy plant when fully dormant, tolerating temperatures down to about -25°c[184]. However, the young growth in spring can be damaged by late frosts. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus. Toxicodendron, by some botanists[200]. This species is a low suckering shrub[182]. There is a specially low growing form, var. arenaria, that is found growing on sand dunes in the mid-west of N. America[184]. A polymorphic species[43]. Plants are susceptible to coral spot fungus[11]. Plants have brittle branches that are easily damaged in very strong winds[11]. Plants in this genus are notably resistant to honey fungus[200]. This species transplants easily[169]. The plant has an offensive smell[149]. Or, to go by another nose, the bruised leaves emit a delicious resinous scent[245]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attracts birds, North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.46 Campanula persicifolia

Harebell, Peachleaf bellflower 3 tlin 7 cyuc 4 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula persicifolia is an evergreen Perennial growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw or cooked[2, 105]. Rich in vitamin C[74]. A mild flavour, it is nice in salads and is liked by most people who try it[K]. The plant forms over-wintering basal rosettes of leaves and thus provides a source of fresh leaves throughout the winter[K]. The main problem with these leaves is that they are very narrow and it takes quite a lot of picking in order to obtain a reasonable quantity[K]. Root - raw[74]. Flowers raw. A pleasant sweetness, and a very ornamental addition to mixed salads[K].

nrakta Europe to western and northern Asia. Locally naturalized in Britain. ksacta Commons and open woods[13,

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[200]. Very easy[221], larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in ordinary garden soil[187]. Prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Succeeds in light woodland[200]. Plants are hardy to at least -15°c[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. A very ornamental plant, there are many named varieties[187]. It was at one time grown as a culinary vegetable, but is now only grown as an ornamental plant[4]. The sub-species C. persicifolia crystalocalvx has larger leaves than the species and so is more suitable as a food crop[K]. A very long-lived and easily grown plant[187], it is best divided every other year[111]. Slugs are very fond of this plant and can cause severe damage even to large plants[K]. Members of this genus are rarely if ever troubled by browsing deer[233]. This plant is a potential winter salad plant, it retains a basal rosette of leaves all winter[K].

# 4.2.47 Rheum $\times$ hybridum

Garden Rhubarh

3 tlin 8 cyuc 4 kcak 1 tcan 3 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Rheum × hybridum is a deciduous Perennial growing to 1.5 m (5ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone The flowers are pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista The leaves contain high concentrations of oxalic acid[34, 76]. Oxalic acid can lock up certain minerals (especially calcium) in the body, leading to nutritional deficiency. Cooking the plant will reduce the concentration of oxalic acid. Another report says that the leaves have the same concentration of oxalic acid in the stems as they do in the leaves and it is not the oxalic acid that makes them poisonous. It says that any toxic properties of the leaves is more likely to be due to the presence of glycosides[142]. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Leaf stem - raw or cooked[1, 2, 46, 105, 200]. An acid taste, it is used as a fruit substitute in spring, usually stewed with sugar and used in pies, jams etc[183]. The juice strained from stewed rhubarb can add colour and flavour to a fruit punch[183]. It is best not to eat large quantities of the stems because of their oxalic acid content - see the notes above on toxicity. Immature flowers - cooked and used like cauliflower[183]. One report says that the plant contains 0.7% rutin[240]. It does not specify which part of the plant. though it is likely to be the leaves[K].

tcanta The leaves can be simmered in hot water to make

dwatta Rhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The main species used is R. palmatum. Though the chemistry varies slightly. this species is used interchangeably[238]. Another report says that this species contains only small quantities of the medicinally active compounds and so it is only used as a mild laxative[244]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagoque, demulcent, diuretic, laxative, purgative, stomachic mildly acid, neutral and basic (mildly alkaline) soils. It can-growing plant but some can also be used by other plants not grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The seed contains a toxic amino-acid which, in large quantities, can cause a very serious disease of the nervous system known as 'lathyrism'. The seed is said to be perfectly safe and very nutritious in small quantities, but should not comprise more than 30% of the diet[65, 76].

kcakta Edible Parts: Leaves Seed SeedpodEdible Uses: CoffeeThe immature seeds are eaten raw or cooked like peas[183, 257]. Mature seeds are cooked or sprouted and used in salads[183]. A delightful vegetable[172]. A famine food[177]. Very bitter[2, 105, 106]. Some caution is advised, see the notes above on toxicity. Young seedpods - raw or cooked when less than 25mm long[105, 106, 183]. A sweet flavour[106, 172]. Young plant - raw or cooked[161]. Use young shoots that are less than 25cm long[172, 213]. The roasted seed is a coffee substitute[61, 183, 257].

tcanta Nitrogen Fixer.

nrakta Circumpolar, south to Britain, France, Mongolia. ksacta Shingle beaches and sand dunes[17, 187].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should

nwatta An easily grown plant, succeeding in any moderately good garden soil[1]. Prefers a deep moist well-drained soil in a cool position[187]. Prefers a position in full sun, growing well on hot sunny banks[200]. The seed remains viable for 4 - 5 years in sea water[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is herbaceous. The plant growth habit is a suckering vine sending up suckers some distance main plant [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

# 4.1.13 Hedvsarum vicioides

tfo2n 3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.7 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hedysarum vicioides is a PERENNIAL growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw. cooked or dried and ground into a powder[74].

nrakta E. Asia - N. Korea to E. Siberia. ksacta Sandy to gravelly slopes in high mountains or grassy places in lower districts of Japan[58]. River banks in E. Siberia[74]. Forests and subalpine meadows at elevations of 2500 - 3200 me-

propta Seed - sow in a cold frame as soon as it is ripe or in the spring[200]. Stored seed should be pre-soaked for 24 hours in warm water. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Great care is needed since the plant dislikes root disturbance[200].

nwatta Easily grown in ordinary garden soil in a sunny position, preferring a deep well-drained sandy loam[1, 200]. Plants strongly resent root disturbance and should be placed in their permanent positions as soon as possible[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the

growing nearby[200].

# 4.1.14 Lathyrus japonicus

Beach Pea, Smallflower beach pea

tfo2n 3 tlin 7 cvuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lathyrus japonicus is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It can fix Nitrogen, Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime

pcista The seed contains a toxic amino-acid which, in large quantities, can cause a very serious disease of the nervous system known as 'lathyrism'. The seed is said to be perfectly safe and very nutritious in small quantities, but should not comprise more than 30% of the diet[65, 76].

kcakta Edible Parts: LeavesEdible Uses: Young plant raw or cooked. An excellent sustenance[207].

nrakta W. and N. Europe, E. Asia - China. N. America. ksacta Sandy coasts from Alaska to N. California[60].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should be taken[200].

nwatta An easily grown plant, succeeding in any moderately good garden soil[1]. It prefers a deep moist welldrained soil in a cool position[187]. Prefers a position in full sun, growing well on hot sunny banks[200]. The seed remains viable for 4 - 5 years in sea water[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 4.1.15 Trifolium incarnatum

Crimson Clover

tfo2n 3 tlin 9 cyuc 2 kcak 4 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli fvifxre7t hionli

drutta Trifolium incarnatum is a ANNUAL growing to 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: TeaThe seeds can be sprouted and eaten in salads[183]. They can also be dried and ground into a nutritious flour[183]. Dried flower heads are a tea substitute[183].

tcanta Green manure Soil reclamationUsed as a green manure. It is relatively fast growing, makes an excellent weed suppressing cover and fixes nitrogen[1, 46, 61, 87]. It is also used with grass seed mixes in soil reclamation projects[200].

nrakta Western and southern Europe, including Britain, to the Balkans and the Mediterranean. ksacta Grassy places near the Lizard peninsula in Cornwall[17].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring to early summer in situ. The seed can also be sown in early autumn as a winter green manure.

nwatta Succeeds in a moist, well-drained circum-neutral soil in full sun[200]. Succeeds in poor soils. The ssp. molinerli is the form of this species that is native to Britain, whilst ssp. incarnatum is naturalized in S. Britain and is the form grown as a green manure crop[17]. It grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. Fairly resistant to 'clover rot'[87]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercups growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

### 4.1.16 Caragana pygmaea

Pygmy Peashrub

tfo2n 3 tlin 7 cvuc 1 kcak 2 tcan 0 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Caragana pygmaea is a deciduous Shrub growing to 1.2 m (4ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: RootEdible Uses: Root cooked[105]. An emergency food, used when all else fails[177].

tcanta Fuel StringThe shoots are very flexible, they are used like string for tying[11]. The wood is used for fuel[146]. nrakta E. Asia - China, Himalayas, Siberia ksacta Desert land at high altitudes with virtually no rain in the growing season, 3600 - 4800 metres[145, 146].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It usually germinates in 2 weeks[K]. Stored seed should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen then scarify it and re-soak for another 12 hours before sowing[138]. Germination usually takes place within 2 - 3 weeks at 20°c[138]. Good percentage[11]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[113]. Layering in spring.

nwatta Landscape Uses:Border, Container, Specimen. Prefers full sun and a light sandy dry or very well-drained soil[1, 11, 200]. Does not require a rich soil, succeeding on marginal land[1, 11]. Tolerant of dry alkaline soils. A very ornamental plant[1], it prefers a continental climate with hot summers and cold winters, it does not grow so well in mild maritime areas such as the western half of Britain. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat

days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

### 4.1.17 Lathyrus ornatus

tfo2n 3 tlin 7 cvuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lathyrus ornatus is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

pcista Although no records of toxicity have been found for this plant, the seed of some species in this genus contain a toxic amino acid that can cause a severe disease of the nervous system known as 'lathyrism' if they are eaten in large amounts (although small quantities are said to be nutritious)[65, 76]. Great caution is advised.

kcakta Edible Parts: SeedpodEdible Uses: Seedpods cooked[46, 61, 105, 161].

dwatta Birthing aid DisinfectantThe plant has been used to help remove the placenta after child birth[257]. The plant has disinfectant properties, a cold infusion has been used internally and as a wash in the treatment of 'deer infection'[257].

nrakta Western N. America - Oklahoma to Kansas and South Dakota, west to Colorado and Utah. ksacta Prairies and plains[235]. Dry open pinewoods, 1500 - 2100 metres in

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should be taken[200].

nwatta An easily grown plant, succeeding in any moderately good garden soil but preferring a position in full sun[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 4.1.18 Thermopsis lupinoides

tfo2n 3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thermopsis lupinoides is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: A vegetable[105, 177]. The reports give no more information.

dwatta Expectorant[61]. The fruit is used in the treatment of diseases of the mouth, teeth and

nrakta E. Asia - Siberia to Japan. ksacta Sand dunes near the sea all over Japan[58]. Sandy beaches and the flood land of ravines or by the sea in Heilongjiang and Iilin Provinces of

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame. Germination together for their optimal soil requirements including nutri- runner spreading indefinitely by rhizomes or stolons [1-2]. ents and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

# 4.2.44 Camassia leichtlinii

Wild Hyacinth, Large camas, Suksdorf's large camas 3 tlin 7 cyuc 4 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Camassia leichtlinii is a BULB growing to 1 m (3ft 3in) by 0.2 m (0ft 8in). See above for USDA hardiness It is hardy to UK zone 3 and is not frost tender. It is in leaf from March to August, in flower from June to July, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[94, 105, 177]. The bulb is about 3cm in diameter[270], eaten raw it has a mild, starchy flavour, but a gummy texture that reduces the enjoyment of it somewhat[K]. It is excellent when slow baked, however, developing a sweet flavour and making a very good potato substitute[183, 256, K]. The cooked bulb can also be dried for later use[183] or ground into a powder and used as a thickener in soups or as an additive to cereal flours when making bread, cakes etc[161]. The bulbs can be boiled down to make a molasses, this was used on festival occasions by various Indian tribes[183]. One report says that the bulbs contain inulin (a starch that cannot be digested by humans) but that this breaks down when the bulb is cooked slowly to form the sugar fructose which is sweet and easily digested[256].

nrakta Western N. America - British Columbia to S. California. ksacta Meadows, prairies and hillsides that are moist, at least in early spring.

propta Seed - best sown as soon as it is ripe in a cold frame[134]. The seed can also be sown in a cold frame in spring[134]. It usually germinates in 1 - 6 months at 15°c, but it can be erratic[138]. Sow the seed thinly so that it does not need to be thinned and allow the seedlings to grow on undisturbed for their first year. Give an occasional liquid feed to ensure that the plants do not become nutrient deficient. When the plants are dormant in late summer, pot up the small bulbs putting 2 - 3 bulbs in each pot. Grow them on for another one or two years in a cold frame before planting them out when dormant in late summer. Offsets in late summer. The bulb has to be scored in order to produce offsets.

nwatta A very easily grown plant, it succeeds in almost any soil[42] and is tolerant of considerable neglect once it is established[K]. Grows well in heavy clay soils. Prefers a rather heavy loam[1] that has plenty of moisture in spring but does not remain wet over the winter[138, 200]. Dislikes dry soils[200]. Prefers full sun but tolerates partial shade[138, 200]. A very ornamental plant[1], there are many named varieties[200]. Plants often self-sow[K]. A good bee plant[108]. Plants can be naturalized in damp grass, this should not be trimmed until mid to late summer when the bulbs have flowered and the leaves have died down[134]. This species can be confused with certain poisonous bulbs in the genus Zigadenus[85]. Plant the bulbs 7 - 10cm deep in early autumn and then leave undisturbed[1]. The bulbs should be planted about 20cm deep[233]. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a

Ephemeral emerging in spring and dving back by summer every year [1-2]. The root pattern is a bulb.

### 4.2.45 Rhus aromatica

Lemon Sumach, Fragrant sumac 3 tlin 9 cyuc 4 kcak 2 tcan 2 dwat 1.2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus aromatica is a deciduous Shrub growing to 1.2 m (4ft) by 1.5 m (5ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not selffertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista There are some suggestions that the sap of this species can cause a skin rash in susceptible people, but this has not been substantiated. See also notes in 'Cultivation

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - raw or cooked[2, 22]. The fruit is small with verv little flesh, but it is easily harvested and when soaked for 10 - 30 minutes in hot or cold water makes a very refreshing lemonade-like drink (without any fizz of course)[61, 85, 183, K]. The mixture should not be boiled since this will release tannic acids and make the drink astringent. The fruit can also be dried and ground into a powder then mixed with corn meal and used in cakes, porridges etc[183].

tcanta Basketry Dve Mordant Oil Soil stabilization TanninThe leaves are rich in tannin (up to 25%) and can be collected as they fall in the autumn then used as a brown dve or as a mordant[169]. The bark is also a good source of tannin[4]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The plant has an extensive root system and is sometimes planted to prevent soil erosion[200]. The split stems are used in basket making[4, 46, 61].

dwatta Astringent Diuretic DysenteryThe leaves are astringent and diuretic[61, 222]. They were used in the treatment of colds, stomach aches and bleeding[222]. The root bark is astringent and diuretic[4, 222]. An infusion can be used in the treatment of diarrhoea, dysentery. Used externally, it is used to treat excessive vaginal discharge and skin eruptions and also as a gargle for sore throats[254]. Its use is contraindicated if inflammation is present[222]. The root is harvested in the autumn and dried for later use[254]. The fruits are astringent and diuretic[254]. They have been chewed in the treatment of stomach aches, toothaches and gripe[222] and used as a gargle to treat mouth and throat complaints[254]. They help reduce fevers and may be of help in treating late-onset diabetes[254]. Some caution is advised in the use of the leaves and stems of this plant, see the notes above on toxicity

nrakta Eastern N. America - Quebec to Florida and Indiana to Texas. ksacta Dry rocks, sands and open woods[43]. often on limestone outcrops[149].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. This soak water can be drunk and has a delicious lemonflavour. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

tcanta InsecticideThe leaves can be simmered in hot water to make an insecticide.

dwatta Anticholesterolemic Antiseptic Antispasmodic Antitumor Aperient Astringent Cholagogue Demulcent Diuretic Homeopathy Laxative Purgative Stomachic TonicThe roots of many members of this genus are used medicinally. Whilst R. palmatum is the main species used in China, we have a report that this species (which has probably been derived from it through cultivation) is used in Korea[279]. The uses of R. palmatum are as follows:- Chinese rhubarb. called Da Huang in China, has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. It has a safe and gentle action, safe even for children to use[254]. The plant is also part of a North American formula called essiac which is a popular treatment for cancer. Its effectiveness has never been reliably proven or disproven since controlled studies have not been carried out. The other herbs included in the formula are Arctium lappa, Ulmus rubra and Rumex acetosella[254]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 7, 9, 21, 91, 171, 176, 238]. The roots contain anthraguinones, which have a purgative effect, and also tannins and bitters, which have an opposite astringent effect[244]. When taken in small doses, it acts as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232, 244]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women. nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta E. Asia - Siberia. ksacta Steppe, sparse woods and sandy soils[74].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. This species is a hybrid and will not necessarily breed true to type from seed. However, this does give the opportunity to look for superior plants from amongst the seedlings. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta A very easily grown plant, tolerant of considerable neglect, it prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade[200, 264]. It succeeds in most soils provided the drainage is good[200] and will grow in the dappled shade of trees so long as there is sufficient side light[K]. It grows well in heavy clay soils. Tolerates acid conditions but prefers a pH in the range 6.5 to 7[200]. Plants are very cold hardy, tolerating temperatures down to at least -20°c[200]. The plant does not like hot summers, however, and is likely to die in warmer climates[264]. Rhubarb is a long-lived and almost indestructible perennial plant[264]. It is often cultivated for its edible leaf stems, there are many named varieties[74, 183]. Most cultivars produce edible stems from spring to early summer, though 'Glaskin's Perpetual' can be harvested throughout the summer. By digging up the roots in the autumn and exposing them to frost, earlier growth will be initiated. These roots can then be transferred to a cold frame or other protected area where they will produce their edible stems in late winter. It is also possible to produce earlier crops outdoors by covering the plants with a layer of straw and an upturned bucket. This species is probably of hybrid origin, R. rhaponticum x R. palmatum[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

# 4.2.43 Amaranthus hypochondriacus

Prince's Feather, Prince-of-wales feather 3 tlin 10 cyuc 4 kcak 2 tcan 3 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Amaranthus hypochondriacus is a AN-NUAL/PERENNIAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is frost tender. It is in leaf from April to October, in flower from July to August, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

pcista No members of this genus are known to be poisonous, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: ColouringYoung leaves - cooked as a spinach[183, 238]. Rich in viamins and minerals, they have a mild flavour[K]. Seed - raw or cooked. They can be used as a cereal substitute. They can also be popped in much the same way as popcorn[183]. The seed can be soaked for 12 hours in warm water and then allowed to sprout for about 11 days[244]. They can then be added to salads[183]. Very small but the seed is easy to harvest and very nutritious. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. A red pigment obtained from the plant is used as a food colourind[238].

tcanta DyeYellow and green dyes can be obtained from the whole plant[168]. A red dye obtained from the plant (the report does not specify which part of the plant) is used as a colouring in foods and medicines[238].

dwatta Antidiarrhoeal AstringentThe whole plant contains tannin and is astringent[238, 254]. It is used internally in the treatment of diarrhoea and excessive menstruation[238, 254]. It can be used as a gargle to soothe inflammation of the pharynx and to hasten the healing of ulcerated mouths[254], whilst it can also be applied externally to treat vaginal discharges, nosebleeds and wounds[238]. The plant can be used fresh or it can also be harvested when coming into flower and dried for later use[238].

nrakta Southern N. America. ksacta A weed of wasteland and agricultural land.

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

mwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Tolerates a pH in the range 5.2 to 7.5. Plants should not be given inorganic fertilizers, see notes above on toxicity. Often cultivated, especially in tropical areas, for its edible leaves and seeds, there are many named varieties[183]. This is the most robust and highest yielding of the grain amaranths, though it is late maturing and therefore less suitable for northern areas[183]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work

is usually good and within a month[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring, Divided plants do not establish readily[1].

nwatta Succeeds in any moderately fertile well-drained soil in a sunny position[200], though it prefers a rich light soil[11]. Judging by the plants native habitat, it is likely to be resistant to maritime exposure[K]. There is some confusion over the correct name for this species, with some authorities saying that the name we are using above is a synonym and that the correct name is T. lanceolata[200]. However, other authorities say that T. lanceolata is a distinct species found only in northern China and Russia, whilst this species (T. lupinoides) is also a distinct species found in Japan, eastern China, Korea and Russia[266]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 4.1.19 Lotus corniculatus

Bird's Foot Trefoil

tfo2n 3 tlin 8 cyuc 1 kcak 4 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Lotus corniculatus is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous, containing cyanogenic glycosides(hydrogen cyanide)[65, 76]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death. This species is polymorphic for cyanogenic glycosides[218]. The flowers of some forms of the plant contain traces of prussic acid and so the plants can become mildly toxic when flowering[218]. They are completely innocuous when dried[218].

kcakta Edible Parts: SeedpodEdible Uses: The young seedpods are 'nibbled'[177]. Caution is advised, see notes above on toxicity.

tcanta Dye Green manureAn orange-yellow dye is obtained from the flowers[74]. A useful green manure plant, fixing atmospheric nitrogen[7]. It is difficult to see this plant as a useful green manure, it is fairly slow growing with us and does not produce much bulk[K].

dwatta Antiinflammatory Antispasmodic Cardiotonic Carminative Febrifuge Hypoglycaemic Restorative Sedative Tonic VermifugeCarminative, febrifuge, hypoglycaemic, restorative, vermifuge[178]. The flowers are antispasmodic, cardiotonic and sedative[7]. The root is carminative, febrifuge, restorative and tonic[218]. The plant is used externally as a local anti-inflammatory compress in all cases of skin inflammation[7].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and temperate Asia. ksacta Pastures and sunny banks of streams, especially on calcareous soils (7. 13. 17).

propta Pre-soak the seed for 24 hours in warm water and then sow in the spring or autumn in situ. The seed usually germinates in 2 - 4 weeks at 15°c. If seed is in short supply, it can be sown in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring or early summer.

nwatta Landscape Uses:Border, Erosion control, Rock garden. Requires a well-drained soil in a sunny position[200]. Dislikes shade[200]. Does well on poor soils[61]. An important food plant for many caterpillars[30]. It is also a good bee plant[74], the flowers providing an important

source of nectar[240]. The flowers are powerfully scented, even though they are able to pollinate themselves[245]. The plant spreads very freely at the roots[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Attracts butterflies. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

# 4.1.20 Alnus glutinosa

Alder, European alder , Common Alder, Black Alder tfo2n 3 tlin 7 cyuc 0 kcak 5 tcan 3 dwat 25 m hkuc hmimhtut cyutli tcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Alnus glutinosa is a deciduous Tree growing to 25 m (82ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from March to November, in flower from March to April, and the seeds ripen from September to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

asiticide Pioneer Shelterbelt Soil reclamation Tannin Teeth WoodTolerant of clipping and maritime exposure, the alder can be grown in a windbreak or a hedge[75]. The trees are very quick to establish[200] and will grow at a rate of 1 metre or more per year when young[K]. This is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K]. Because they tolerate very poor soils and also produce nitrogen nodules on their roots, alders are suitable for use in land reclamation schemes. The plants can be used as a source of biomass[269]. According to the phytomass files, annual productivity is estimated at 6 to 9 tonnes per hectare. The tree has vielded 11.8 tonnes per hectare per annum on pulverized fuel ash and annual productivity has been estimated at 8.66 tonnes per hectare, with 5.87 tonnes in wood, bark, and branches, 2.79 tonnes in foliage[269]. Alder has been recommended for consideration for firewood plantations in Tropical highlands where unseasonable cold might destroy the red alder[269]. The powdered bark has been used as an ingredient of toothpastes[9]. Sticks of the bark have been chewed as tooth cleaners[9]. An ink and a tawny-red dye are obtained from the bark[4, 6, 7, 66]. A green dye is obtained from the catkins[4, 6, 66]. A pinkish-fawn dye is obtained from the fresh green wood[4, 6, 66]. A vellow dye is obtained from the bark and young shoots[4, 6, 66]. A cinnamon dve is obtained from the shoots if they are harvested in March[4]. If they are dried and powdered then the colour will be a tawny shade[4]. The bark and the fruits contain up to 20% tannin[46, 61, 223], but they also contain so much dvestuff (imparting a dark red shade) that this limits their usefulness[4, 7]. The leaves are also a good source of tannin[4]. The leaves are clammy and, if spread in a room, are said to catch fleas and flies on their glutinous surface[4, 7]. Wood - very durable in water, elastic, soft, fairly light, easily worked, easily split. It is often used for situations where it has to remain underwater and is also used for furniture, pencils, bowls, woodcuts, clogs etc. It is much valued by cabinet makers[4, 7, 11, 13, 26, 46, 66, 100, 115]. The wood also makes a good charcoal[4, 115].

dwatta Alterative Astringent Cathartic Emetic Febrifuge Galactogogue Haemostatic Parasiticide Skin Tonic VermifugeThe bark is alterative, astringent, cathartic, febrifuge and tonic[4, 7, 14, 46, 269]. The fresh bark will cause vomiting, so use dried bark for all but emetic purposes[21]. A decoction of the dried bark is used to bathe swellings and inflammations, especially of the mouth and throat[4, 9, 21, 2541. The powdered bark and the leaves have been used as an internal astringent and tonic, whilst the bark has also been used as an internal and external haemostatic against haemorrhage[21]. The dried bark of young twigs are used, or the inner bark of branches 2 - 3 years old[9]. It is harvested in the spring and dried for later use[9]. Boiling the inner bark in vinegar produces a useful wash to treat lice and a range of skin problems such as scabies and scabs[21]. The liquid can also be used as a toothwash[21]. The leaves are astringent, galactogogue and vermifuge[7]. They are used to help reduce breast engorgement in nursing mothers[254]. A decoction of the leaves is used in folk remedies for treating cancer of the breast, duodenum, oesophagus, face, pylorus, pancreas, rectum, throat, tongue, and uterus[269]. The leaves are harvested in the summer and used fresh[238].

nrakta Most of Europe, including Britain, to Siberia, W. Asia and N. Africa. ksacta Wet ground in woods, near lakes and along the sides of streams, often forming pure woods n succession to marsh or fen[9].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, Kl. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. There are about 700,000 - 750,000 seeds per kilo, but on average only about 20 - 25,000 plantable seedlings are produced[269]. Seeds can remain viable for at least 12 months after floating in water[269]. Seeds germinate as well under continuous darkness as with normal day lengths. Airdried seeds stored at 1 - 2°C retained their viability for two years. Seeds can however be sown immediately as soon as ripe[269]. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Agroforestry Services: Nitrogen Industrial Crop: Biomass Industrial Crop: Tannin Management: Coppice Management: Standard Minor Global Crop Other Systems: SRCLandscape Uses:Firewood, Pest tolerant, Pollard, Screen. Prefers a heavy soil and a damp situation[1, 11], tolerating prolonged submergence of its roots and periods with standing water to 30cm deep[186, 200]. Plants can also grow quickly in much drier sites, though they will usually not live for so long in such a position. Alders grow well in heavy clay soils[24, 98], they also tolerate lime and very infertile sites [200]. Tolerates a wide range of soils but prefers a pH above 6[186]. Very tolerant of maritime exposure[49, 75, 166]. Alder is estimated to tolerate an annual precipitation of 40 to 200cm, an annual average temperature of 8 to 14°C and a pH of 6 to 8[269]. The leaves often remain green on the tree until November, or even later on young seedlings. The seeds contain a margin of air-filled tissue and are capable of floating in water for 30 days before becoming waterlogged[186]. This enables distribution of the seed by water. The alder has a very rapid early growth[98], specimens 5 years old from seed were 4 metres tall even though growing in a very windy site in Cornwall[K]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[98. 200]. Nitrogen-fixation by trees up to 8 years old has been put at 125 kg/ha/yr., for 20 years at 56 - 130 kg/ha/yr.[269]. Trees often produce adventitious roots from near the base of the stem and these give additional support in unstable soils[186]. Trees are very tolerant of cutting and were at one time much coppiced for their wood which had a variety

of uses[4, 186]. Alders are an important food plant for the caterpillars of many butterfly and moth species[30] and also for small birds in winter[24]. There are 90 insect species associated with this tree[24]. There are some named varieties, selected for their ornamental value[200]. Special Features:Not North American native, Naturalizing, Wetlands plant, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 4.1.21 Alnus hirsuta

tfo2n 3 tlin 7 cyuc 0 kcak 0 tcan 0 dwat 18 m hkuc hmimhtut cyutli tcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatnriklwis hpa7tmwatli hionli

drutta Alnus hirsuta is a deciduous Tree growing to 18 m (59ft 1in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from March to April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

tcanta Charcoal Dye WoodA dye is obtained from the bark[46, 61]. No more details are given. Wood - close grained. Used in turnery and for making charcoal[46, 61].

nrakta E. Asia - Japan, Manchuria ksacta Mountains and hills all over Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. A polymorphic species[58], it is closely related to A. incana[11]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 4.1.22 Robinia viscosa

Clammy Locust, Hartweg's locust tfo2n 3 tlin 7 cyuc 0 kcak 3 tcan 0 dwat 13 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Robinia viscosa is a deciduous Tree growing to 13 m (42ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

because of its inulin content[9]. Inulin is a starch that cannot be digested by humans, it tends to pass straight through the digestive system and is therefore unlikely to be of use to a diabetic[K]. However, the inulin can be used to make a sweetener that is suitable for diabetics to use[K]. Chicoryroot is free of harmful ingredients, and is essentially a concentrated combination of three sugars (pentose, levulose and dextrose) along with taraxarcine (the bitter principle of dandelion)[269]. It is especially important as source of levulose[269]. Roots are used in seasoning soups, sauces and gravies, and to impart a rich deep colour[269]. The roasted root is used as a caffeine-free coffee adulterant or substitute[2, 4, 5, 7, 13, 21, 27, 46]. Young roots have a slightly bitter caramel flavour when roasted, roots over 2 years old are much more bitter[238].

tcanta Biomass CompostThe roots have the potential to be used for the production of biomass for industrial use[132]. They are rich in the starch 'inulin' which can easily be converted to alcohol[269]. A blue dye has been obtained from the leaves[4]. The flowers are an alternative ingredient of 'QK' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Nectary, Insect shelter.

dwatta Appetizer Bach Cardiac Cholagogue Depurative Digestive Diuretic Hypoglycaemic Laxative Tonic WartsChicory has a long history of herbal use and is especially of great value for its tonic affect upon the liver and digestive tract[254]. It is little used in modern herbalism. though it is often used as part of the diet. The root and the leaves are appetizer, cholagogue, depurative, digestive, diuretic, hypoglycaemic, laxative and tonic[4, 7, 9, 13, 21, 46, 222]. The roots are more active medicinally [222]. A decoction of the root has proved to be of benefit in the treatment of jaundice, liver enlargement, gout and rheumatism[4]. A decoction of the freshly harvested plant is used for treating gravel[4]. The root can be used fresh or dried, it is best harvested in the autumn[9]. The leaves are harvested as the plant comes into flower and can also be dried for later use[9]. The root extracts have experimentally produced a slower and weaker heart rate (pulse)[222]. The plant merits research for use in heart irregularities[222]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Possessiveness', 'Self-love' and 'Self-pity'[209]. The latex in the stems is applied to warts in order to destroy them[218]. The German Commission E Monographs, a therapeutic quide to herbal medicine, approve Cichorium intybus for loss of appetite, dyspepsia (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Grassy meadows and arable land, especially on chalk[5, 13].

propta Seed - sow the wild form or cultivars being grown for their roots in May or June in situ. Cultivars being grown for their edible leaves can be sown in April for a summer crop or in June/July for a winter crop. Sow them in situ or in pots and then plant them out as soon as they are large enough.

nwatta Prefers a sunny position in any moderately fertile well-drained moisture retentive soil[1, 14, 52]. Prefers a pH 5.5 to 7[200]. Tolerates a pH in the range 4.5 to 8.3. Chicory grows on any type of soil but, when cultivated, grows best on mellow, deeply tilled, fertile soil or sandy loam[269].. A cool weather crop, it tolerates only moderate summer temperatures and requires well-distributed rainfall, with good drainage, or some irrigation in drier areas[269]. Chicory roots deeply in relatively short time; soil too wet for beans and small grains is not suitable[269]. To insure proper rootgrowth, apply lime or marl to acid soil to neutralize acidity[269]. Chicory is reported to tolerate a pH in the range of 4.5 to 8.3, an annual rainfall of 30 to 400 cm and an annual mean biotemperature of 6° to 27°C[269]. Chicory is an excellent winter salad. It is often cultivated, especially in Europe, for its edible leaves and for its roots which are used to make a coffee substitute. There are many named varieties[46, 132, 183] and, by careful selection of cultivars and sowing times, fresh leaves can be obtained all year round. There are three main types of chicory grown for their leaves. there are many cultivars of each form:- A bitter-tasting loose leafed form is grown as a green winter vegetable, especially in southern Italy. A narrow-leafed, witloof or Belgian form

has a compact elongate head (chicon) which is blanched for use in salads or cooked dishes. A broad-leaved (usually red) form produces cabbage-like hearts, these are generally less bitter than the other forms and are eaten raw or cooked. These forms are often used as a winter salad crop[K]. Although a perennial, chicory is usually cultivated as an annual crop, especially when being grown as a winter salad. The winter salad cultivars are usually sown in early summer to make sure that they do not flower in their first year of growth. By late autumn they have formed an overwintering rosette of leaves rather like a cabbage. These leaves can be harvested as required during the winter and the plants will then usually make some new growth (as long as the winter is not too cold) that can be harvested in late winter or early spring. The plants run to flower in the following summer and fail to make an overwintering rosette of leaves for that winter[K]. Chicory can be grown successfully in a meadow or even in a lawn so long as the grass is not cut too short nor too often[K]. It often self-sows freely when well-sited, especially if it is growing in a dry alkaline soil[238]. A good bee plant[24, 108]. A very ornamental plant[1]. The flowers open in the early morning (about 6 - 7 o'clock in Britain) and close around midday[4]. Special Features: Edible, Not North American native, Invasive, Naturalizing. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 4.2.42 Rheum x cultorum

Rhubarb

3 tlin 7 cyuc 4 kcak 2 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum x cultorum is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from February to October, in flower in June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain high concentrations of oxalic acid[34, 76]. Oxalic acid can lock up certain minerals (especially calcium) in the body, leading to nutritional deficiency. Cooking the plant will reduce the concentration of oxalic acid. Another report says that the leaves have the same concentration of oxalic acid in the stems as they do in the leaves and it is not the oxalic acid that makes them poisonous. It says that any toxic properties of the leaves is more likely to be due to the presence of glycosides[142]. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers StemEdible Uses: Colouring RutinLeaf stem - raw or cooked[1, 2, 46, 105, 200]. An acid taste, it is used as a fruit substitute in spring, usually stewed with sugar and used in pies, jams etc[183]. The juice strained from stewed rhubarb can add colour and flavour to a fruit punch[183]. It is best not to eat large quantities of the stems because of their oxalic acid content - see the notes above on toxicity. Immature flowers - cooked and used like cauliflower[183]. One report says that the plant contains 0.7% rutin[240]. It does not specify which part of the plant, though it is likely to be the leaves[K].

nrakta Europe - Mediterranean in south-western Europe and northern Africa. ksacta Shady rocks and screes in mountains[90]. Limestone rubble[190].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required. Plants sometimes produces bulbils, these can be potted up as soon as they are ripe and planted out in late spring.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden, Woodland garden. An easily grown plant[203], preferring a sunny position in a light well-drained soil[1, 90]. Established plants are fairly drought tolerant[190]. The bulbs should be planted fairly deeply[1]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -10°c[214]. There are some named forms selected for their ornamental value[203]. The flowers are softly scented[245]. Some forms of this species, especially A. moly bulbiferum[203], produce bulbils in the flowering head[42] and can be invasive[203]. The species type is sometimes considered to be invasive, though it has not proved so with most people[203]. It is useful for naturalising between shrubs and grows well at the base of a beech hedge in a wet garden[203]. Grows well with most plants. especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. It is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Not North American native, Naturalizing, Attracts butterflies, Suitable for dried flowers.

#### 4.2.40 Secale cereale

Rye, Cereal rye 3 tlin 7 cyuc 4 kcak 3 tcan 1 dwat 1.8 m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Secale cereale is a ANNUAL growing to 1.8 m (6ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: Coffee Oil SweetenerSeed - cooked[2, 13, 34, 46]. A common cereal, it is used especially in N. Europe to make bread[183]. The seed contains about 13% protein[61]. The grain also contains some gluten, though not as much as wheat, so it makes a heavier bread than wheat. It can also be used to make cakes etc. The seed can be sprouted and added to salads[183]. A nutritional analysis is available[218]. Malt, a sweet substance produced by germinating the seed, is extracted from the roasted germinated seed and used as a sweetening agent and in making beer etc[13]. The roasted (ungerminated) seed is used as a coffee substitute[46, 183].

tcanta Biomass Green manure Oil Soil stabilization ThatchingThe straw is used as a fuel or as a biomass in industry[141]. It is quite strong[100] and can also be used in thatching, for paper making, weaving mats and hats etc[13, 34, 46, 61, 171]. Other uses for the straw include as a packing material for nursery stock, bricks and tiles, for bedding archery targets, and mushroom compost[269]. The plant is a good green manure crop. It is fast growing with an extensive and deep root system[46]. It is especially useful if sown in late autumn. Its growth over the winter will prevent soil erosion and the leaching of nutrients from the soil, it can then be incorporated into the soil in the spring[171]. The extensive root system also makes this a good plant to use for soil stabilization, especially on sandy soils[171].

74

dwatta Cancer Laxative PoulticeThe seed is made into a poultice and applied to tumours[218]. The seed is also an effective laxative due to its fibrous seed coat[269].

nrakta W. Asia? Original habitat is obscure. ksacta Not known in a truly wild situation.

propta Seed - sow March or October in situ and only just cover the seed. Germination should take place within 2 weeks.

nwatta An easily grown plant, it succeeds in most soils but prefers a well-drained light soil in a sunny position[1, 132]. It thrives on infertile, submarginal areas and is renouned for its ability to grow on sandy soils[269]. Established plants are drought tolerant[1]. The plant is reported to tolerate an annual precipitation in the range of of 22 to 176cm, an annual temperature in the range of of 4.3 to 21.3°C and a pH of 4.5 to 8.2[269]. Rye is a widely cultivated temperate zone cereal crop. It is able to withstand severe climatic conditions and can be grown much further north and at higher altitudes than wheat[13, 34, 57]. Average yields vary widely from country to country, the world average is around 1.6 tonnes per hectare with yields of almost 7 tonnes per hectare achieved in Norway[269]. There are many named varieties[183]. Rye is a rather variable species and botanists have divided it into a number of sub-species, all of which could be of value in breeding programmes. These sub-species are briefly listed below:- S. cereale afghanicum (Vavilov.)K.Hammer. Native to the Caucasus, western Asia and India. S. cereale ancestrale Zhuk. Native to western Asia. S. cereale dighoricum Vavilov. Native to the Caucasus and eastern europe. S. cereale segetale Zhuk. Native to temperate Asia. Rye grows well with cornflowers and pansies[18, 20], though it inhibits the growth of poppies and couch grass[18, 20]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1].

# 4.2.41 Cichorium intybus

Chicory, Radicchio, Succory, Witloof 3 tlin 7 cyuc 4 koak 3 tcan 3 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hionli

drutta Cichorium intybus is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista Excessive and continued use may impair function of the retina[268]. Slight potential for sensitization [301]

kcakta Edible Parts: Flowers Leaves RootEdible Uses: CoffeeLeaves - raw or cooked[2, 4, 5, 9, 27, 33, 171]. The leaves are rather bitter, especially when the plants are flowering[4]. The leaves are often blanched by excluding light, either by removing all the leaves and then earthing up the new growth, or by covering the plant with a bucket or something similar. Whilst this greatly reduces any bitterness, there is also a corresponding loss of vitamins and minerals[K]. The blanched leaves are often used in winter salads (they are known as chicons) and are also cooked[132, 200]. The unblanched leaves are much less bitter in winter and make an excellent addition to salads at this time of year[K] A nutritional analysis of the leaves is available[218]. Flowers raw[52]. An attractive addition to the salad bowl[183], but rather bitter[K]. Root - cooked like parsnip[5, 7, 9, 13, 21, 27, 46]. The boiled young roots form a very palatable vegetable[4]. The root is said to be an ideal food for diabetics

tcanta Soil stabilizationPlants produce an extensive suckering root system and can be used for soil stabilization on banks etc[229]. The flowers are a rich source of nectar for bees. Wood - heavy, hard, close-grained[82]. The wood weighs 50lb per cubic foot[235].

nrakta South-eastern N. America - Pennsylvania to Alabama. ksacta Dry open woodland and hillside scrub to 1200 metres[184].

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. The seed stores for over 10 years[113]. Suckers taken during the dormant season.

nwatta Succeeds in any soil, preferring one that is not too rich[1, 200]. Requires a well-drained soil, succeeding on dry barren sites[184, 200]. Plants are tolerant of drought and atmospheric pollution[200]. Plants prefer a position in full sun, though they also tolerate light shade. A very hardy plant, tolerating temperatures down to at least -25°c when fully dormant[184]. A fast-growing but short-lived species in the wild[229]. The branches are brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. The young branches, seedpods and petioles are covered with dark glandular hairs that exude a clammy sticky substance[82]. Plants sucker freely, especially after coppicing, the suckers have vicious thorns. A very greedy tree, tending to impoverish the soil. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 4.1.23 Alnus serrulata

Smooth Alder, Hazel alder tfo2n 3 tlin 9 cyuc 0 kcak 2 tcan 2 dwat 4.5 m hkuc htut cyutli tcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Alnus serrulata is a deciduous Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 3. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Soil stabilizationTrees have extensive root systems and are sometimes planted on the banks of streams in order to prevent erosion[227]. The wood is soft and brittle, weighing 29lb per cubic foot[227]. It is of little commercial value[229].

dwatta Astringent Diuretic Emetic Ophthalmic PurgativeA tea made from the bark is analgesic, astringent, blood purifier, diuretic, emetic and purgative[4, 222, 257]. It is used in the treatment of diarrhoea, the pain of childbirth, coughs, toothache and sore mouths[222]. Externally, it is used as an eye wash and a wash for hives, poison ivy rash, piles, swellings and sprains[222]. A decoction of the cones is astringent[4].

nrakta Eastern N. America - Maine to Florida, west to Oklahoma and Indiana. ksacta Moist lowlands, such as swamps, and along ponds and streams where it forms thickets[222, 229]. propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. Requires a position in full sun, dying out when shaded by taller trees[229]. A fast-growing but short-lived tree[229]. This species is closely related to A. rugosa[11]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 4.1.24 Alnus maritima

Seaside Alder, Beach Alder tfo2n 3 tlin 7 cyuc 0 kcak 0 tcan 0 dwat m hkuc htut cyutli tcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatpriklwishsom hpa7tmwatli hionli

drutta Alnus maritima is a deciduous Tree growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from September to October, and the seeds ripen in May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Biomass WoodThis species has the potential to be used as a biomass crop[269]. Wood - light, soft, closegrained. Light brown in colour with thick, hardly distinguishable heartwood[82]

nrakta Eastern and Central N. America - Delaware, Maryland and Oklahoma. ksacta Along edges of ponds and small streams, often in standing water; from sea level to 100 metres[82, 270].

propta Seed -

47

nwatta Landscape Uses:Erosion control, Massing. Prefers a heavy soil and a damp situation, but it succeeds in ordinary garden soil[11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. Trees are tolerant of frost, poor soil, and some salinity and water-logging[269]. Seaside alder is reported to tolerate an annual precipitation in the range of 95 to 400cm, an average annual temperature of 13. 5 to  $18^{\circ}\mathrm{C}$ , and a pH in the range of 6. 1 to 8. 1[269]. This species has a symbiotic relationship with certain soil microorganisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: North American native, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root

structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 4.1.25 Caragana jubata

Shag-Spine

tfo2n 3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Caragana jubata is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Fibre Hedge HedgeA fibre obtained from the bark is used for making cordage, gunny bags etc[91]. A very spiny plant, it forms an impenetrable barrier and can be grown as a hedge[2001]

dwatta Antirheumatic Demulcent VulneraryAntirheumatic, demulcent, vulnerary. Used in the treatment of boils, swellings, coughs, headaches and rheumatic arthritical 11

nrakta E. Asia - Siberia to Mongolia and Tibet. ksacta Dry gravel slopes above the sub-alpine forest belt[91].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It usually germinates in 2 weeks[K]. Stored seed should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen then scarify it and re-soak for another 12 hours before sowing[138]. Germination usually takes place within 2 - 3 weeks at 20°c[138]. Good percentage[11]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[113]. Layering in spring.

nwatta Prefers full sun and a light sandy dry or well-drained soil[1, 11, 200]. Dislikes damp conditions[1]. Does not require a rich soil, succeeding on marginal land[11]. A very hardy plant but it does not like the lack of sun in British gardens. It is best grown at the foot of a warm dry wall in a well-drained light soil[11]. It prefers a continental climate with hot summers and cold winters[200], it does not flower freely in Britain due to our cooler summers and lack of sunshine[182]. A remarkably curious shrub, but it is not showy[1]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 4.1.26 Baptisia australis

Wild Indigo, Blue wild indigo, Blue False Indigo tfo2n 3 tlin 9 cyuc 0 kcak 2 tcan 2 dwat 1.5 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Baptisia australis is a PERENNIAL growing to  $1.5\,\mathrm{m}$  (5ft) by  $0.6\,\mathrm{m}$  (2ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from May to October, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista A report says that the plant is potentially toxic[222].

tcanta A blue dye is obtained from the plant[257]. No more information is given, but it is likely to be the leaves that are used[K].

dwatta Antiemetic Appetizer Digestive Emetic PurgativeAppetizer, digestive[61]. The root is antiemetic, emetic and purgative[222, 257]. There are confusing reports from two sources that the plant is used as an emetic and also that a cold tea is given to stop vomiting[222, 257]. A poultice of the root is anti-inflammatory and is held in the mouth to treat toothaches[222]. The plant is under investigation as a potential stimulant of the immune system[222].

nrakta Eastern and Central N. America - Pennsylvania to Georgia, west to Texas, Nebraska and Indiana. ksacta Rich woods and alluvial thickets, often on river banks[43].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed should be pre-soaked for 24 hours in warm water and then sown in a cold frame in late winter or early spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer or following spring. Division in spring[188]. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Seashore. Prefers a deep, well-drained neutral to slightly acid soil in full sun[188, 200]. Grows freely in a loamy soil[1]. Succeeds in a hot dry position. Succeeds in a rich moist soil in sun or light shade[187]. Plants are hardy to about -20°c[187]. A very ornamental species, but it is somewhat shy flowering in British gardens[1]. Plants have a very deep root system and dislike root disturbance, they should be left alone once they are established[188, 233]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Attracts birds, Attractive foliage, North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 4.1.27 Baptisia pendula

White False Indigo, False Indigo

tfo2n 3 tlin 9 cyuc 0 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli

xre7t hjonli

drutta Baptisia pendula is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from May to October, in flower from June to July. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista The plant is potentially toxic[222].

tcanta DyeA blue dye is obtained from the leaves. It is an indigo substitute but a lot of leaves are required for even a little indigo[169].

nrakta South-eastern N. America. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed should be pre-soaked for 24 hours in warm water and then sown in a cold frame in late winter or early spring. Prick out the seedlings into individual

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Arctium lappa is a BIENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Care should be taken if harvesting the seed in any quantity since tiny hairs from the seeds can be inhaled and these are toxic[205]. Can cause allergic reactions. Contraindicated during pregnancy [301].

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: Root - raw or cooked[2, 7, 9, 14, 179]. Very young roots can be eaten raw, but older roots are normally cooked[206]. They can be up to 120cm long and 2.5cm wide at the top, but are best harvested when no more than 60cm long[206]. Old and very long roots are apt to become woody at the core[206]. Although it does not have much flavour the root can absorb other flavours[116]. Young roots have a mild flavour, but this becomes stronger as the root gets older[206]. The root is white but discolours rapidly when exposed to the air[206]. Roots can be dried for later use[213]. They contain about 2.5% protein, 0.14% fat, 14.5% carbohydrate, 1.17% ash[179]. The root contains about 45% inulin[240]. Inulin is a starch that cannot be digested by the human body, and thus passes straight through the digestive system. In some people this starch will cause fermentation in the gut, resulting in wind[K]. Inulin can be converted into a sweetener that is suitable for diabetics to eat[K]. Young leaves - raw or cooked[9, 12, 14, 62]. A mucilaginous texture[179]. The leaves contain about 3.5% protein, 1.8% fat, 19.4% carbohydrate, 8.8% ash[179]. Young stalks and branches - raw or cooked[2, 9, 52, 55, 62]. Used like asparagus or spinach[12, 183]. They taste best if the rind is removed[85, 117]. The leaf stalks can be parboiled and used as a substitute for cardoons[183]. The pith of the flowering stem can be eaten raw in salads, boiled or made into confections[4, 183]. A delicate vegetable, somewhat like asparagus in flavour[4]. The seeds can be sprouted and used like bean-sprouts[12, 52, 183].

tcanta HairThe juice of the plant, when used as a friction, is said to have a stimulating action against baldness[7]. dwatta Alterative Antibacterial Antifungal Antiphlogistic Antipsoriatic Aperient Blood purifier Carminative Chol-

agogue Depurative Diaphoretic Diuretic Eczema Hypoglycaemic StomachicBurdock is one of the foremost detoxifying herbs in both Chinese and Western herbal medicine[254]. The dried root of one year old plants is the official herb, but the leaves and fruits can also be used[4]. It is used to treat conditions caused by an 'overload' of toxins, such as throat and other infections, boils, rashes and other skin problems[254]. The root is thought to be particularly good at helping to eliminate heavy metals from the body[254]. The plant is also part of a North American formula called essiac which is a popular treatment for cancer. Its effectiveness has never been reliably proven or disproven since controlled studies have not been carried out. The other herbs included in the formula are Rumex acetosella. Ulmus rubra and Rheum palmatum[254]. The plant is antibacterial, antifungal, carminative[9, 21, 147, 165, 176]. It has soothing, mucilaginous properties and is said to be one of the most certain cures for many types of skin diseases, burns, bruises etc[4, 244]. It is used in the treatment of herpes, eczema, acne, impetigo, ringworm, boils, bites etc[244]. The plant can be taken internally as an infusion, or used externally as a wash[244]. Use with caution[165]. The roots of oneyear old plants are harvested in mid-summer and dried. They are alterative, aperient, blood purifier, cholagogue, depurative, diaphoretic, diuretic and stomachic[218, 222]. The seed is alterative, antiphlogistic, depurative, diaphoretic and diuretic[218]. Recent research has shown that seed extracts lower blood sugar levels[238]. The seed is harvested in the summer and dried for later use[254]. The crushed seed is poulticed onto bruises[222]. The leaves are poulticed onto burns, ulcers and sores[222].

nrakta Most of Europe, including Britain, east to north-

ern Asia. ksacta Waste ground, preferring calcareous soils[7], it is sometimes also found in meadows and woods[9].

propta Seed - best sown in situ in the autumn[200]. The seed can also be sown in spring[206]. Germination can be erratic, it is best to sow the seed in trays and plant out the young plants before the tap-root develops[206]. Seed requires a minimum temperature of 10°c, but a temperature of 20 - 25°c is optimum[206]. Germination rates can be improved by pre-soaking the seed for 12 hours or by scarification[206]. They germinate best in the light[206]. The autumn sowing should be made as late as possible because any plants with roots more than 3mm in diameter in the spring will quickly run to seed if cold temperatures are followed by daylengths longer than 12½ hours[206].

nwatta Succeeds in most soils when grown in partial shade[200]. Prefers a moist neutral to alkaline soil[238] and a sunny position in a heavy soil[22]. Plants are best grown in a light well-drained soil if the roots are required for culinary use[200, 206]. Tolerates a pH in the range 4.6 to 7.8. The top growth dies back at temperatures a little above freezing, but the roots tolerate much lower temperatures [206] and can be left in the ground all winter to be harvested as required. Burdock is cultivated for its edible root in Japan, there are some named varieties[183]. Spring-sown seed produces edible roots in late summer and autumn, whilst autumn sown crops mature in the following spring or early summer[206]. Although the plants are quite large, it is best to grow them fairly close together (about 15cm apart, or in rows 30cm apart with the plants 5 - 8cm apart in the rows) since this encourages the development of long straight roots[206]. The seed head has little hooked prickles and these attach themselves to the hairs or clothing of passing creatures and can thus be carried for some considerable distance from the parent plant[4]. The plants usually self-sow freely[238]. The flowers are very attractive to bees and butterflies[206]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

# 4.2.39 Allium molv

Golden Garlic, Ornamental Onion 3 tlin 9 cyuc 4 kcak 0 tcan 2 dwat m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis haa7tmwatli xre7t hionli

drutta Allium moly is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf from September to ?, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. A pleasant mild garlic flavour, when sliced it makes a very nice addition to salads and can also be used as a flavouring in cooked foods[K]. The bulbs are about 25mm in diameter[200]. Leaves - raw or cooked. Flowers - raw. The yellow flowers make an attractive garnish on salads and have a pleasant onion flavourf[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

etc[183, 257]. They can also be sprouted and used in sal-ads[183]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. The flowers are used as a food colouring in ceremonial maize bread[183].

tcanta DyeYellow and green dyes can be obtained from the whole plant[168].

dwatta The plant can be cultivated from the tropics to the temperate zone. It grows best in areas where annual daytime temperatures are within the range 22 - 28°c, but can tolerate 10 - 45°c[418]. It can be killed by temperatures of 4°c or lower[418]. It prefers a mean annual rainfall in the range 2,000 - 2,400mm, but tolerates 500 - 4,000mm[418]. Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Prefers a pH in the range 5.5 - 7, tolerating 4.3 - 7.5[418]. Often cultivated as a food crop and ornamental plant, it has escaped from cultivation in many areas and become naturalised as a weed of cultivated and disturbed ground[305]. A fast-growing plant, the first crop of leaves can be harvested in 30 - 50 days from sowing the seed, and the plant can carry on being harvested for up to another 250 days[418]. Grain yields usually range from 800-1200 kg/ha but with the use of fertilizers the yield can be raised up to 3 t/ha. This species is cultivated for its edible seed in many parts of S. America and in Japan[58, 97 , 183 ]. There is at least one named variety, 'Oeschberg' is a very productive plant, growing 1 metre tall and can yield up to 2.5 tonnes per hectare[183]. This species is the most adaptable of the grain amaranths, it also flowers under a wider range of daylength hours than the other species [183]. Plants are particularly susceptible to attacks by leaf-chewing insects[298]. Plants should not be given inorganic fertilizers, see notes above on toxicity. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196].

nrakta Original habitat is obscure, it was probably tropical America. ksacta Not known in a truly wild situation.

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206]

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Tolerates a pH in the range 4 to 7.5. Plants should not be given inorganic fertilizers, see notes above on toxicity. This species is cultivated for its edible seed in many parts of S. America and in Japan[58, 97, 183]. There is at least one named variety, 'Oeschberg' is a very productive plant, growing 1 metre tall and can yield up to 2.5 tonnes per hectare[183]. This species is the most adaptable of the grain amaranths, it also flowers under a wider range of daylength hours than the other species[183]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway'. this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

# 4.2.37 Vaccinium corvmbosum

High-Bush Blueberry, American Blueberry, Swamp Blueberry, Blueberry

3 tlin 8 cvuc 4 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli dyatxre7t hjonli

drutta Vaccinium corymbosum is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from May to Iune, and the seeds ripen in August. The

species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked[2, 3, 43, 62, 161]. It is usually sweet and juicy, though the flavour can be variable[11]. It can be used in pies, pastries, cereals, jellies etc[183]. The fruit can also be dried and used like raisins[183]. The fruit is rich in vitamin C[201]. The fruit is about 15mm in diameter[200]. A tea is made from the leaves and dried fruit[101].

dwatta Astringent Pectoral Vitamin CAstringent, pectoral[201]

nrakta Eastern N. America - Nova Scotia to Quebec and south to Florida.. ksacta Swamps, low wet woods, pine barrens and dry uplands[43].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of greenwood, May/June in a shady position in a compost that contains some peat[113]. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Cuttings of mature wood. harvested in November and stored in a fridge then planted in a frame in March. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Landscape Uses: Border, Massing, Seashore, Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Hardy to about -25°c[184]. Often cultivated for its edible fruit in America[183], it is the most common and successful blueberry to be cultivated in Britain[11]. There are many named varieties [183]. A very variable plant, it usually blossoms freely in Britain[11]. Plants are at least partially self-sterile, more than one variety is required in order to obtain good yields of fruit[182]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. leave the fruit on the shrub until the last minute, as the fruit is very acidic and will not ripen after being picked. Does not grow well with blackberries or raspberries[201]. Closely related to V. atrococcum and V. virgatum[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Edible, Wetlands plant, Attracts butterflies, Attractive flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 4.2.38 Arctium lappa

Great Burdock, Gobo 3 tlin 7 cyuc 4 kcak 2 tcan 5 dwat 2 m hkuc pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer or following spring. Division in spring[188]. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Landscape Uses:Border, Massing, Specimen. Prefers a deep, well-drained neutral to slightly acid soil in full sun[200, 233]. Grows freely in a loamy soil[1]. Shy flowering in British gardens[1]. Plants have a very deep root system and dislike root disturbance, they should be left alone once they are established[188, 233]. This species might be no more than a synonym for Baptisia alba var. alba. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Attractive foliage, North American native.

# 4.1.28 Genista sagittalis

Winged Broom, Arrow Broom tfo2n 3 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Genista sagittalis is a deciduous Shrub growing to 0.3 m (1ft) by 0.9 m (3ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known kcakta None Known

tcanta A good high density groundcover. Nitrogen Fixer. Location: Border, Ground Cover, Mass Planting, Rock Garden, Wildlife Garden, Woodland Garden. A very hardy, mat-forming plant for the rock garden. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2].

nrakta Native Range: Southern and central Europe ksacta Dry grasslands, open forests, hillsides and mountain slopes from central Belgium south to southern Spain and east through the Balkans to Greece. Western European broadleaf forest, Atlantic mixed forests and conifer and mixed forests (Pyrenees and Alps). It is also known to occur in mixed forests and montane forests.

propta Seed: Easy. Cover seed and germinate at 55-65F/13-18C. Chipping and soaking may aid germination. Do not transplant. Cuttings taken in summer, or by simple layering. Tip cuttings about 3-6 cm may be taken in mid-summer and rooted in a mist chamber or shaded frame.

nwatta A prostrate, very hardy, sometimes spiny, deciduous shrub or small tree that forms a wide mat of flattened, upright stems. It requires full sun and a very well-drained soil. Soil: Sand, Chalk, Loam. In the wild, it often grow on limestone but in cultivation, it is not too particular about soil pH as long as it is not too acidic. pH: Acid, Alkaline, Neutral. Exposure: Exposed or Sheltered. Upper elevation limit:2,700 metres. Lower elevation limit: 0 metres. Blooming Period: April in the south to July in the north. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2].

# 4.1.29 Vicia caroliniana

Carolina vetch, Carolina wood vetch tfo2n 3 tlin 9 cyuc 0 kcak 4 tcan 2 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Vicia caroliniana is a PERENNIAL growing to  $0.6\,$  m (2ft) by  $0.6\,$  m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone  $4.\,$  The flowers are

pollinated by Insects. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known

tcanta Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2]. Host plant for Northern Cloudywing butterfly. Seeds may be eaten by songbirds. Nitrogen Fixer. Dynamic accumulator.

dwatta In the US, the Cherokee use Carolina wood vetch for a variety of medicinal purposes. It is used for back pains, local pains, to toughen muscles, for muscular cramps, twitching and is rubbed on stomach cramps. They also use a compound for rheumatism, for an affliction called "blacks", and it is taken for wind before a ball game (Hamel and Chiltoskey 1975 Cherokee Plants and Their Uses). An infusion is used for muscle pain, in that it is rubbed on scratches made over the location of the pain. An infusion is also taken as an emetic. It is also used internally with Pseudognaphalium obtusifolium ssp. obtusifolium for rheumatism.

nrakta Native to the United States, V. caroliniana is now found throughout the eastern half of the country, from Texas east to Florida and north to New York and Minnesota. It is also found in Ontario, Canada. ksacta Acid soils on rocky slopes, rocky woods, ridges, streambanks.

propta Seed.

nwatta An attractive perennial, herbaceous vine generally sprawling, occasionally climbing stems with tendrillate leaf tips. Light: Full sun (6 or more hours of direct sunlight a day) to partial shade (direct sunlight only part of the day, 2-6 hours). There is some suggestion that it can take deep shade but we have been unable to confirm this. Soil Drainage: moist and well-drained, occasionally Dry. Flower Color: Pink, White. Flower Bloom Time: Spring. Flower Description: Light pinkish white, pea-like flowers appear in spring. This plant has an extreme flammability rating. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Herbaceous. Growth habit is a single or multiple shooting vine from a crown [1-2].

# 4.1.30 Desmodium glutinosum

Pointed-leaved Ticktrefoil

tfo2n 3 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Desmodium glutinosum is a PERENNIAL growing to 0.9 m (3ft) by 0.9 m (3ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known

kcakta None Known

tcanta Nitrogen Fixer: A member of the Legume Family, it improves the soil by adding nitrogen. Attracts: Butterflies. Larval Host: Eastern Tailed Blue, Silver-spotted Skipper. Invertebrates shelter: beneficial for insects and other arthropods.

nrakta Native to eastern North America. ksacta Richer soils of woods and savannas where there is partial shade and mesic to dry moisture conditions.

propta Seed.

nwatta A perennial wildflower found in part shade, shade; woods, and thickets. Prefers partial sun to medium shade, moist to dry-mesic conditions, and loamy soil with decaying organic matter. Clay-loam and rocky soil are also tolerated. Bloom Time: June to August. Bloom Color: Pink. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

# **4.2** mran

# 4.2.1 Tilia x europaea

Linden, Common Lime

3 tlin 9 cyuc 5 kcak 3 tcan 3 dwat 35 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Tilia x europaea is a deciduous Tree growing to 35 m (114ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista If the flowers used for making tea are too old, they may produce symptoms of narcotic intoxication[4].

kcakta Edible Parts: Flowers Leaves Manna SapEdible Uses: Chocolate Sweetener TeaYoung leaves - raw[6, 177, 183]. Excellent in salads, they are mild and mucilaginous. A refreshing tea is made from the dried flowers[183]. A honey-like fragrance[183]. Some caution is advised, see notes above on toxicity. Flowers - used as a vegetable[183]. A very acceptable chocolate substitute can be made from a paste of the ground-up flowers and immature fruit. Trials on marketing the product failed because the paste is very apt to decompose[2, 115]. Sap - used as a drink or concentrated to make a syrup and used as a sweetener[4, 115, 183]. An edible manna is obtained from the tree[183]. No further details, does this report refer to the sap?

tcanta Charcoal Fibre Paper WoodA fibre from the inner bark is used to make mats, shoes, baskets, ropes etc[1, 13, 14, 46, 61, 100]. It is also suitable for cloth[115]. It is harvested from trunks that are 15 - 30cm in diameter[115]. The fibre can also be used for making paper[189]. The stems are harvested in spring or summer, the leaves are removed and the stems steamed until the fibres can be stripped. The outer bark is removed from the inner bark by peeling or scraping. The fibres are cooked for 2 hours with lve and then beaten in a ball mill. The paper is beige in colour[189]. Wood - soft, white, easily carved. It is very suitable for carving domestic items and small non-durable items[4, 13, 46, 61, 115]. A charcoal made from the wood is used for drawing[46, 61, 115]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antispasmodic Cholagogue Diaphoretic Diuretic Emollient Expectorant Hypotensive Sedative Skin VasodilatorLime flowers are a popular domestic remedy for a number of ailments, especially in the treatment of colds and other ailments where sweating is desirable[9]. A tea made from the fresh or dried flowers is antispasmodic, diaphoretic, expectorant, hypotensive, laxative and sedative[4, 9, 13, 226, 238]. Lime flower tea is also used internally in the treatment of indigestion, hypertension, hardening of the arteries, hysteria, nervous vomiting or palpitation[4, 238]. The flowers are harvested commercially and often sold in health shops etc[226]. Lime flowers are said to develop narcotic properties as they age and so they should only be harvested when freshly opened[238]. A charcoal made from the wood is used in the treatment of gastric or dyspeptic disturbances and is also made into a powder then applied to burns or sore places[4]

nrakta A hybrid, probably T. cordata. x T. platyphyllos. ksacta Not known in a truly wild situation.

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large

enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Succeeds on poorer soils than T. platyphyllos[11, 14]. Tolerates considerable exposure[125]. A very valuable bee plant[11]. The flowers are toxic to bees[188]. A food plant for the caterpillars of many butterfly and moth species[30]. This tree is frequently infested by aphis[17, 200], which cover the ground and the leaves with a sticky honeydew[188]. Although a hybrid species, it does produce fertile seed in Britain[17]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Easily transplanted, even when guite large, trees up to 60 years old have been moved successfully[1, 74]. Can be coppiced, the tree produces suckers very freely[98, 200]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. Plants in this genus are notably resistant to honey fungus[200]. Note: Tilia × vulgaris B.Hevne is a synonym of Tilia × europaea L. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.2 Ginkgo biloba

Maidenhair Tree, Ginkgo

3 tlin 8 cyuc 5 kcak 2 tcan 5 dwat 30 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ginkgo biloba is a deciduous Tree growing to 30 m (98ft) by 9 m (29ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The seed contains a mildly acrimonious principle that is unstable when heated. It is therefore best to cook the seed before eating it to ensure any possible toxicity is destroyed. This acrimonious principle is probably 4'-methoxypyridoxine, which can destroy vitamin B6[237]. It is more toxic for children, but the raw nuts would have to be eaten often over a period of time for the negative effects to become apparent[237]. Avoid if known allergy to Ginkgo or cross-react species (cashew, poison ivy). Not recommended for children. Avoid if on blood thinning medication (e.g. warfarin). Discontinue prior to surgery. Avoid parenteral use as possible hypotension, shock, dizziness. Excessive seed ingestion can cause 'qin-man' food poisoning [301].

kcakta Edible Parts: Oil Oil SeedEdible Uses: Oil OilSeed - raw (in small quantities), or cooked[237]. A soft and oily texture[229], the seed has a sweet flavour[2, 63] and

See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This species produces hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. Usually present in too small a quantity to do any harm, any very bitter seed or fruit should not be eaten[65]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death. Oral doses of 50g of hydrogen cyanide can be fatal (= 30g of kernels or 50-60 kernels at 2 mg HCN/g kernel) [301].

kerhels at 2 mg rCN/ng kerhels at 2 mg rCN/ng kerhels [301]. kcakta Edible Parts: Fruit Oil SeedEdible Uses: Gum OilEdible Portion: Fruit, Seeds. Fruit - raw, cooked or dried for later use[1, 2, 3, 34]. The best forms are soft and juicy with a delicious rich flavour[K]. Wild trees in the Himalayas yield about 47.5kg of fruit per year[194]. The fruit of the wild form contains about 6.3% sugars, 0.7% protein, 2.5% ash, 2.5% pectin. There is about 10mg vitamin C per 100g of pulp[194]. The fruit is about 5cm in diameter and contains one large seed[200]. Seed - raw or cooked[183]. Bitter seeds should be eaten in strict moderation, but sweet ones can be eaten freely[132]. The bitter seeds can be used as a substitute for bitter almonds in making marzipan etc[4]. An edible gum is obtained from the trunk[64]. The seed contains up to 50% of an edible semi-drying oil[4, 57, 61, 183]. Carbon Farming - Staple Crop: oil.

tcanta Cosmetic Dye Gum Oil WoodAn edible semidrying oil is obtained from the seed[57]. Used for lighting[194]. The oil has a softening effect on the skin and so it is used in perfumery and cosmetics, and also in pharmaceuticals[4, 61]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - handsome, hard, durable. Agricultural implements etc[146, 194]. Carbon Farming - Industrial Crop: oil. Espalier: tree or other plants that is trained to grow flat against a support (such as a trellis or wall).

dwatta Analgesic Anthelmintic Antiasthmatic Antiinflammatory Antipyretic Antiseptic Antispasmodic Antitussive Astringent Cancer Demulcent Emetic Emollient Expectorant Laxative Ophthalmic Pectoral Sedative Skin Tonic Vitamin C VulneraryApricot fruits contain citric and tartaric acid. carotenoids and flavonoids[283]. They are nutritious, cleansing and mildly laxative[254. They are a valuable addition to the diet working gently to improve overall health. The salted fruit is antiinflammatory and antiseptic[283]. It is used medicinally in Vietnam in the treatment of respiratory and digestive diseases[283]. Antipyretic, antiseptic, emetic, ophthalmic[194]. The flowers are tonic, promoting fecundity in women[218]. The bark is astringent[254]. The inner bark and/or the root are used for treating poisoning caused by eating bitter almond and apricot seeds (which contain hydrogen cyanide)[218]. Another report says that a decoction of the outer bark is used to neutralize the effects of hydrogen cyanide[238]. The decoction is also used to soothe inflamed and irritated skin conditions[254]. The seed is analgesic, anthelmintic, antiasthmatic, antispasmodic, antitussive, demulcent, emollient, expectorant, pectoral, sedative and vulnerary[176, 218]. It is used in the treatment of asthma, coughs. acute or chronic bronchitis and constipation[176, 279]. The seed contains 'laetrile', a substance that has also been called vitamin B17[218]. This has been claimed to have a positive effect in the treatment of cancer, but there does not at present seem to be much evidence to support this[K]. The pure substance is almost harmless, but on hydrolysis it yields hydrocyanic acid, a very rapidly acting poison - it should thus be treated with caution[218]. In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - N. China, Mongolia. ksacta Temperate. Most trees growing apparently wild have escaped from cultivation but there are pure stands of the trees in Tibet on mountain slopes in sparse forests at elevations of 700 - 3000 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as

possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Difficult[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Difficult. Layering in spring.

nwatta Industrial Crop: Oil Management: Standard Regional Crop Staple Crop: OilClimate: boreal to warm temperate. Humidity: semi-arid to humid. Landscape Uses:Specimen. Requires a well-drained moisture retentive fertile soil in a warm sunny position[11, 200]. Succeeds in light shade but fruits better in a sunny position[200]. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but is apt to become chlorotic if too much is present[11]. Prefers a pH in the range 6.5 to 7.5[200]. Dislikes clay soils[37, 61]. Intolerant of saline soils[200]. Trees drop their fruit buds if there is a summer drought[200]. The apricot is widely cultivated for its edible fruit in temperate areas that have long hot summers, there are many named varieties[183, 200]. The tree is perfectly hardy in Britain but it usually flowers very early in the spring and the flowers are then liable to be destroyed by frosts[11]. It really requires a more continental climate (with its clearly defined seasons) than it gets in Britain. However, if given the benefit of a south or west facing wall and some protection from frosts when it is in flower, reasonable crops can usually be produced in southern England[1, 219]. The plants are self-fertile[200], but hand pollination would be advisable since they are normally flowering before many pollinating insects are active. In Britain apricots are usually grown on plum rootstocks, 'St. Julien A' is the most widely used[200]. The dwarfing rootstock 'Pixie' is also a possibility, but this must be double worked with 'St. Julien A' because it is incompatible with apricots[200]. Any pruning should be carried out in the summer to allow rapid healing and therefore less risk of infection[201]. Oats should not be grown near apricots because their roots have an antagonistic effect on the roots of the apricot[201]. Tomatoes and potatoes are also bad companions for apricots[201]. If nasturtiums (Tropaeoleum spp) are grown under apricots they will make the fruit less palatable to insects, though this is not detectable by the human palate [201]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Edible, Not North American native, Fragrant flowers. Attractive flowers or blooms. Carbon Farming - Cultivation: regional crop only. Management: standard. Espalier.

#### 4.2.36 Amaranthus cruentus

Purple Amaranth, Red amaranth 3 tlin 11 cyuc 4 kcak 2 tcan 2 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyif hjonli

drutta Amaranthus cruentus is a ANNUAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

pcista No members of this genus are known to be poisonus, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: ColouringLeaves - cooked as a spinach[183]. The mild-flavoured leaves are rich in vitamins and minerals[183]. Seed - very small but easy to harvest and very nutritious. They are eaten cooked or ground into a powder and used for making cakes

dye is obtained from the fruit[100, 141]. This can be used as an ink[66].

dwatta Antidiarrhoeal Antiemetic Antiseptic Astringent Diuretic Hypoglycaemic Kidney Ophthalmic Tonic Urinary-The dried leaves of bilberries are used in the treatment of a variety of complaints[4]. These leaves should be harvested in early autumn, only green leaves being selected, and then dried in gentle heat[4]. The leaves should not be used medicinally for more than 3 weeks at a time[254]. A tea made from the dried leaves is strongly astringent, diuretic, tonic and an antiseptic for the urinary tract[4]. It is also a remedy for diabetes if taken for a prolonged period[4]. Another report says that the leaves can be helpful in pre-diabetic states but that they are not an alternative to conventional treatment[254]. The leaves contain glucoguinones, which reduce the levels of sugar in the blood[238]. A decoction of the leaves or bark is applied locally in the treatment of ulcers and in ulceration of the mouth and throat[4]. A distilled water made from the leaves is an excellent evewash for soothing inflamed or sore eves[7]. Whilst the fresh fruit has a slightly laxative effect upon the body, when dried it is astringent and is commonly used in the treatment of diarrhoea etc[4, 7, 254]. The dried fruit is also antibacterial and a decoction is useful for treating diarrhoea in children[254]. The skin of the fruits contains anthocyanin and is specific in the treatment of hemeralopia (day-blindness)[7]. The fruit is a rich source of anthocyanosides, which have been shown experimentally to dilate the blood vessels[238], this makes it a potentially valuable treatment for varicose veins, haemorrhoids and capillary fragility[254].

nrakta Europe, including Britain, from Iceland south and east to Spain, Macedonia, the Caucasus and N. Asia ksacta Heaths, moors and woods on acid soils to 1250 metres[17, 186].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Cuttings of mature wood in late autumn. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[17, 200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Tolerates some shade, succeeding in light woodland. Very tolerant of wind and exposure[186]. Plants do not always do well in sheltered positions and they fruit better in an exposed position[115]. They can also form the ground layer in acid woods[186]. A freely suckering shrub when growing well[182]. Plants quickly regenerate from below ground level if they are burnt and also tolerate some grazing[186]. One report says the plant is self-sterile[3], another that it is self-fertile[17]. The fruits are relished by wildlife and the plants provide food for a number of insect species[186]. Plants in this genus are notably resistant to honey fungus[200]. In garden design. as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

# 4.2.34 Ribes aureum

Golden Currant 3 tlin 8 cyuc 4 kcak 0 tcan 1 dwat 2.4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Ribes aureum is a deciduous Shrub growing to 2.4 m (7ft 10in). See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit - raw or cooked[2, 11, 62, 101, 257]. They make an accept-raw leavest fruit[K] and are also used in jellies, sauces and pies[183]. The fruit can also be dried for winter use[46, 85]. Fairly large and flavourful[85, 183]. The fruit is about 5mm in diameter[200]. Flowers - raw. A very sweet flavour[85].

dwatta Antiinflammatory SalveThe dried and pulverized inner bark has been sprinkled on sores[257]. A decoction of the inner bark has been used in the treatment of leg swellings[257].

nrakta Western N. America - Saskatchewan to Washington, south to California. Naturalized in C. Europe. ksacta By streams, in ravines and on mountain slopes[60, 62]. Rocky slopes and sandy bluffs[274].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at -2 to +2°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 2001.

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11]. Succeeds in full sun but is also guite tolerant of shade though not fruiting so well in such a position[11]. Grows well on exposed dry sites[85]. Very tolerant of being transplanted[85]. Plants can spread by means of underground rhizomes, especially when growing in moist conditions[164]. Hardy to about -20°c[200]. The fruit can be red, black, yellow, golden or reddish-brown[164]. A very ornamental plant[1], it is closely allied to R. odoratum[11]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Sometimes cultivated for its edible fruit, there are some named varieties[183]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.35 Prunus armeniaca mandschurica

Manchurian apricot 3 tlin 9 cyuc 4 kcak 3 tcan 3 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Prunus armeniaca mandschurica is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft) at a medium rate. tastes somewhat like a large pine nut[237]. The baked seed makes very pleasant eating, it has a taste rather like a cross be the political plants are drought resistant[117], they also tolerate atmospheric pollution[117, 200]. Plants can grow in poor hard-packed soil, making the boiled and used in soups, porridges etc[183, 237]. It needs to be heated before being eaten in order to destroy a mildly acrimonious principle[57]. Another report says that the seed can be eaten raw[132] whilst another says that large quantities of the seed are toxic[218]. See the notes above on toxicity for more details[237]. The raw seed is said to have a fishilke flavour[218]. The seed is rich in niacin[160]. It is a good source of starch and protein, but is low in fats[237]. These fats are mostly unsaturated or monosaturated[237]. A more detailed nutritional analysis is available[218]. An edible oil is obtained from the seed[2, 183].

tcanta Oil Oil Soap WoodAn oil from the seed is used as a fuel in lighting[2]. A soap substitute is produced by mixing the pulp of the seed (is the fruit meant here?) with oil or wine[178]. Wood - light, soft, it has insect repelling qualities[117].

dwatta Antianxiety Antiasthmatic Antibacterial Antifungal Astringent Cancer Digestive Expectorant Infertility Ophthalmic Sedative Tonic Urinary VermifugeGinkgo has a long history of medicinal use in traditional Chinese medicine, where the seed is most commonly used. These uses are mentioned in more detail later. Recent research into the plant has discovered a range of medicinally active compounds in the leaves and this has excited a lot of interest in the healthpromoting potential of the plant[237]. In particular, the leaves stimulate the blood circulation and have a tonic effect on the brain, reducing lethargy, improving memory and giving an improved sense of well-being[237]. They have also been shown to be effective in improving peripheral arterial circulation[218, 237] and in treating hearing disorders such as tinnitus where these result from poor circulation or damage by free radicals[237]. The leaves contain ginkgolides, these are compounds that are unknown in any other plant species[238]. Ginkgolides inhibit allergic responses and so are of use in treating disorders such as asthma[238]. Eye disorders and senility have also responded to treatment[237]. The leaves are best harvested in the late summer or early autumn just before they begin to change colour. They are dried for later use[237, 238]. The fruit is antibacterial, antifungal, astringent, cancer, digestive, expectorant, sedative, vermifuge[117, 147, 176, 178]. The fruit is macerated in vegetable oil for 100 days and then the pulp is used in the treatment of pulmonary tuberculosis, asthma, bronchitis etc[218]. (This report might be referring to the seed rather than the fleshy fruit[K]). The cooked seed is antitussive, astringent and sedative[218]. It is used in the treatment of asthma, coughs with thick phlegm and urinary incontinence[176, 238]. The raw seed is said to have anticancer activity and also to be antivinous[176, 218]. It should be used with caution, however, due to reports of toxicity[176, 218]. The cooked seeds stabilize spermatogenesis[176].

nrakta E. Asia - N. China. ksacta Found wild in only 2 localities at Guizhou and on the Anhui/Zhejiang border[200], where it grows on rich sandy soils[147].

propta Seed - best sown as soon as it is ripe in a cold frame or in a sheltered outdoor bed[78, 80]. The seed requires stratification according to one report[78] whilst another says that stratification is not required[80] and that the seed can be sown in spring but that it must not have been allowed to dry out[80]. Germination is usually good to fair. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first year. Plant them out into their permanent positions in the following spring[78, 80] and consider giving them some protection from winter cold for their first winter outdoors[K]. Softwood cuttings in a frame in spring[238]. Cuttings of half-ripe wood, July/August in a frame. The cutting may not grow away in its first year but usually grows all right after that[113]. Cuttings of mature wood. December in a frame[200].

nwatta Industrial Crop: Medicinal Management: Copping Management: Standard Minor Global Crop Staple Crop: Balanced carbLandscape Uses:Firewood, Pest tolerant, Specimen, Street tree. Succeeds in most soil types so long as they are well-drained[117, 200, 202], though it prefers a rather dry loam in a position sheltered from strong winds[11]. Some of the best specimens in Britain are found growing on soils over chalk or limestone[185]. Plants flower and fruit more reliably after hot summers or when grown in

resistant[117], they also tolerate atmospheric pollution[117, 200]. Plants can grow in poor hard-packed soil, making the male forms good candidates for street planting[229]. Trees are often used for street planting in towns, only the males are used because the fruit from female plants has a nauseous smell. The fruit contains butanoic acid, it has the aroma of rancid butter[200]. Ginkgo is a very ornamental plant[1, 117] and there are several named forms[11, 200]. This species is the only surviving member of a family that was believed to be extinct until fairly recent times. It has probably remained virtually unchanged for at least 150 million years and might have been growing when the dinosaurs were roaming the earth[237]. It is exceptional in having motile sperm[185] and fertilization may not take place until after the seed has fallen from the tree[81]. This genus belongs to a very ancient order and has affinities with tree ferns and cycads[185]. The ginkgo is usually slow growing, averaging less than 30cm per year with growth taking place from late May to the end of August[185]. Growth is also unpredictable, in some years trees may not put on any new growth whilst in others there may be 1 metre of growth[185]. This variability does not seem to be connected to water or nutrient availability. Trees are probably long-lived in Britain, one of the original plantings (in 1758) is still growing and healthy at Kew (1993). Plants are not troubled by insects or diseases[132, 200], have they evolved a resistance?[132]. Ginkgo is a popular food and medicinal crop in China, the plants are often cultivated for this purpose and are commonly grown in and around temples. Plants are either male or female, one male plant can pollinate up to 5 females. It takes up to 35 years from seed for plants to come into bearing[117]. Prior to maturity the sexes can often be distinguished because female plants tend to have almost horizontal branches and deeply incised leaves whilst males have branches at a sharper angle to the trunk and their leaves are not so deeply lobed[132]. Branches of male trees can be grafted onto female frees in order to fertilize them. When a branch from a female plant was grafted onto a male plant at Kew it fruited prolifically[11]. Female trees have often been seen in various gardens with good crops of fruit[K]. Seeds are marked by two or three longitudinal ridges, it is said that those with two ridges produce female plants whilst those with three ridges produce male plants[178]. Trees can be coppiced[200]. They can also be pruned into a fan-shape for growing on walls[202]. Another report says that the trees dislike pruning and will often die back as a result[238]. Special Features: Attractive foliage, Not North American native, Fragrant flowers, Inconspicuous flowers or blooms, Flowers have an unpleasant odor. The plant is heat tolerant in zones 9 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 4.2.3 Malva moschata

Musk Mallow

3 tlin 10 cyuc 5 kcak 2 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Malva moschata is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade.

It prefers moist soil. The plant can tolerates strong winds but 4.2.4 Tilia cordata not maritime exposure.

pcista When grown on nitrogen rich soils (and particularly when these are used inorganically), the plant tends to concentrate high levels of nitrates in its leaves[76]. The leaves are perfectly wholesome at all other times.

kcakta Edible Parts: Flowers Leaves SeedEdible Uses: Leaves - raw or cooked[K]. A mild pleasant flavour[K]. The leaves are mucilaginous and fairly bland, we use them in bulk in summer salads[K]. They make a very good perennial substitute for lettuce in a salad, producing fresh leaves from spring until the middle of summer, or until the autumn from spring germinating plants[K]. Flowers - raw[K]. A very decorative addition to the salad bowl, they have a very mild flavour[K]. Seed - raw. Best used before it is fully mature. the seed has a pleasant nutty taste but it is rather small and

tcanta Dye FibreCream, yellow and green dyes can be obtained from the plant and the seed heads[168]. A fibre obtained from the stems is used for cordage, textiles and paper making[115]

dwatta Antiphlogistic Astringent Demulcent Diuretic Emollient Expectorant Laxative Poultice Salve UrinaryAll parts of the plant are antiphlogistic, astringent, demulcent, diuretic, emollient, expectorant, laxative, salve[4, 7, 9, 21, 46, 222, 238]. The leaves and flowers can be eaten as part of the diet, or a tea can be made from the leaves, flowers or roots[222]. The leaves and flowers are the main part used, their demulcent properties making them valuable as a poultice for bruise, inflammations, insect bites etc, or taken internally in the treatment of respiratory system diseases or inflammation of the digestive or urinary systems[4, 238]. They have similar properties, but are considered to be inferior, to the common mallow (M. sylvestris) and the marsh mallow (Althaea officinalis) and are seldom used internally[4]. The plant is an excellent laxative for young children[7].

nrakta Most of Europe, including Britain, south to N. Africa. ksacta Grassy places, pastures, hedgebanks etc, especially on rich soils, avoiding acid soils.

propta Seed - best sown in early spring in a cold frame. The seed germinates guickly and easily. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in their permanent positions in the early summer[K]. If you have sufficient seed then it can be sown outdoors in situ in the middle to late spring. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Cuttings of side shoots, July/August in a cold frame[111].

nwatta Landscape Uses:Border A very easily grown plant, succeeding in ordinary garden soil[1], though it prefers a reasonably well-drained and moderately fertile soil in a sunny position[200]. Hardy to about -25°c[187]. A very ornamental plant[1]. It is very variable in form, especially with regard to the degree of laciniation of the leaves[17]. The crushed leaves have a musk-like smell[245]. Plants are generally guite short-lived though they can self-sow freely when in a suitable position and usually more than maintain themselves[233, K]. If the plant is pruned back to the main branches as it comes into flower, then it will produce a fresh flush of leaves in late summer for salad use[K]. A good plant for the summer meadow[24]. Plants seem to be immune to the predations of rabbits[233]. Prone to infestation by rust fungus[200]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2].

Small Leaved Lime, Littleleaf linden 3 tlin 7 cyuc 5 kcak 3 tcan 3 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tilia cordata is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista If the flowers used for making tea are too old, they may produce symptoms of narcotic intoxication[4].

kcakta Edible Parts: Leaves SapEdible Uses: Chocolate TeaYoung leaves - raw[2]. They make an excellent salad or sandwich filling, they are mild tasting and somewhat mucilaginous[K]. The leaves can be available from spring until early autumn from the young growths at the base of the tree[K]. A very acceptable chocolate substitute can be made from a paste of the ground-up flowers and immature fruit. Trials on marketing the product failed because the paste is very apt to decompose[2, 115]. A popular herb tea is made from the flowers, it has a sweet, fragrant pleasant flavour[46]. Some caution is advised, see the notes above on toxicity. Sap - harvested in the spring, it is sweet and can be used as a drink or concentrated into a syrup[4].

tcanta Charcoal Fibre Paper WoodA fibre from the inner bark is used to make mats, shoes, baskets, ropes etc[1, 13, 14, 46, 61, 100]. It is also suitable for cloth[115]. It is harvested from trunks that are 15 - 30cm in diameter[115]. The fibre can also be used for making paper[189]. The stems are harvested in spring or summer, the leaves are removed and the stems steamed until the fibres can be stripped. The outer bark is removed from the inner bark by peeling or scraping. The fibres are cooked for 2 hours with Ive and then beaten in a ball mill. The paper is beige in colour[189]. Wood - soft, white, easily carved. It is very suitable for carving domestic items and small non-durable items[4, 13, 46, 61, 115]. A charcoal made from the wood is used for drawing[46, 61,

dwatta Antispasmodic Diaphoretic Expectorant Hvpotensive Laxative Sedative SkinLime flowers are a popular domestic remedy for a number of ailments, especially in the treatment of colds and other ailments where sweating is desirable[9]. A tea made from the fresh or dried flowers is antispasmodic, diaphoretic, expectorant, hypotensive, laxative and sedative[4, 9, 13, 226, 238]. Lime flower tea is also used internally in the treatment of indigestion, hypertension, hardening of the arteries, hysteria, nervous vomiting or palpitation[4, 238]. The flowers are harvested commercially and often sold in health shops etc[226]. Lime flowers are said to develop narcotic properties as they age and so they should only be harvested when freshly opened[238]. A charcoal made from the wood is used in the treatment of gastric or dyspeptic disturbances and is also made into a powder then applied to burns or sore places[4].

nrakta Europe, including Britain, from Norway south and east to Spain, Siberia, Crimea and Caucasus. ksacta Woods on most fertile soils, especially limestone, it is commonly found on wooded limestone cliffs[17].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring

kcakta Edible Parts: FruitEdible Uses: The following report is for the closely related L. villosa, it would be worthwhile experimenting with this plant to check on edibility[K]. The fruit of this species is about 5mm in diameter [235]. Fruit - raw or preserved[43, 105, 200]. A milder flavour than most edible honeysuckles, they can be eaten raw but are mainly used in making jams, jellies and refreshing drinks[183].

nrakta N.E. Europe. Northern N. America - Newfoundland to Alaska and southwards, ksacta Low ground[235].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 -10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200]. Closely related to L. villosa[200]. Interesting botanically because it appears as though two flowers arise from a single ovary[11]. The fruit is actually a fleshy growth that surrounds the two ovaries[11]. A very variable species[11], there are some named forms selected for their ornamental value[200] Plants of many haskap cultivars grow to be 1.5 to 2 meters tall and wide, can survive a large range of soil acidity, from 3.9-7.7 (optimum 5.5-6.5), requiring high organic matter, well drained soils, and plentiful sunlight for optimum productivity. Lonicera caerulea plants are more tolerant of wet conditions than most fruit species. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 4.2.32 Prunus maritima

Beach Plum, Graves' plum 3 tlin 7 cyuc 4 kcak 3 tcan 1 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus maritima is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[2, 55, 102]. Very variable in quality[11], the best forms are sub-acid to sweet, the fruit can be eaten out of hand, used in pies, preserves etc or be dried for later use[46, 171, 183]. The fruit is about 15mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dve Soil stabilization agreen dve can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Plants have extensive root systems and can be used for binding sand along the coast[200].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and

prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Eastern N. America - New Brunswick to Virginia ksacta Light gravelly or sandy soils near the coast[43, 182].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[, doing well on limestone11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Requires a sunny position[11]. Tolerates maritime exposure[11, 102]. The beach plum is cultivated for its edible fruit in N. America, there are some named varieties[183]. The fruit is often sold in local markets[46] and the plant is of potential commercial importance[171]. The fruit seldom ripens when grown in the interior of America[2]. The cultivar 'Eastham' has large well-flavoured fruit and is a heavy cropper[200]. 'Hancock' is an early ripening form with sweet juicy fruit[200]. 'Squibnocket' is of high quality and is also a good sand binder[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

### 4.2.33 Vaccinium myrtillus

Bilberry, Whortleberry

69

3 tlin 7 cyuc 4 kcak 1 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli fyifxre7t hjonli

drutta Vaccinium myrtillus is a deciduous Shrub growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista High tannin content may cause digestive disorders - avoid prolonged use or high doses. Avoid in pregnancy. Avoid if on anticoagulant therapy (e.g. warfarin) [301].

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit raw or cooked[183]. Sweet and very tasty[2, 3, 5, 7, 8, 9, 13], they make an excellent preserve, their small seeds making them suitable for jam[4]. A slightly acid flavour when eaten raw[4]. The fruit can be dried and used like currants[12]. The fruit is up to 10mm in diameter [200]. A tea is made from the leaves[4, 177, 183].

tcanta Dye InkA green dye is obtained from the leaves and the fruit and is used to colour fabrics[7]. A blue or black June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit StemEdible Uses: TeaFruit raw or cooked and used in pies, preserves etc[2, 3, 34, 62, 85, 101, 1831. It is of variable quality, with the finest forms having a rich acid flavour[2]. The hemispherical fruit is about 15mm in diameter[200]. Young shoots - raw or cooked like rhubarb[101, 161, 183, 257]. They are harvested as they emerge through the soil in the spring, and whilst they are still tender, and then peeled[K]. A tea is made from the leaves and another from the bark of the root[161, 183], 257.

tcanta DyeA purple to dull blue dye is obtained from the

dwatta Astringent Cathartic Dysentery Ophthalmic Pectoral Salve TB VDThe roots are cathartic[257]. A decoction of the roots has been used in the treatment of gonorrhoea[257]. The root has been chewed in the treatment of coughs and toothache[257]. An infusion of the roots has been used as a wash for sore eyes[257]. The root has been used, combined with Hypericum spp, to treat the first stages of consumption[257]. An infusion of the astringent root bark is used in the treatment of diarrhoea and dysentery[213, 222]. The leaves are highly astringent[257]. A decoction is used in the treatment of bowel complaints[257]. A tea made from the leaves is used as a wash for old and foul sores, ulcers and boils[222, 257]. A decoction of the roots, stems and leaves has been used in the treatment of whooping cough[257].

nrakta Eastern and Central N. America - New Brunswick to Ontario, south to Georgia and Missouri. ksacta Rich thickets, ravines and borders of woods[43], often in full shade[62] and preferring moist positions[159].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Sometimes cultivated, especially in N. America, for its edible fruit[183], it is a parent of many named varieties[1, 34]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.29 Hablitzia tamnoides

Caucasian spinach

3 tlin 9 cyuc 4 kcak 1 tcan 0 dwat 3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli hionli

drutta Hablitzia tamnoides is a PERENNIAL CLIMBER growing to 3 m (9ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers welldrained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known

kcakta Edible greens and shoots raw or cooked. Mild edible leaves similar to those of the related spinach. Add leaves to a salad. Leaves also used in soups, pies, pizza, indian and oriental food. Young shoots can be eaten.

tcanta Originally introduced to gardens in Finland, Sweden and Norway as an attractive climbing ornamental.

nrakta Origin: The Caucasus, the border of Europe and Asia ksacta Mesic woodland habitats especially spruce and beech woods in its native environment, among rocks and in ravines and along rivers.

propta Seed. Germinate at very low temperatures in early spring. Seeds need to be stratified. Cild moist treatment improves germination. Division in autumn

nwatta A woodland climber. Plant in a spot that gets sun for half the day ideally. Plants can tolerate sun for up to two thirds of the day. Will die back in the winter. Plants need something to climb on for example a bamboo trellis.

#### 4.2.30 Rubus canadensis

American Dewberry, Smooth blackberry 3 tlin 7 cyuc 4 kcak 1 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Rubus canadensis is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, jams etc[2, 3, 43, 105, 183]. Sweet, juicy and richly flavoured, it is generally preferred to most other species of blackberries[2, 183]. The fruit can be pressed into cakes and then dried for later use[257]. The fruit can be up to 25mm long[235].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

dwatta Astringent DysenteryThe stems and the fruit have been used in the treatment of dysentery[257]. A decoction of the root has been used in the treatment of dysentery[257].

nrakta North-eastern N. America - Newfoundland to Michigan and North Carolina. ksacta Thickets, woods and clearings[43, 235].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. This species is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. The stems are free from prickles[235]. The plant produces apomictic flowers, these produce fruit and viable seed without fertilization, each seedling is a genetic copy of the parent[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 4.2.31 Lonicera caerulea

Sweetberry honeysuckle, Bluefly honeysuckle, Haskap berry 3 tlin 9 cvuc 4 kcak 0 tcan 0 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Lonicera caerulea is a deciduous Shrub growing to 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers

or early summer, after the last expected frosts. Layering in for some purpose such as making cider and then the seeds spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Landscape Uses:Firewood, Pollard, Screen, Specimen, Street tree. Prefers a good moist loamy alkaline to neutral soil but it also succeeds on slightly acid soils[200]. Grows poorly on any very dry or very wet soil[200]. Tolerates considerable exposure[125, K]. Succeeds in sun or semishade[188]. Plants can be transplanted quite easily, even when large, trees up to 60 years old have been moved successfully[1, 74]. Trees are very amenable to coppicing or pollarding[186]. They produce numerous suckers from the base[98]. Suckers are produced but not freely according to another report[186]. This species produces far less suckers than T. platyphyllos or T. x yulgaris[238]. This species grows well in Britain, but it rarely produces viable seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[186]. Mature trees cast a dense shade[186]. A very valuable bee plant, producing an abundance of nectar[186]. A valuable species for wildlife, there are 31 species of insects associated with this tree[24]. The leaves are very attractive to leaf aphis and these aphis produce an abundance of sweet secretions which drip off the leaves to the ground below and also attract sooty mould fungus[186]. This makes the tree unsuitable for street planting. This species, however, is less likely to become infested with aphis than T. platyphyllos or T. x vulgaris[238]. There are some named varieties selected for their ornamental value[188]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms

# 4.2.5 Malus domestica

3 tlin 8 cyuc 5 kcak 4 tcan 2 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus domestica is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cvanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit Oil OilEdible Uses: Oil Oil PectinFruit - raw, cooked or dried for later use. Apples are one of the most common and widely grown fruits of the temperate zone. There are a great many named varieties with differing flavours ranging from sour to sweet and textures from dry and mealy to crisp and juicy. There is also a wide range in the seasons of ripening with the first fruits being ready in late July whilst other cultivars are not picked until late autumn and will store for 12 months or sometimes more. See individual records for more details. The fruit of some cultivars is rich in pectin and can be used in helping other fruits to set when making jam etc[61, 142]. Pectin is also said to protect the body against radiation[201]. An edible oil can be obtained from the seed[4]. It would only really be viable to use these seeds as an oil source if the fruit was being used

could be extracted from the remaining pulp[K].

tcanta Lighting Oil Oil Pectin Teeth WoodThe fruit is a source of pectin[61, 142]. Pectin is used as a thickener in jams etc and as a culture medium in laboratories. The apple is also an excellent dentifrice, the mechanical action of eating a fruit serving to clean both the teeth and the gums[4, 2691. The oil from the seed has been used as an illuminant[269]. Wood - hard, compact, fine-grained. Used for turnery, tool handles, canes etc[46, 171, 226]. It makes an excellent fuel[226]. Espalier: tree or other plants that is trained to grow flat against a support (such as a trellis or

dwatta Antibacterial Antidiarrhoeal Astringent Laxative Odontalgic StomachicThe fruit is astringent and laxative[4. 9]. The bark, and especially the root bark, is anthelmintic, refrigerant and soporific[218, 240]. An infusion is used in the treatment of intermittent, remittent and bilious fevers[4, 240]. The leaves contain up to 2.4% of an antibacterial substance called 'phloretin'[240]. This inhibits the growth of a number of gram-positive and gram-negative bacteria in as low a concentration as 30 ppm[240]. A ripe raw apple is one of the easiest foods for the stomach to deal with, the whole process of digestion taking about 85 minutes[4]. The apple juice will reduce the acidity of the stomach, it becomes changed into alkaline carbonates and thus corrects sour fermentation[4]. The apple is also an excellent dentifrice, the mechanical action of eating a fruit serving to clean both the teeth and the gums[4].

nrakta A hybrid of garden origin, mainly involving M. sylvestris and M. pumila[200].. ksacta Not known in a truly wild situation.

propta Seed - this species is a hybrid and will not breed true from seed, though some interesting new fruiting cultivars can be produced.. It is best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils, though if these are poorly drained there could be problems with diseases such as canker[200]. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1. 200]. Tolerates a pH range from 6 to 7, preferring a range of 6.5 to 6.8[200]. The apple is one of the most commonly cultivated fruit crops in the temperate zone. The primary climatic requirements for the production of good quality fruit are warm summer temperatures, relative freedom from spring frosts, reasonable protection from the wind (especially cold north and east winds) and an evenly distributed rainfall of about 600 - 800mm per annum[200]. Good apple production has been achieved as far north as 65°, whilst about 1000 hours of winter temperatures below 7°c are necessary to initiate flower production[269]. However good quality apples can still be produced in other areas with careful management and choice of cultivars[200]. Even in tropical latitudes, the plant has succeeded at high elevations, producing fruit at elevations over 3000 metres in Ecuador for example [269]. Where space is at a premium, or at the limits of their climatic range, apples can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall, an east facing wall will suit many of the tougher cultivars and even a north facing wall can be used for early culinary cultivars[219]. A hybrid of mixed origins, including M. dasyphylla, M. praecox, M. pumila, M. sieversii and M. sylvestris, this species is very commonly cultivated in temperate areas for its edible fruit[11]. There are very many named varieties[46, 183, 200] and with careful choice of these varieties it is possible to provide freshly harvested fruit from July to December and stored fruit for the rest of the year. When chives (Allium schoenoprasum) or other alliums are grown under apple trees it can prevent or cure scab[18]. A spray of

the infused leaves of Equisetum spp can also be used against scab[18, 201]. If climbing nasturtiums (Tropaeolum majus) are grown into the tree they can repel woolly aphis[18, 201]. Apples lose their flavour if they are stored with potatoes[18]. They will also impart a bitter flavour to carrots or potatoes if they are stored in the same area[201]. Growing apples near potatoes makes the potatoes more susceptible to blight[201]. Wrapping maple leaves (Acer spp) around apples in store helps to preserve the apples[18, 20]. Apples store better if they are grown in a sward that contains a high percentage of clover[201]. Apple trees grow better and produce better quality fruit when foxgloves (Digitalis spp) and wallflowers (Erysimum cheiri) are growing in the orchard[201]. Dandelions (Taraxacum spp) produce ethylene gas and this can cause earlier ripening of fruit if plants are growing in an orchard[18]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 4.2.6 x Sorbocrataegus hybrid

Haw x mountain ash 3 tlin 8 cyuc 5 kcak 2 tcan 0 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli prik hpa7tmwatli hionli

drutta x Sorbocrataegus hybrid is a deciduous Tree growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista None Known

kcakta Fruit - raw or cooked[105, 177]. Sub-acid[82]. A delicious flavour, it is sweet with a soft juicy flesh and makes an excellent dessert fruit[K]. It can also be cooked and used in pies, preserves etc and can be dried for later use. The fruit ripens in early September in southern Britain[K]. The fruit is about 2cm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82]. nrakta Hybrid ksacta A cultivated plant.

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta An interesting and unusual hybrid between Sorbus aucuparia (Mountain Ash) and a Crataegus (Hawthorn). The foliage is similar to the common mountain ash and turns an attractive red in autumn. The wine-red berries are about the size of a small cherry and are best used to make juice, preserves and sauces. Well-drained but moisture-retentive loamy soil, but they will succeed in most other situations including heavy clays and very chalky soils. Once established they are quite drought tolerant, though they will also tolerate quite wet soils and some species succeed even where the water stands in winter. Many species are also very wind tolerant, some of them succeeding in maritime exposure, and

they can be included as part of a shelter-belt planting. They are also tolerant of atmospheric pollution and so grow well in towns, cities, by main roads and industrial estates. For the highest fruit production, it is best to grow the plants in as sunny a position as possible, though they will also succeed in semi-shade. A position on the sunny edge of a woodland is probably ideal. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

### 4.2.7 Rosa rugosa

Ramanas Rose, Rugosa rose

3 tlin 9 cyuc 5 kcak 3 tcan 2 dwat 2 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rosa rugosa is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy cay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: TeaFruit - raw or cooked[1, 2, 62]. They are very sweet and pleasant to eat, though it takes guite a bit of patience to eat any quantity[K]. The fruit is a fairly large size for a rose with a relatively thick layer of flesh[K]. The fruit is about 25mm in diameter[200]. Rich in vitamin C[3, 14]. containing up to 2.75% dry weight[74]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Flowers - raw or cooked[183]. An aromatic flavour, they are also used in jellies and preserves[74, 183]. Remove the bitter white base of the petals before using them. Young shoots - cooked and used as a potherb[183]. Harvested as they come through the ground in spring and are still tender. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. A pleasant tasting fruity-flavoured tea is made from the fruit, it is rich in vitamin C[21]. A tea is also made from the leaves[218]

tcanta Hedge HedgeThe plant makes a good low hedge[1, 29]. It is very tolerant of maritime exposure, but is very bare in winter[K].

dwatta Cancer Hepatic Vitamin CThe leaves are used in the treatment of fevers[218]. The flowers act on the spleen and liver, promoting blood circulation[147, 218]. They are used internally in the treatment of poor appetite and digestion, and menstrual complaints arising from constrained liver energy[238]. The root is used in the treatment of coughs[218]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - N. China, Japan, Korea. Naturalized in several places in Britain[17]. ksacta Sandy sea shores[58].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not

alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista There are some suggestions that the sap of this species can cause a skin rash in susceptible people, but this has not been substantiated. See also notes in 'Cultivation Details'.

kcakta Edible Parts: Fruit Oil Root StemEdible Uses: Drink OilFruit - raw or cooked[2, 22, 46]. An acid flavour. it has been used as a substitute for lemon juice[2]. The fruit is rather small and with very little flesh, but it is produced on fairly large panicles and so is easily harvested. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[85, 95, 101, 102, 149, 159, 183]. The mixture should not be boiled since this will release tannic acids and make the drink astringent. Root - peeled and eaten raw[161, 183]. This report should be treated with some caution due to possible toxicity[214]. Young shoots - peeled and eaten raw[183, 257]. This report should be treated with some caution due to possible toxicity[214]. The bark has been eaten as a delicacy by children[257]. This report should be treated with some caution due to possible toxicity[214].

tcanta Dye Hedge Hedge Mordant Oil Pioneer Shelterbelt Soil stabilization Tannin WoodThe leaves are rich in tannin, containing about 10 - 25%[171]. Up to 31.2% has been obtained from some plants[223]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. The twigs and root are also rich in tannin[149]. A black and a red dye is obtained from the fruit[4, 257]. A black dye is obtained from the leaves, bark and roots[257]. An orange or vellow dve is obtained from the roots harvested in spring[46, 61, 257]. A light yellow dye is obtained from the pulp of the stems[257]. The inner bark, mixed with bloodroot (Sanguinaria canadensis) and the inner bark of wild plum (Prunus sp.) has been used to make a yellow dye[257]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The plant has an extensive root system and is fairly wind tolerant, though branches can be broken off in very strong winds. It is planted for soil stabilization and as a shelter screen[200]. It can quickly establish itself in open sunny locations and so can be used as a pioneer species for establishing woodlands[229]. Wood - soft, light, brittle[101, 149].

dwatta Alterative Antiseptic Appetizer Astringent Diuretic Dysentery Emetic Emmenagogue Febrifuge Galactogogue Haemostatic Ophthalmic Refrigerant Rubefacient Salve TB TonicSmooth sumach was employed medicinally by various native North American Indian tribes who used it to treat a variety of complaints[257]. It is occasionally used in modern herbalism where it is valued for its astringent and antisentic qualities. Some caution should be employed in the use of this species since it can possibly cause skin irritations. It is best only used under the supervision of a qualified practitioner. A tea made from the bark or root bark is alterative, antiseptic, astringent, galactogogue, haemostatic, rubefacient and tonic[4, 222, 238, 257]. It is used in the treatment of diarrhoea, fevers, general debility, sore mouths. rectal bleeding, uterine prolapse etc[222, 254]. It is used as a gargle to treat sore throats and applied externally to treat excessive vaginal discharge, burns and skin eruptions[254, 257]. The powdered bark can be applied as a poultice to old ulcers, it is a good antiseptic[4]. A tea made from the roots is appetizer, astringent, diuretic and emetic[222, 257]. An infusion is used in the treatment of colds, sore throats, painful urination, retention of urine and dysentery[257]. The root is harvested in the autumn and dried for later use[254]. An infusion of the green or dried branches has been used in the treatment of TB[257]. A decoction of the branches, with the seed heads, has been used to treat itchy scalps and as a bathing water for frost-bitten limbs[257]. The milky latex from the plant has been used as a salve on sores[257]. A tea made from the leaves was used in the treatment of asthma, diarrhoea and stomatitis[222]. A poultice of the leaves has been used to treat skin rashes[257]. The leaves have been chewed to treat sore gums and they have been rubbed on the lips to treat sore lips[257]. The berries are diuretic. emetic, emmenagogue, purgative and refrigerant[4, 257]. They are used in the treatment of late-onset diabetes, stranguary bowel complaints, febrile diseases, dysmenorrhoea etc[4, 254, 257]. They have been chewed as a remedy

for bed-wetting[222, 257]. The blossoms have been chewed as a treatment for sore mouths[257]. A decoction of the blossoms has been used as a mouthwash for teething children[257]. An infusion of the blossoms has been used as an eye wash for sore eyes[257].

nrakta N. America - found in all 48 mainland states of USA[214] and in southern Canada. ksacta Thickets and waste ground on dry soil and by streams[4, 43, 60]. The best specimens are found in rich moist soil[149, 229].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. This soak water can be drunk and has a delicious lemonfavour. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Landscape Uses:Border, Specimen. Succeeds in a well-drained fertile soil in full sun[11, 200]. Tolerates poor sandy soils[200]. A very hardy plant, when fully dormant it can tolerate temperatures down to at least -25°c[200]. However, the young growth in spring can be damaged by late frosts. A fast-growing but short-lived plant in the wild[229]. Single-stem plants are short-lived in cultivation, but if the plants are coppiced regularly and allowed to form thickets, then they will live longer and also be more ornamental with larger leaves[238]. Any coppicing is best carried out in early spring[238]. It is a very ornamental plant, there are some named varieties[182]. Closely allied to R. typhina[11], it hybridizes with that species where their ranges overlap[101, 229]. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. A good bee plant[K]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus. Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attracts birds, North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.28 Rubus occidentalis

Black Raspberry

3 tlin 7 cyuc 4 kcak 1 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rubus occidentalis is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in

as whistles and flutes[149, 159].

dwatta Antidiarrhoeal Antiseptic Cholera Diaphoretic Diuretic Emetic Febrifuge Kidney Laxative Poultice Purgative Skin Stimulant Vitamin CAmerican elder was widely employed as a medicinal herb by many native North American tribes who used it to treat a wide range of complaints[257]. It is still commonly used as a domestic remedy. A tea made from the inner bark and root bark is diuretic, emetic and a strong laxative[222, 257]. A tea made from the root bark is used to promote labour in childbirth and in treating headaches, kidney problems and mucous congestion[21, 257]. The inner bark is also applied as a poultice to cuts, sore or swollen limbs etc in order to relieve pain and swelling[222. 257]. A poultice of the leaves is applied to bruises and to cuts in order to stop the bleeding[222]. An infusion of the leaf buds is strongly purgative[21]. Elder flowers are stimulant, diaphoretic and diuretic[213, 257]. A warm tea of the flowers is stimulant and induces sweating, taken cold it is diuretic[21]. It is used in the treatment of fevers and infant colic[257]. An infusion of the leaves and flowers is used as an antiseptic wash for skin problems, wounds etc[21]. The fresh juice of the fruit, evaporated into a syrup, is laxative. It also makes a good ointment for treating burns when mixed with an oily base[21]. The dried fruit can be made into a tea that is useful in the treatment of cholera and diarrhoea[21]. Some caution should be exercised if using any part of the plant fresh since it can cause poisoning[21].

nrakta Eastern N. America - Nova Scotia to Florida, west to Manitoba and Texas. ksacta Rich moist soils along streams and rivers, woodland margins and waste ground[229].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 1131. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78]. Division of suckers in the

nwatta Agroforestry Services: Contour hedgerow Industr Crop: Dye Industrial Crop: Medicinal Management: Standard Regional CropTolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. A very hardy plant, when dormant it tolerates temperatures down to about -34°c[200]. The flowers have a muscatel smell[245]. A fast-growing but short-lived plant[229], it often forms thickets by means of root suckers[200]. It is occasionally cultivated for its edible fruit, there are several named varieties[183], though these have mainly been developed for their ornamental value[182]. Yields of up to 7kg of fruit per tree have been recorded[160]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.26 x Sorbopyrus hybrid

Pear x mountain ash

3 tlin 8 cvuc 4 kcak 2 tcan 0 dwat 4 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli prik hpa7tmwatli

drutta x Sorbopyrus hybrid is a deciduous Tree growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Insects, Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista None Known

kcakta Edible Fruit. The fruit is a pome 2.5-3 cm long; it is edible with a sweet, vellowish flesh, which tastes similar to a Nashi Pear.

tcanta A yellow-tan dye is obtained from the leaves[106, 1151. Wood - heavy, tough, durable, fine grained, hard, Used by cabinet and instrument makers[11, 61, 100, 149]. When covered with black varnish it is an excellent ebony substitute[74].

nrakta Hybrid ksacta A cultivated plant.

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year. The seed of pear cultivars will not usually breed true to type.

nwatta A hybrid of the European Pear (Pyrus communis) and the Common Whitebeam (Sorbus aria). For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. Prefers a good well-drained loam in full sun[1, 200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types, if they are moderately fertile[200], avoiding only the most acid soils[186]. Dislikes very exposed positions[186]. Established plants are drought tolerant[200]. A very hardy plant, tolerating temperatures down to below -15°c[200]. Atattractive flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) The cultivar Shipova is a small to medium size tree with roundish to slightly pear shaped, seedless, fruit, about the size of a large apricot; skin is a deep vellow with a delicious flavour and delicate rose-like aroma.

# 4.2.27 Rhus glabra

Smooth Sumach

3 tlin 9 cvuc 4 kcak 3 tcan 3 dwat 3 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikl-

wis hpa7tmwatli nyanhjen hjonli

drutta Rhus glabra is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly

as vet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel. July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Prefers a light well-drained soil but succeeds in most soils including dry ones[11, 14, 200]. Grows well in heavy clay soils[200]. Prefers a circumneutral soil and a sunny position[200]. Dislikes water-logged soils[200]. Tolerates maritime exposure[14, K]. Plants are said to withstand temperatures down to -50°c without damage[160]. The foliage is said to resist disease[11]. A very ornamental plant[1]. it suckers freely but these are fairly easily controlled[K]. There are a number of named varieties[11]. 'Scabrosa' is said to be larger in all its parts, including the fruit[200]. though it has not proved to be much larger with us[K]. The flowers have a clove-like perfume[245]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Dislikes boxwood[18]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.8 Urtica dioica

Stinging Nettle, California nettle 3 tlin 10 cvuc 5 kcak 4 tcan 5 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Urtica dioica is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from March to November, in flower from May to October, and the seeds ripen from June to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The leaves of the plants have stinging hairs, causing irritation to the skin[21, 200]. This action is neutralized by heat or by thorough drying, so the cooked leaves are perfectly safe and nutritious [200]. However, only young leaves should be used because older leaves develop gritty particles called cystoliths which act as an irritant to the kidneys[172]. Possible interference with allopathic drugs for diabetes mellitus, hypertension. Central nervous system depression drugs (e.g. morphine, alcohol) may also interact with nettle. Avoid during pregnancy [301].

kcakta Edible Parts: Leaves OilEdible Uses: Colouring Curdling agent Drink OilYoung leaves - cooked as a potherb and added to soups etc[1, 2, 9, 12, 13, 36, 183]. They can also be dried for winter use[12]. Nettles are a very valuable addition to the diet[244], they are a very nutritious food that is easily digested and is high in minerals (especially iron) and vitamins (especially A and C)[4, 201, 238]. Only use young leaves (see the notes above on toxicity) and wear stout gloves when harvesting them to prevent being stung. Cooking the leaves, or thoroughly drying them, neutralizes the sting, rendering the leaf safe to eat[4, 244]. The young shoots, harvested in the spring when 15 - 20cm long complete with the underground stem are very nice[85]. Old leaves can be laxative[5]. The plants are harvested commercially for extraction of the chlorophyll, which is used as a green colouring agent (E140) in foods and medicines[238]. A tea is made from the dried leaves, it is warming on a winters day[21, 183]. A bland flavour, it can be added as a tonic to China tea[238]. The juice of the leaves, or a decoction of the herb, can be used as a rennet substitute in curdling plant milks[183]. Nettle beer is brewed from the young shoots[200].

tcanta Biomass Compost Dye Fibre Hair Liquid feed Oil Repellent WaterproofingA strong flax-like fibre is obtained from the stems[200]. Used for making string and cloth[1, 4, 6, 13, 36], it also makes a good quality paper[115]. It is harvested as the plant begins to die down in early autumn and is retted before the fibres are extracted[4, 99]. The fibre is produced in less abundance than from flax (Linun usitatissimum) and is also more difficult to extract[4]. The plant matter left over after the fibres have been extracted are a good source of biomass and have been used in the manufacture of sugar, starch, protein and ethyl alcohol[4]. An oil obtained from the seeds is used as an illuminant[4]. An essential ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The leaves are also an excellent addition to the compost heap[12, 18, 20] and they can be soaked for 7 - 21 days in water to make a very nutritious liquid feed for plants[54]. This liquid feed is both insect repellent and a good foliar feed[14, 18, 53]. The growing plant increases the essential oil content of other nearby plants, thus making them more resistant to insect pests[18, 20, 54]. Although many different species of insects feed on nettles, flies are repelled by the plant so a bunch of freshly cut stems has been used as a repellent in food cupboards[4]. The juice of the plant, or a decoction formed by boiling the herb in a strong solution of salt, will curdle milks and thus acts as a rennet substitute[4]. This same juice, if rubbed into small seams of leaky wooden tubs, will coagulate and make the tub watertight again[4]. A hair wash is made from the infused leaves and this is used as a tonic and antidandruff treatment[172, 201]. A beautiful and permanent green dye is obtained from a decoction of the leaves and stems[4, 115]. A yellow dye is obtained from the root when boiled with alum[4, 115]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiasthmatic Antidandruff Antirheumatic Antiseborrheic Astringent Diuretic Eczema Galactogogue Haemostatic Hypoglycaemic Stings Tonic UrinaryNettles have a long history of use in the home as a herbal remedy and nutritious addition to the diet[K]. A tea made from the leaves has traditionally been used as a cleansing tonic and blood purifier so the plant is often used in the treatment of hay fever, arthritis, anaemia etc[254]. The whole plant is antiasthmatic, antidandruff, astringent, depurative, diuretic, galactogogue, haemostatic, hypoglycaemic and a stimulating tonic[4, 9, 21, 36, 165, 238]. An infusion of the plant is very valuable in stemming internal bleeding[4], it is also used to treat anaemia, excessive menstruation, haemorrhoids, arthritis, rheumatism and skin complaints, especially eczema[238]. Externally, the plant is used to treat skin complaints, arthritic pain, gout, sciatica, neuralgia, haemorrhoids, hair problems etc[238]. The fresh leaves of nettles have been rubbed or beaten onto the skin in the treatment. of rheumatism etc[257]. This practice, called urtification, causes intense irritation to the skin as it is stung by the nettles. It is believed that this treatment works in two ways.

Firstly, it acts as a counter-irritant, bringing more blood to the area to help remove the toxins that cause rheumatism. Secondly, the formic acid from the nettles is believed to have a beneficial effect upon the rheumatic joints. For medicinal purposes, the plant is best harvested in May or June as it is coming into flower and dried for later use[4, 238]. This species merits further study for possible uses against kidney and urinary system ailments[222]. The juice of the nettle can be used as an antidote to stings from the leaves and an infusion of the fresh leaves is healing and soothing as a lotion for burns[4]. The root has been shown to have a beneficial effect upon enlarged prostate glands[254]. A homeopathic remedy is made from the leaves[4]. It is used in the treatment of rheumatic gout, nettle rash and chickenpox, externally is applied to bruises[4]. The German Commission E Monographs. a therapeutic guide to herbal medicine, approve Urtica dioica Stinging Nettle for rheumatic ailments (internal use of leaf), irrigation therapy, for inflammatory disease of the lower urinary tract and prevention of kidney 'gravel' formation, urination difficulty from benign prostatic hyperplasia (root) (see [302] for critics of commission E)

nrakta Temperate regions throughout the world, including Britain. The plant has become naturalized at higher elevations in the Tropics. ksacta Waste ground, hedgerows, woods etc, preferring a rich soil and avoiding acid soils[4, 0]

propta Seed - sow spring in a cold frame, only just covering the seed. Prick out the seedlings into individual pots when they are large enough to handle, and plant them out in the summer. Division succeeds at almost any time in the growing season. Very easy, plant them straight out into their permanent positions.

nwatta Industrial Crop: Fiber Management: Hay Regional Crop Staple Crop: ProteinPrefers a soil rich in phosphates and nitrogen. Plants must be grown in a deep rich soil if good quality fibre is required[4, 115]. Nettles are one of the most undervalued of economic plants. They have a wide range of uses, for food, medicines, fibres etc and are also a very important plant for wildlife. There are at least 30 species of insects that feed on it and the caterpillars of several lepidoptera species are dependant upon it for food[30]. Especially when growing in rich soils, the plant can spread vigorously and is very difficult to eradicate. It is said that cutting the plant down three times a year for three years will kill it[4]. It is a good companion plant to grow in the orchard and amongst soft fruit[53, 54]. So long as it is not allowed to totally over-run the plants, it seems to improve the health of soft fruit that grows nearby and also to protect the fruit from birds, but it makes harvesting very difficult. Dioecious. Male and female plants must be grown if seed is required. The plant is heat tolerant in zones 10 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone man is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

# 4.2.9 Foeniculum vulgare

Fennel, Sweet fennel

3 tlin 10 cyuc 5 kcak 4 tcan 3 dwat 1.5 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Foeniculum vulgare is an evergreen Perennial growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from August to October, and the seeds ripen from September to October. The species is

hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Skin contact with the sap or essential oil is said to cause photo-sensitivity and/or dermatitis in some people[218, 222]. Ingestion of the oil can cause vomiting, seizures and pulmonary oedema[222]. Avoid for small children. Avoid if cirrhosis/liver disorders. Diabetics check sugar content of preparation [301].

kcakta Edible Parts: Flowers Leaves Oil Root Seed StemEdible Uses: Condiment Drink Oil TeaLeaves - raw or cooked[2, 4, 5, 9, 27]. A delicious aniseed flavour[183], the young leaves are best since older ones soon become tough[K]. They are often used as a garnish on raw or cooked dishes and make a very pleasant addition to salads[183]. They help to improve digestion and so are particularly useful with oily foods[244]. The leaves are difficult to store dried[200], though this does not really matter since they can often be harvested all year round, especially if the plants are in a warm, sheltered position[K]. Leaf stalks and flower heads - raw or cooked[14, 37, 52, 183]. A similar aniseed flavour to the leaves[K]. The aromatic seeds are used as a flavouring in cakes, bread, stuffings etc[2, 4, 5, 21, 27, 183]. They have a similar flavour to the leaves[K] and also improve the digestion[244]. The sprouted seeds can be added to salads[183]. An essential oil from the fully ripened and dried seed is used as a food flavouring in similar ways to the whole seed[1, 46. 183, 2451, Root - cooked[53], Somewhat parsnip-like. The leaves or the seeds can be used to make a pleasant-tasting herbal tea[16, 183].

tcanta Dye Essential Oil Repellent StrewingThe seed yields up to 5% of an essential oil[1, 4, 46]. This is used medicinally, as a food flavouring, in toothpastes, soaps, perfumery, air fresheners etc[1, 46, 238]. The flavour of fennel oil depends upon its two main constituents. 'Fenchone' is a bitter tasting element whilst 'anethole' has a sweet aniselike flavour[238]. The proportions of these two ingredients varies according to strain and region. Plants growing in the Mediterranean and southern Europe usually have a sweet oil whilst plants growing in central and northern Europe usually produce a more bitter oil[238]. The quality of the oil also depends upon how well the seed has been dried - the oil from fully ripened and dried seeds being much sweeter and more fragrant[245]. The dried plant is an insect repellent[14, 53], the crushed leaves are effective for keeping dogs free of fleas[201]. The plant was formerly used as a strewing herb[201]. Yellow and brown dyes are obtained from the flowers and leaves combined[168]

dwatta Analgesic Antiinflammatory Antispasmodic Aromatherapy Aromatic Carminative Diuretic Emmenagogue Expectorant Galactogogue Hallucinogenic Stimulant Stomachic UrinaryFennel has a long history of herbal use and is a commonly used household remedy, being useful in the treatment of a variety of complaints, especially those of the digestive system[244]. The seeds, leaves and roots can be used, but the seeds are most active medicinally and are the part normally used[4]. An essential oil is often extracted from the fully ripened and dried seed for medicinal use, though it should not be given to pregnant women[4, 238]. The plant is analgesic, anti-inflammatory, antispasmodic, aromatic, carminative, diuretic, emmenagogue, expectorant, galactogogue, hallucinogenic, laxative, stimulant and stomachic[4, 7, 9, 21, 147, 165, 176, 192, 238]. An infusion is used in the treatment of indigestion, abdominal distension, stomach pains etc[254]. It helps in the treatment of kidney stones and, when combined with a urinary disinfectant like Arctostaphylos uva-ursi, makes an effective treatment for cystitis[254]. It can also be used as a gargle for sore throats and as an evewash for sore eves and conjunctivitis[254]. Fennel is often added to purgatives in order to allay their tendency to cause gripe, and also to improve the flavour[4]. An infusion of the seeds is a safe and effective cure for wind in babies [244]. An infusion of the root is used to treat urinary disorders[238]. An essential oil obtained from the seed is used in aromatherapy. Its keyword is 'Normalising'[210]. The essential oil is bactericidal, carminative and stimulant[218]. Some caution is advised, see notes above

a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. Highly resistant to frost and drought, this species is being used to a limited extent in breeding programmes for cultivated apples[183]. The cultivar 'Hyslop' has edible fruits 4cm in diameter[200]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 4.2.24 Malus pumila

Paradise Apple, Common Apple, Apple Tree 3 tlin 9 cyuc 4 kcak 3 tcan 2 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus pumila is a deciduous Tree growing to 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked in pies, cakes etc or fermented into cider[183]. The taste can be sweet and pleasant. The fruit can be up to 6cm in diameter[200].

tcanta Dye Rootstock WoodUsed as a rootstock for the cultivated apples, there are several named varieties[50]. A yellow dye is obtained from the bark[257]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Landscape Uses: Container, Espalier, Specimen.

dwatta Anthelmintic Antibacterial Bach Hypnotic RefrigerantThe bark, and especially the root bark, is anthelmintic, refrigerant and soporific[218, 240]. An influsion is used in the treatment of intermittent, remittent and bilious fevers[240]. The fruit is said to dispel gas, dissolve mucous, cure flux and be a tonic for anaemia, bilious disorders and colic[218]. The leaves contain up to 2.4% of an antibacterial substance called 'phloretin'[240]. This inhibits the growth of a number of gram-positive and gram-negative bacteria in as low a concentration as 30 ppm[240]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'The cleansing remedy', 'Despondency' and 'Despair'[209].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Greece and S.W. Asia. ksacta Not known in a truly wild situation[74].

propta Seéd - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An overstory and understory tree (can grow and fruit in some shade). An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive welldrained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. A parent of the cultivated apple[200], it is occasionally cultivated for its edible fruit and also as a dwarfing rootstock[50]. There are some named forms[200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Attracts birds, Not North American native, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

# 4.2.25 Sambucus nigra spp canadensis

American Elder

3 tlin 9 cyuc 4 kcak 3 tcan 3 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sambucus nigra spp canadensis is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric nollution

pcista The leaves and stems of this species are poisous[9, 76]. The fruit has been known to cause stomach upsets to some people[65, 76]. The unripe fruit contains a toxic alkaloid and cyanogenic glycosides[274]. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers Fruit ShootsEdible Uses: Drink TeaFruit - raw or cooked[2, 3, 55, 85, 257]. A bittersweet flavour the fruits are about 5mm in diameter and are borne in large clusters[200, 227]. They are at their best after being dried[62], the fresh raw fruit has a rather rank taste[101]. The fruit is normally cooked and used in pies, jams, jellies, sauces, bread etc[62, 159, 183]. Rich in vitamin C[183]. Some caution is advised, see notes above on toxicity. Flowers - raw or cooked. They are often covered in batter and made into fritters[105]. The flowers can be picked when unopened, pickled and then used as a flavouring in candies etc[149, 227]. They can also be soaked in water to make a drink[149]. A pleasant tasting tea is made from the dried flowers[21, 159, 183, 257]. Young shoots are said to be edible when cooked and to be used as an asparagus substitute[55. 105] though, since the leaves are also said to be poisonous, this report should be viewed with some doubt.

tcanta Compost Dye Hedge Insecticide Musical Pipes Plant breeding RepellentAgroforestry Uses: When grown near a compost heap, the root activity of this plant encourages fermentation in the compost heap[18]. Other Uses: The leaves and inner bark of young shoots are used as an insect repellent[6, 101, 149, 159, 257], the dried flowering shoots are said to repel insects and rodents[101]. A decoction of the leaves can be used as an insecticide[201]. It is prepared by boiling 3 - 4 handfuls of leaves in a litre of water, then straining and allowing to cool before applying. Effective against many insects, it also treats various fungal infections such as leaf rot and powdery mildew[201]. A black dye is obtained from the bark[149]. When grown near a compost heap, the root activity of this plant encourages fermentation in the compost heap[18]. The stems can be easily hollowed out to be used as drains in tapping the sap from trees such as the Sugar Maples (Acer spp). the stems can also be used

heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. An evergreen.

#### 4.2.22 Actinidia kolomikta

Kixazi

3 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia kolomikta is a deciduous Climber growing to 10 m (32Rt 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw, cooked or dried for later use[1, 3, 105, 183]. Sweet and agreeable[1, 74]. It contains up to 5 times the vitamin C of blackcurrants[74]. The ovoid fruit is hairless and pale orange when fully ripe and is up to 25mm in diameter[266]. It contains a number of small seeds, but these are easily eaten with the fruit[K]. Young leaves - cooked[105, 177]. Used as a potherb or added to soups[183]. One report suggests the its Content of vitamin C in berries is 1520mg in 100grams of fruit.

nrakta E. Asia - China, Japan, E. Siberia. ksacta Coniferous woodlands and hedges in mountains throughout Japan[58, 126]. Mountain mixed forests in open places at elevations of 1600 - 2900 metres in China[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood. October/November in a frame.

nwatta Landscape Uses:Arbor. Prefers a sound loamy neutral soil[11, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Another report says that the plant prefers semi-shade[160]. Prefers a sheltered position[200]. When grown in a sunny position the leaves normally develop a strong variegation[219]. Prefers a neutral soil, plants become more variegated when they are grown in a limy soil[200]. Very cold resistant, dormant plants are hardy to at least -30°c but new growth in spring can be cut back by late frosts[74, 160, 200]. Plants grow well on a wall and can also be grown into trees[1]. Cats are very fond of this plant and can damage it by scratching it etc[1, 3, 200]. A very ornamental plant[1], there are some named varieties that have been selected for their edible fruit[183, 200]. The form most often cultivated in this country is a male and it is guite possible that all the plants grown here have been developed from a single clone[219]. Often confused with the closely related A. polygama, but it can be distinguished by its leaves which are heart-shaped at the base whilst those of A. polygama are tapered[219]. Fruits are produced on second year wood or on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. The flowers are sweetly scented[184]. This is a climbing plant, supporting itself by twining around branches etc[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody, Growth habit is a single or multiple shooting vine from a crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 4.2.23 Malus prunifolia

Chinese Apple, Plumleaf crab apple 3 tlin 7 cyuc 4 koak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus prunifolia is a deciduous Tree growing to 8 m (26ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy clay soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. A bitter flavour[K]. Fruits we have tasted have been astringent rather than bitter, though some cultivars and forms are not at all bitter. A fruit of the species, tasted at Kew in October 1991, had a sweet pleasant taste, was mealy and of low acidity[K]. The fruit can be used fresh or in preserves etc. The fruit is about 20mm in diameter[200], though some forms are considerably larger[K].

tcanta RootstockThis species is an excellent stock for grafting apple trees[266].

nrakta E. Asia - northern China. ksacta Slopesand plains from sea level to 1300 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in

on toxicity[222]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Foeniculum vulgare for cough, bronchitis, dyspeptic complaints (see I3021 for critics of commission E).

nrakta S. Europe. Naturalized in Britain. ksacta Found most often in dry stony calcareous soils near the sea[1, 16, 190]

propta Seed - best sown in early spring in situ[1]. The seed can also be sown in situ in the autuml[4, 37]. In many gardens it self sows freely. Division in March as the new growth appears[16, 200]. The plants are very tolerant of disturbance, we have found divisions to take well at any time of the year, though these divisions are never as good as seed-sown plants[K].

nwatta An easily grown plant, it succeeds in most soils but prefers a sunny dry position[4, 16, 37, 200]. It grows well in sandy soils[188] and is drought tolerant once established[190]. Plants often self-sow freely in the garden[K]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Although hardy in most parts of Britain, plants are liable to die out over the winter if the soil is not well-drained or the weather is persistently cold and wet[238]. Fennel is often cultivated in the herb garden for its edible and medicinal uses, there are some named varieties[183]. Especially in mild winters, the leaves can be available all year round[K]. It is best to cut a few plants back to ground level occasionally during the growing season, thus ensuring a constant supply of fresh young shoots[4]. In a dry summer make sure that you water the cut-down clump or it might not regrow that year[K]. Fennel is also grown commercially as a medicinal plant and for its essential oil[4, 238]. Fennel is in general a poor companion plant in the garden. It inhibits the growth of nearby plants, especially beans, tomatoes and kohl rabi[14, 18]. It is itself inhibited by wormwood and coriander[14, 18]. However, the flowering plant attracts beneficial insects such as bees, parasitic wasps, tachinid flies and hoverflies to the garden. The presence of these creatures will help to maintain a natural balance of insects in the garden and help prevent infestations by aphis etc[238]. It is best not to grow fennel and dill (Anethum graveolens) close to each other since hybridisation can occur and the resulting seedlings will be of indeterminate flavour[238]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread

#### 4.2.10 Secale strictum kuprijanovii

3tlin 7 cyuc 5 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Secale strictum kuprijanovii is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - used as a whole grain or ground into a flour and used for making bread etc[46, 177, 183]. Somewhat smaller than the seed of S. cereale but produced abundantly. It is relatively difficult to extract the seed from the glumes by hand[K].

nrakta W. Asia - Caucasia. ksacta Mountain meadows[74]

propta Seed - sow March or October in situ and only just cover the seed. Germination should take place within 2

weeks. If the seed is in short supply, it can be grown in pots in the greenhouse or cold frame in early spring. Only just cover the seed. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils but prefers a well-drained light soil in a sunny position[1]. One report says that it requires protection from severe frosts[1], though our experience is that it is hardy in most parts of the country[K]. Occasionally cultivated for its edible seed[61], it is possibly a parent of the cultivated Rye, S. cereale[57]. This species has an excellent potential as a perennial cereal crop in temperate zones. Although the seed is somewhat smaller than the cultivated annual rye, it is produced abundantly, especially from the second year onwards. The plant tillers well, especially in its second and subsequent years, and the ears in selected varieties can be 25cm long[K]. This subspecies is reliably perennial[46].

# 4.2.11 Althaea officinalis

Marsh Mallow, Common marshmallow 3 tlin 7 cyuc 5 kcak 3 tcan 5 dwat 1.2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli fyifxre7t hjonli

drutta Althaea officinalis is a PERENNIAL growing to 1.2 m (4ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista No documented adverse effects but anecdotal reports allergic reaction and lower blood sugar.

kcakta Edible Parts: Leaves Oil RootEdible Uses: Egg Oil TeaLeaves - raw or cooked[2, 4, 100]. They are used as a potherb or to thicken soups[62, 183]. When used as a small proportion with other leaves, the taste and texture is acceptable, but if a lot of the leaves are cooked together their mucilaginous texture makes them unpalatable [K]. The leaves can be eaten raw but are rather fibrous and somewhat hairy, though the taste is mild and pleasant[K]. We have found them to be quite acceptable in salads when chopped up finely[K]. Root - raw or cooked[61]. When boiled and then fried with onions it is said to make a palatable dish that is often used in times of shortage[4]. The root is used as a vegetable[62, 141, 183], it is also dried then ground into a powder, made into a paste and roasted to make the sweet 'marshmallow'[4, 5, 7, 17, 61]. The root contains about 37% starch, 11% mucilage, 11% pectin[254]. The water left over from cooking any part of the plant can be used as an egg-white substitute in making meringues etc[62]. The water from the root is the most effective[183], it is concentrated by boiling until it has a similar consistency to egg white. A tea is made from the flowers[183]. A tea can also be made from the root[183].

tcanta Adhesive Fibre Oil TeethThe dried root is used as a toothbrush or is chewed by teething children[6, 7]. It has a mechanical affect on the gums whilst also helping to ease the pain. The root is also used as a cosmetic, helping to soften the skin[7]. A fibre from the stem and roots is used in paper-making[46, 61, 74, 115]. The dried and powdered root has been used to bind the active ingredients when making pills for medicinal use[268]. A glue can be made from the root[74]. The root is boiled in water until a thick syrup is left in the pan, this syrup is used as a glue. An oil from the seed is used in making paints and varnishes[74].

dwatta Antidiarrhoeal Antitussive Demulcent Diuretic Emollient Laxative Odontalgic UrinaryMarsh mallow is a very useful household medicinal herb. Its soothing demulcent properties make it very effective in treating inflammations and irritations of the mucous membranes such as the alimentary canal, the urinary and the respiratory organs[4, 254]. The root counters excess stomach acid, peptic ulceration and gastritis[254]. It is also applied externally to

bruises, sprains, aching muscles, insect bites, skin inflammations, splinters etc[4, 238]. The whole plant, but especially the root, is antitussive, demulcent, diuretic, highly emollient, slightly laxative and odontalgic[4, 17, 21, 46, 165]. An infusion of the leaves is used to treat cystitis and frequent uriantion[254]. The leaves are harvested in August when the plant is just coming into flower and can be dried for later use[4]. The root can be used in an ointment for treating boils and abscesses[254]. The root is best harvested in the autumn, preferably from 2 year old plants, and is dried for later use[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Althaea officinalis Marsh Mallow for irritation of mouth and throat and associated dry cough/bronchitis (Root and leaf), mild stomach lining inflammation (root) (see [302] for critics of commission E).

nrakta Central and southern Europe, including Britain, to N. Africa and W. Asia. ksacta The upper margins of salt and brackish marshes, sides of ditches and grassy banks near the sea[7, 17].

propta Seed - sow spring or autumn in a cold frame. The seed is best sown as soon as it is ripe in late summer, the germination is often erratic [238]. Stratification can improve germination rates and time. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer [K]. Division in spring or autumn. Fairly easy, it is best to pot up the divisions in a lightly shaded position in a cold frame or greenhouse until they are growing away well and then plant them out into their permanent positions. Root cuttings in December.

nwatta Succeeds in almost any soil and situation[1, 4, 200], though it prefers a rich moist soil in a sunny position[4, 200]. It also tolerates fairly dry soil conditions[1]. Plants are hardy to about -25°c[187]. Marsh mallow is often cultivated in the herb garden, as a culinary and medicinal herb as well as for ornament[61]. Its roots were at one time the source of the sweet 'marsh mallow', but this sweet is now made without using the plant[4]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 4.2.12 Secale strictum

Mountain Rye

3 tlin 7 cyuc 5 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Secale strictum is a PERENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - used as a whole grain or ground into a flour and used for making bread etc[46, 177, 183]. Somewhat smaller than the seed of S. cereale but produced abundantly. It is relatively difficult to extract the seed from the glumes by hand[K].

nrakta Europe - Mediterranean to northern Africa and western Asia. ksacta Dry stony or rocky mountain sides.

propta Seed - sow March or October in situ and only just cover the seed. Germination should take place within 2 weeks. If the seed is in short supply, it can be grown in pots in

the greenhouse or cold frame in early spring. Only just cover the seed. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils but prefers a well-drained light soil in a sunny position[1]. One report says that it requires protection from severe frosts[1], though our experience is that it is hardy in most parts of the country[K]. Mountain rye is occasionally cultivated for its edible seed[61], it is possibly a parent of the cultivated Rye, S. cereale[57]. This species has an excellent potential as a perennial cereal crop in temperate zones. Although the seed is somewhat smaller than the cultivated annual rye, it is produced abundantly, especially from the second year onwards. The plant tillers well, especially in its second and subsequent years, and the ears in selected varieties can be 25cm long[K]. Not all forms of this species are perennial, the subspecies S. strictum kuprijanovii. Gross. is reliably so[46].

#### 4.2.13 Secale hybrids

Perennial cereal rve

3 tlin 9 cyuc 5 kcak 4 tcan 1 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Secale hybrids is a PERENNIAL growing to 1.8 m (6ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilCarbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. A minor or regional perenial crop in production with low or unreported yields [1-1]. Perennial hybrids are now under development. Wild perennial species found in Turkey , for example, Secale monatum Guss var. anatolicum Boiss and Secale montanum Guss var. vavilovi Grossh. have a larger stature, high frost resistance, strong tillering ability, and tolerance to poor soils and drought. Understanding wild plant species is becoming important in the development of new hybrid crops.

tcanta OilMany including Biomass; Green manure; Oil; Soil stabilization; and Thatching.

dwatta Possible. For example Secale cereale seed is made into a poultice and applied to tumours[218]. The seed is also an effective laxative due to its fibrous seed coat[269].

nrakta Origin: recent hybrid origin. ksacta Hybrid propta Seed. Division.

nwatta Management: Standard Staple Crop: Balanced carb Under DevelopmentClimate: boreal to warm temperate, Mediterranean. Humidity: semi-arid to humid. Carbon Farming Solutions - Cultivation: under development perennial hybrids. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1]

# 4.2.14 Lepidium spp.

Perennial Lepidium

3 tlin 10 cyuc 5 kcak 0 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Lepidium spp. is a PERENNIAL growing to  $1.2~\mathrm{m}$  (4ft) by  $2~\mathrm{m}$  (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone  $3~\mathrm{Suitable}$  for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Carbon Farming Solutions - Staple Crop: oil (The term staple crop typically refers to a food that is eaten routinely and accounts

#### 4.2.20 Pyrus ussuriensis

Harbin Pear, Chinese pear, Ussurian Pear 3 tlin 7 cyuc 4 kcak 2 tcan 0 dwat 15 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus ussuriensis is a deciduous Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. Size and quality varies tremendously from tree to tree. Good forms have somewhat dry but pleasantly flavoured fruits up to 4cm in diameter, other forms are less pleasant and often smallerf KI.

tcanta Rootstock WoodUsed as a rootstock[183] for P. pyrifolia culta in Korea[151], it is very frost resistant[74].

nrakta E. Asia - N.E. China, Korea. ksacta Forests and river valleys in lower mountain zones[74].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. A very frost resistant tree[74], tolerating temperatures down to below -15°[200], it is a possible rootstock for northern areas[74]. It is used as a rootstock for P. pyrifolia culta in Korea. This species is a parent of the cultivated Asian pears[200]. Special Features:Not North American native, Blooms are very showy.

#### 4.2.21 Pinus cembra

Swiss Stone Pine, Swiss Pine, Arolla Pine 3 tlin 9 cyuc 4 koak 3 tcan 2 dwat 15 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus cembra is an evergreen Tree growing to 15 m (49ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from May to June, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Oil SeedEdible Uses: Condiment OilSeed - raw or cooked[1, 2, 4, 34, 177, 183]. Much valued as a food, the oil-rich seed has a delicious flavour but with a slight flavour of turpentine. A reasonable size, it is about 10mm x 8 mm[200]. An edible drying oil is obtained from the seed[2, 57, 63, 183]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide Oil Resin WoodLandscape Uses: Screen, Specimen, ornamental. A tan or green dye is obtained from the needles[168]. The needles contain a sub-

stance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Turpentine is obtained from the leaves[46, 61]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 641. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - soft, easily worked. Used for furniture, turnery etc[46, 61, 100].

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta Europe - Alps, running north to Russia and Siberia. ksacta Rarely found below elevations of 1500 metres, it grows with larch up to the tree line[11, 81].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Thrives in a light well-drained sandy or gravelly loam[1]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Succeeds in most situations, flourishing on N. facing slopes and in moist heavy clay soils[81]. Grows best in the cooler wetter areas of Britain[11. 81]. A very hardy plant tolerating temperatures down to about -30°c[160]. The edible seeds are collected in large numbers in Siberia and are often exported[142]. (This report probably refers to the sub-species P. cembra sibirica.) This species does not appear to be long lived or to produce its cones freely in S. Britain[11]. It does not produce cones until it is 30 years old[200]. The cones take three years to ripen and then fall from the tree with the seeds still inside[120]. The seed is often eaten by squirrels etc before it can fall to the ground. The cones do not open, seed is extracted by breaking up the soft scales of the cone[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Slow growing in cultivation[81, 120], plants usually make less than 30 cm increase in height per year even when young[185]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native. Inconspicuous flowers or blooms. The plant is heat. tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the

years[229] It is cultivated for its timber in C. Europe[50] This species produces an abundance of flowers and usually fruits well in Britain[11]. In the wild the tree begins to fruit when about 10 years old and then continues for about 100 years, fruiting well in most years[149]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attracts birds. North American native, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Fragrant flowers. Attractive flowers or blooms.

#### 4.2.19 Prunus avium

Wild Cherry, Sweet cherry

3 tlin 7 cyuc 4 kcak 4 tcan 2 dwat 18 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Prunus avium is a deciduous Tree growing to 18 m (59ft) by 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: GumFruit - raw or cooked[2, 12, 13]. It can be sweet or bitter but it is not acid[11]. The fruit can be cooked in pies etc or used to make preserves. The fruit contains about 78% water, 8.5 - 14% sugars[74]. The fruit is about 20mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible gum is obtained by wounding the bark[115, 183].

tcanta Dye Gum Tannin WoodAgroforestry Uses: Wild cherry is essentially a pioneer species, and quickly colonises clearings by seeds and suckering, forming secondary woodland, but is often out-competed later by other hardwood species. It is used extensively in Europe for the afforestation of agricultural land and it is also valued for wildlife and amenity plantings[1195]. The flowers are a good source of pollen and nectar for bees[74, 1145]. This species is a bad companion for potatoes, making them more susceptible to potato blight[201], it also suppresses the growth of wheat[18] I. It also grows badly with plum trees, its roots giving out an antagonistic secretion[201]. Other Uses: A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The bark, especially of the root, contains the dve phlorizin[74]. The wood contains the dye xylan[74]. The seed contains around 30% oil[74]. The bark usually only contains small amounts of tannin, but this sometimes rises to 16%[223]. This species has been utilized to breed cherry cultivars with resistance to frost and a number of diseases. Among cultivated forms there are very ornamental ones with double and pink flowers, motley or dissected leaves as well as with a drooping crown[1145] The heartwood is pinkish-brown; the sapwood red. The grain is fine and straight, with a satiny texture. The wood is firm, compact, and generally free from defects. A valuable, attractive timber that is easy to work, it is used for turnery, furniture, cabinet making, panelling, musical instruments etc[46] , 74, 100, 115, 1195]. The red sapwood is valued in turnery and woodwork[74].

dwatta Antitussive Astringent Diuretic TonicThe fruit stalks are astringent, diuretic and tonic[4, 7, 238]. A decoction is used in the treatment of cystitis, oedema, bronchial complaints, looseness of the bowels and anaemia[4, 238]. An aromatic resin can be obtained by making small incisions in the trunk[7]. This has been used as an inhalant in the treatment of persistent coughs[7]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238]

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Better soils in hedgerows and woods, especially in beech woods[5, 17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Division of suckers in the dormant season[98]. They can be planted out direct into their permanent positions. Lavering in spring.

nwatta Landscape Uses:Espalier. Requires a welldrained moisture retentive soil[1, 11]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. A very ornamental plant[1], it is fast growing on deep moist soils[11] but is shallow rooting[98]. Trees cast a light shade and are themselves intolerant of heavy shade[186]. They produce quite a lot of suckers and can form thickets, especially if the main trunk is felled[186]. This species is a parent of many cultivated forms of sweet cherries[17, 34], especially the black fruited forms[11]. Where space is at a premium, or at the limits of their climatic range, sweet cherries can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall though east or north facing walls are not very suitable[219]. The main problems with growing this species against a wall are firstly that it is usually completely selfsterile and so there needs to be space for at least two different cultivars[186], secondly it is very vigorous and so is difficult to keep within bounds[219]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. An excellent tree for insects[24] and the fruit is a good food source for birds. A bad companion for potatoes, making them more susceptible to potato blight[201], it also suppresses the growth of wheat[18]. It also grows badly with plum trees, its roots giving out an antagonistic secretion[201]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Edible, Not North American native, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant for a dominant part of people's diets in a particular region of treatment of cancer - extracts from the roots have shown anthe world) [1-1]. Fruit is usually spreading and squat (less than 3 times as long as broad),

tcanta See individual species

dwatta Various medicinal qualities depending on the species

nrakta Origin: N. Temperate. Widely distributed in the Americas, Africa, Asia, Europe, and Australia. ksacta Various depending on the species.

propta See individual species.

nwatta Management: Standard Staple Crop: Oil Under DevelopmentClimate: boreal to warm temperate. Humidity: semi-arid to humid. A genus of plants in the mustard/cabbage family, Brassicaceae. Annual to perennial, herbs or shrubs. Species include garden cress, maca, and dittander. Lepidium is from the Greek lepis (scale) referring to the shape of the seed pods. Carbon Farming Solutions - Cultivation: under development. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

#### 4.2.15 Hemerocallis fulva

Common Day Lily, Orange daylily, Tawny Daylily, Double

3 tlin 10 cyuc 5 kcak 2 tcan 2 dwat 1 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Hemerocallis fulva is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

pcista Large quantities of the leaves are said to be hallucinogenic[127, 137]. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves Root ShootsEdible Uses: Leaves and young shoots - cooked[85, 116, 179, 183]. An asparagus or celery substitute. An excellent sweet tasting vegetable[179, K], though some caution is recommended[127, 137]. The leaves need to be eaten whilst still very young since they guickly become fibrous[K]. Flowers raw or cooked[62, 100]. The petals are thick and crunchy, making very pleasant eating raw, with a nice sweetness at the base because of the nectar[K]. The flowers can also be dried and used as a thickener in soups etc[62, 183]. In this case, they are picked when somewhat withered and closed[85]. A rich source of iron[218]. Flower buds - raw or cooked[62, 100, 105, 116]. A pea-like flavour[85]. Can be dried and used as a relish[178]. The dried flower contains about 9.3% protein. 25% fat!?, 60% carbohydrate (rich in sugar), 0.9% ash. It is rich in vitamin A[179]. Tubers - raw or cooked[183]. A nutty flavour[62]. Young tubers are best, though the central portion of older tubers is also good[85].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 90cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208]. The cultivar 'Kwanso Flore Pleno' has been especially mentioned[208].

dwatta Anodyne Anthelmintic Antidote Antiemetic Antispasmodic Blood purifier Cancer Depurative Diuretic Febrifuge Laxative SedativeDiuretic, febrifuge, laxative (mild)[62, 178, 205]. The flowers are anodyne, antiemetic. antispasmodic, depurative, febrifuge and sedative[218]. In China they are used as an anodyne for women in childbirth[240]. An extract of the flowers is used as a blood purifier[240]. The rhizome has shown antimicrobial activity, it is also tuberculostatic and has an action against the parasitic worms that cause filariasis[279]. It is used in Korea to treat oppilation, jaundice, constipation and pneumonia[279]. The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. The root also has a folk history of use in the

titumour activity[218]. A tea made from the boiled roots is used as a diuretic[205, 218].

nrakta Of uncertain origin. A garden escape in Britain. ksacta Common and widespread in the wild[205], probably as an escape from cultivation

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year Kl. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. nwatta Landscape Uses:Border, Erosion control, Ground

cover, Massing. Succeeds in most soils[1], including dry ones, though it prefers a rich moist soil[111] and a sunny position but tolerating partial shade[88, 111]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. This species is hardy to about -20°c[187]. Plants take a year or two to become established after being moved[200]. The roots have spindleshaped swellings and spread freely, the plant can become invasive[205]. A very ornamental plant[1], it is cultivated in China and Japan for its edible flowers and leaves, there are many named varieties [200]. Individual flowers are shortlived, opening in the morning and withering in the evening. The plant, however, produces a succession of flowers over a period of about 6 weeks[205]. The sterile cultivar 'Kwanzo' has double flowers, it has been especially mentioned for these flowers which are said to be crunchy with a nutty aftertaste[137]. 'Flore Pleno' is another form with doubleflowers that have a delicious taste[K]. The sterile cultivar 'Europa' is very vigorous, with long stolons, and each piece of root is capable of growing into a new plant[205]. This cultivar, which is the form usually supplied from nurseries, succeeds in lawns and has even been known to grow through tarmac[205]. Hybridizes freely with other members of this genus[200]. Many forms of this plant are sterile triploids, probably of garden origin, and do not set seed[205]. The pollen, however, is fertile and can be used to fertilize other plants[205]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. Special Features: Naturalizing, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 12 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 4.2.16 Rumex acetosa

Sorrel, Garden sorrel

3 tlin 7 cyuc 5 kcak 4 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rumex acetosa is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen from June to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities. the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant. in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Curdling agentLeaves - raw or cooked[2, 4, 5, 7, 13, 27]. They make a thirst-quenching on their own, or can be added to salads, used as a potherb or pureed and used in soups[183]. A delicious lemon-like flavour, liked by most people who try them, they can be rather overpowering in quantity and are more generally used as a flavouring in mixed salads[K]. The leaves can also be dried for later use[12]. The leaves can be available all through the winter, especially in mild weather or if a little protection is given to the plants[K]. The leaves should be used sparingly in the diet[9, 21], see the notes on toxicity above. Flowers - cooked as a vegetable or used as a garnish[183]. Root - cooked. It is dried, ground into a powder and made into noodles[105]. Seed - raw or cooked[172]. Ground into a powder and mixed with other flours to make bread[183]. The seed is easy to harvest, but is rather small and fiddly to use[K]. The juice of the leaves can be used as a curdling agent for milks[4, 183].

tcanta Cleanser Dye PolishDark green to brown and dark grey dyes can be obtained from the roots, they do not need a mordant[168]. A grey-blue dye is obtained from the leaves and stems[106]. An infusion of the stems is used as a polish for bamboo and wicker furniture and also for silver[53, 2381. The juice of the plant removes stains from linen[14] and also ink stains (but not ball-point ink) from white material [53. 238]. It is sometimes sold as 'essential salt of lemon'[4]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anthelmintic Antiscorbutic Astringent Depurative Diuretic Febrifuge Homeopathy Laxative Refrigerant StomachicThe fresh or dried leaves are astringent, diuretic. laxative and refrigerant[4, 7, 14, 21, 238]. They are used to make a cooling drink in the treatment of fevers and are especially useful in the treatment of scurvy[4]. The leaf juice, mixed with fumitory, has been used as a cure for itchy skin and ringworm[4] An infusion of the root is astringent diuretic and haemostatic[4, 7, 14, 21, 218]. It has been used in the treatment of jaundice, gravel and kidney stones[4]. Both the roots and the seeds have been used to stem haemorrhages[4]. A paste of the root is applied to set dislocated bones[272]. The plant is depurative and stomachic[7, 14, 21, 218]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of spasms and skin ailments[9].

nrakta Most of Europe, including Britain, temperate Asia, N. America, Greenland. ksacta Meadows, by streams and in open places in woodland[7, 17]. Often found as a weed of acid soils[1]

propta Seed - sow spring in situ. Leaves can be harvested within 8 weeks from sowing. Division in spring. Division is very simple at almost any time of the year, though the plants establish more rapidly in the spring. Use a sharp spade or knife to divide the rootstock, ensuring that there is at least one growth bud on each section of root. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame. planting them out once they are well established in the sum-

nwatta Industrial Crop: Biomass Management: Hay Management: Standard Minor Global Crop Staple Crop: Balanced carbA very easily grown and tolerant plant, it succeeds in most soils[37], preferring a moist moderately fertile well-drained soil in a sunny position[200]. Shade tolerant[12]. Established plants are tolerant of considerable neglect, surviving even in dense weed growth[K]. Sorrel

if seed is required), and is pollinated by Wind. The plant is has been used since ancient times as a food and medicinal plant[244]. It is still occasionally cultivated for its edible leaves, there are some named varieties[183]. The plant stops producing leaves when it flowers in the summer, regrowing after the seed has set. Plants also usually die down in the winter. Cutting down the flowering stem will encourage the growth of fresh young leaves[4]. 'Blonde de Lyon' has large, only slightly acid leaves and is much less likely to flower than the type[200]. This means that the leaves of this cultivar are often available all through the summer and are often also produced throughout the winter, especially if the winter is mild[200, Kl. A food plant for the caterpillars of many species of butterfly, it is a good plant to grow in the spring meadow[24]. Dioecious. Male and female plants must be grown if seed is required. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

#### 4.2.17 Camassia guamash

Quamash, Small camas, Utah small camas, Walpole's small camas

3 tlin 7 cyuc 5 kcak 3 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Camassia guamash is a BULB growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[62, 95]. The bulb, which can be up to 5cm in diameter[270], has a mild, starchy flavour when eaten raw, but a gummy texture that reduces the enjoyment of it somewhat[K]. When cooked, however, it develops a delicious sweet flavour somewhat like sweet chestnuts[92], and is a highly nutritious food[2]. Excellent when slow baked, it can also be dried and made into a powder which can be used as a thickener in stews or mixed with cereal flours when making bread, cakes etc[K]. The bulbs can be boiled down to make a molasses, this was used on festival occasions by various Indian tribes[2, 183]. The bulbs can be harvested at any time of the year[85], but are probably best in early summer when the seeds are ripe[94]. One report says that the bulbs contain inulin (a starch that cannot be digested by humans) but that this breaks down when the bulb is cooked slowly to form the sugar fructose which is sweet and easily digested[256]. Ouamash bulbs were a staple food of the N. American Indians[42, 92]. The tribes would move to the Ouamash fields in the early autumn and, whilst some people harvested the bulbs, others would dig a pit, line it with boulders then fill it with wood and set fire to it. The fire would heat the boulders and the harvested bulbs would then be placed in the pit and the whole thing covered with earth and the bulbs left to cook slowly for 2 days. The pit would then be opened and the Indians would feast on the bulbs until they could no longer fit any more in their stomachs. Whatever was left would be dried and stored for winter use.

tcanta Notable Products: Nectar, pollen, edible bulb. Attracts Wildlife - flowers attract beneficial insects. Grown as an ornamental plant.

been used to induce labour[257]. An infusion of the leaves has been used to treat vaginal bleeding after birth and to help expel the placenta[257].

nrakta Western N. America - Washington to California, east to Montana and Utah, ksacta Coastal mountain forests and wet meadows inland[60, 62]. Marshy meadows in coniferous forest to 2300 metres[90]

propta Seed - best sown as soon as it is ripe in a cold frame[134]. The seed can also be sown in a cold frame in spring[134]. It usually germinates in 1 - 6 months at 15°c, but it can be erratic[138]. Sow the seed thinly so that it does not need to be thinned and allow the seedlings to grow on undisturbed for their first year. Give an occasional liquid feed to ensure that the plants do not become nutrient deficient. When the plants are dormant in late summer, pot up the small bulbs putting 2 - 3 bulbs in each pot. Grow them on for another one or two years in a cold frame before planting them out when dormant in late summer. Offsets in late summer. The bulb has to be scored in order to produce offsets.

nwatta Succeeds in almost any soil[42]. Grows well in heavy clay soils. Prefers a rather heavy loam[1] that has plenty of moisture in spring but does not remain wet over the winter[138, 200]. Dislikes dry soils[200]. Prefers full sun but tolerates partial shade[138, 200]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°c[214]. Quamash is a very pretty flowering bulb that has quite a large potential as an edible ornamental plant[K]. It grows very well in the flower border but can also be naturalised in damp grass[134]. We are intending to grow it in a grassed-down orchard in our Cornish trial ground. The bulbs flower in late spring and early summer and have completely died down by early July so they do not interfere with harvesting the apple crop. The grass in the orchard will be cut in early spring before the quamash comes into growth, but will not be cut again until July. The bulbs will be harvested at any time from July to December and, since it is impossible to find all the bulbs, it is hoped that those remaining will be able to increase and supply bulbs for future years[K]. A polymorphic and very ornamental plant[1], there are some named varieties [200]. The subspecies C. quamash maxima has larger bulbs than the type, up to 65mm in diameter[270]. A good bee plant[108]. This species can be confused with certain poisonous bulbs in the genus Zigadenus[85]. Plant the bulbs 7 - 10cm deep in early autumn and then leave undisturbed[1]. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is a bulb.

#### 4.2.18 Prunus serotina

Rum Cherry - Wild Cherry, Black Cherry, Wild Black Cherry 3 tlin 9 cvuc 4 kcak 0 tcan 2 dwat 18 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prunus serotina is a deciduous Tree growing to 18 m (59ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The seeds and leaves of this species contain high quantities of hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is readily detected

dwatta Birthing aid OxytoxicA decoction of the roots has by its bitter taste. Usually present in too small a quantity to do any harm, any very bitter seed or fruit should not be eaten[21, 65]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion. it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death. Discard the seeds. Keep plant way from children

kcakta Edible Parts: Fruit SeedEdible Uses: Condiment DrinkFruit - raw or cooked in pies, jellies, stews etc[2, 11, 34, 55, 62, 101, 149, 183]. It must be fully ripe or else it will have a bitter flavour. The fruit can taste sweet or bitter[43]. The better fruits have a thin skin and a juicy flesh with a pleasant vinous flavour[82]. The fruit can also be used as a flavouring[149]. The taste is best when the plant is grown in a sunny position[159]. The fruit is about 9mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An infusion of the twigs is used as a beverage[161, 257]. An extract from the bark is used commercially as a flavouring in soft drinks, sweets, syrups and baked goods[183].

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - close and straight-grained, light, strong, rather hard, highly shock resistant [46, 82, 149, 171 229]. It bends well, works well, finishes smoothly, glues well, seasons well, shrinks moderately and is moderately free from checking and warping[227]. It weighs about 36lb per cubic foot and takes a beautiful polish[227]. It is widely used for furniture, cabinet making, the interior finish of buildings etc[46, 82, 149, 171, 229].

dwatta Antidiarrhoeal Antitussive Astringent Dysentery Pectoral Sedative Stomachic TonicRum cherry was widely employed medicinally by various native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. The bark of the root, trunk and branches is antitussive, astringent, pectoral, sedative, stomachic, tonic[4, 21, 95, 165, 238]. The medicinal properties of this plant are destroyed by boiling, so the plant should only be allowed to steep in warm water[213]. The root bark and the aromatic inner bark have expectorant and mild sedative properties and a tea made from either of them has been used to ease pain in the early stages of labour[213, 222]. The tea is also used in the treatment of fevers, colds, sore throats, diarrhoea etc[222, 257]. The bark is harvested in the autumn and should not be stored for longer than one year since it quickly loses its medicinal properties[4, 213]. Young thin bark is preferred[213]. A decoction of the inner bark has been used in the treatment of laryngitis[257]. The root bark has been used as a wash on old sores and ulcers[257]. The bark contains the glycoside prunasin, which is converted in the digestive tract to the highly toxic hydrocyanic acid[222]. Prunasin is at its highest level in the bark in the autumn[222] so the bark is harvested at this time and can be dried for later use[254]. In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238]. The fruit is astringent and has been used in the treatment of dysentery[213].

nrakta N. America - Nova Scotia to Minnesota, south to Florida and Texas. Also in Arizona and Mexico. ksacta Found in a variety of soils, preferring moist fertile conditions on north or east facing slopes or protected coves[229]. Dry woods[43]

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[1, 11]. Requires a warm sunny position[11, 159]. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. A fast-growing and moderately long-lived tree in the wild, producing a heavy fruit crop about once every 4 Elaphria grata (Grateful Midget) and Eubaphe mendica (The Beggar), the leaf-mining larvae of Ametastegia pallipes (Violet Sawfly), the aphid Neotoxoptera violae, and the thrips Odontothrips pictipennis. The seeds and other parts of violets are occasionally eaten by such birds as the Ruffed Grouse, Wild Turkey, and Mourning Dove, and they are also consumed by the White-Footed Mouse, Pine Mouse, and Eastern Chipmunk. Similarly, the foliage of these low-growing plants is a source of food for the Cottontail Rabbit and Wood Turtle (Clemmys insculpta) [1-6].

dwatta Analgesic Dysentery PoulticeAn infusion of the plant has been used in the treatment of coughs, colds and dysentery[257]. A poultice of the leaves has been used to reduce the pain of headaches[257]. A poultice of the crushed root has been applied to boils[257].

nrakta Eastern N. America - Quebec to Ontario and south to Georgia. ksacta Wet places, often in open woods[187]. Wet meadows, springs, bogs, swamps etc[43].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Very intolerant of drought[187]. Succeeds in dense shade[197]. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5. This plant produces cleistogamous flowers as well as the usual insect pollinated flowers[187]. It usually self-sows freely[188]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62]. 85, 159]. A polymorphic species[188]. there are many named forms, selected for their ornamental value[200].

# 4.2.125 Campanula alliariifolia

Cornish Bellflower

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 0.7 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula alliariifolia is a deciduous Perennial growing to 0.7 m (2ft 4in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from April to November, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[K]. The leaves are rather hairy and. especially as they age, have a slightly unpleasant bitterness. They are acceptable as a minor ingredient in mixed salads, but are generally less than pleasant to eat on their own[K]. Flowers - a pleasant taste and texture with a slight sweetness[208].

tcanta Plants can be grown for ground cover when planted about 45cm apart each way, they form spreading clumns[208]

nrakta E. Europe to W. Asia. Naturalized in Britain, in Cornwall. ksacta Open scrub and conifer forests, occasionally on cliffs but frequently on steep banks[271]. Naturalized on banks and rough ground, especially by railways, in south-

propta Seed - surface sow spring in a cold frame. Germination usually takes place within 2 - 4 weeks at 18°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[200]. The plant has a thick fleshy root with a number of crowns. Whilst this can be divided if great care is taken not to damage the root, it is not really recommended because the divisions take a long time to become established[221].

nwatta Succeeds in any well-drained fertile soil[233], but prefers a moist well-drained rich sandy loam and a neutral or alkaline soil in full sun, though it also tolerates partial shade[1, 200, 208]. When grown in exposed and windy positions, plants tend to grow better when in a poor soil[271]. Plants are hardy to at least -15°c[200]. If the plant is cut back as the flowers fade, it will usually produce a second flush of flowers later in the season[271]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. This species tends to produce seed abundantly in cultivation and will often self-sow[221, 271]. Plants can be naturalized in the light dappled shade of a woodland[200]. There are some named forms selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by brows-

# 4.2.126 Mentha x piperita officinalis

3 tlin 7 cvuc 3 kcak 3 tcan 5 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha x piperita officinalis is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista In large quantities this plant, especially in the form of the extracted essential oil, can cause abortions so should not be used by pregnant women.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A mild peppermint flavour, they are used as a flavouring in salads or cooked foods[183]. An essential oil from the leaves and flowers is used as a flavouring in sweets, chewing gum, ice cream etc[183]. A herb tea is made from the fresh or dried leaves[183].

tcanta Essential Repellent StrewingAn essential oil obtained from the whole plant is used in perfumery[46, 105]. It is also an ingredient of oral hygiene preparations, toiletries etc[238]. Peppermint leaves are used as an ingredient of potpourri[238]. They were formerly used as a strewing herb[14] The plant repels insects, rats etc[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. A dvnamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Dynamic accumulator.

dwatta Anodyne Antiseptic Antispasmodic Aromatherapy Carminative Cholagogue Diaphoretic Refrigerant Stomachic Tonic VasodilatorWhite peppermint is a very important and commonly used remedy, being employed by allopathic doctors as well as herbalists[9]. It is also widely used as a domestic remedy. This cultivar is considered to be milder acting than black peppermint (Mentha x piperita vulgaris). A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders (especially flatulence) and various minor ailments[222, 238]. The herb is abortifacient, anodyne, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, refrigerant, stomachic, tonic and vasodilator[4, 9, 21, 165, 238]. An infusion is used in the treatment of irritable bowel syndrome, digestive problems. spastic colon etc[254]. Externally a lotion is applied to the skin to relieve pain and reduce sensitivity[254]. The leaves and stems can be used fresh or dried, they are harvested for

rodents off the grain[244].

dwatta Antiemetic Antiseptic Antispasmodic Cancer Carminative Diuretic Poultice Restorative Stimulant StomachicSpearmint is a commonly used domestic herbal remedy. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The herb is antiemetic, antispasmodic, carminative, diuretic, restorative, stimulant and stomachic[4, 21, 46, 218]. The leaves should be harvested when the plant is just coming into flower, and can be dried for later use[4]. The stems are macerated and used as a poultice on bruises[218]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222]. Both the essential oil and the stems are used in folk remedies for cancer[218]. A poultice prepared from the leaves is said to remedv tumours[218].

nrakta C. Europe. Naturalized in Britain. ksacta Roadsides and waste places, usually in damp soils and sunny positions[4, 16, 17, 37].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade[4]. Prefers partial shade and a slightly acid soil[4, 16]. Often grown as a culinary herb in the herb garden, spearmint is also commercially cultivated for its essential oil, the yields are about 3.5 to 4.5 kilos per tonne of leaves. There are some named varieties[200, 238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a strong spearmint smell. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. Can be grown in containers.

# 4.2.52 Streptopus roseus

Scootberry, Rosybells 3 tlin 7 cyuc 4 kcak 0 tcan 2 dwat 0.5 m hkuc pcimhmim cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Streptopus roseus is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Young leaves and shoots are added to salads to impart a cucumber flavour[183]. They can also be cooked and used as greens[172, 257]. Fruit - raw or cooked. A sweetish flavour[207], though it is said to be cathartic if eaten in guantity[183, 207], especially if you have not eaten this fruit before[K]. A watermelon flavour[172]. The fruit is about 12mm in diameter[235].

dwatta Cathartic Diaphoretic Ophthalmic Pectoral Tonic Women's complaintsThe fruit is cathartic[172, 207]. An infusion of the roots has been used in the treatment of a fallen womb[257]. A cough syrup can be made from the root[257]. A poultice of the steeped root has been applied to the eyes in the treatment of sties[257]. The flowers are diaphoretic[257]. They can be used to induce sweating in the treatment of colds and fevers. The plant is tonic[257]. An infusion of the plant has been used in the treatment of coughs[257].

nrakta Eastern N. America - Newfoundland to Manitoba, south to Georgia and Michigan. ksacta Moist woods, river banks, alder thickets[172]. Damp montane woods, 9000 -1800 metres[60].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[200]. Sow stored seed in a cold frame as soon as it is received. The seed, especially if it has been stored, can be very slow to germinate, sometimes taking 18 months or more. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in a shady part of the greenhouse or cold frame. It will normally take 2 or more growing seasons before the roots are large enough to plant out - this is best done when the plant is dormant in the autumn. Division as the plant comes into growth in early spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame for their first year, planting them out in the following spring.

nwatta Requires a cool leafy soil in shade or partial shade[187]. Thrives in a moist light soil containing organic matter[1]. Hardy to at least -20°c. A very ornamental plant[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.53 Campanula poscharskyana

Trailing Bellflower

3 tlin 7 cvuc 4 kcak 0 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hionli

drutta Campanula poscharskyana is an evergreen Perennial growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[K]. A pleasant sweet flavour but the leaves are a little tough[K]. It makes a very addition to mixed salads in the winter, though we tend not to eat it much at other times of the year when there are more leaves available[K]. Flowers - raw. Produced in abundance, they have a pleasant sweet flavour and make a decorative addition to the salad bowl[K].

tcanta A rampantly spreading plant, suitable for ground cover in a sunny position[187, 197, 208].

nrakta Europe - N. Yugoslavia. Naturalized in Britain. ksacta Naturalized on walls and rocky banks in central and southern England.

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at  $18^{\circ}$ c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[200]. Very easy, the plant can be divided at almost any time of the year[221].

nwatta Prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in full sun though it also tolerates partial shade[1, 200, 208]. We have seen plants doing very well on a north-west-facing wall[K]. Plants are very drought-tolerant and can be grown on a dry stone wall[200], they also succeed in poor soils[221]. Plants are hardy to at least -15°c[200]. A rampant spreading plant[188], it makes an excellent ground cover but can become a nuisance if it isn't sited with care[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. This species does not produce seed very freely in Britain, but it is very easily propagated by division[221]. There are several named forms selected for their ornamental value[200]. The form 'E.K.Toogood' is less invasive[197]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 4.2.54 Medeola virginiana

Indian Cucumber Root 3 tlin 7 cyuc 4 kcak 1 tcan 1 dwat 0.3 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Medeola virginiana is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[55, 62]. Crisp and tender with the aroma and taste of cucumbers[1, 2, 102, 183]. A sweet flavour[159]. The root is up to 8cm long[200].

tcanta Scented plant.

dwatta Antispasmodic Diuretic HydrogogueThe root is diuretic and hydrogogue[4]. It is used in the treatment of dropsy[4]. An infusion of the crushed dried berries and leaves has been used to treat babies with convulsions[257].

nrakta Eastern N. America - Nova Scotia to Ontario, Minnesota, Florida and Tennessee. ksacta Rich woods[43], margins of swamps and bogs[62].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame in a well-drained soil-less medium[200]. Fully remove the fleshy seed covering because this contains germination inhibitors. The seed should germinate in the spring[K]. Spring sown seed can be slow to germinate and may take 12 months or more[K]. The seed should be sown thinly so that the seedlings can be grown on undisturbed in the pot for their first year. If necessary apply a liquid feed at intervals through the growing season to ensure that the plants grow on well. Prick the roots out into individual pots in the autumn and grow them on in a shady part of the greenhouse for at least the next growing season, planting them out into their permanent positions when they are dormant. Division in spring as the plant comes into growth[1].

nwatta Prefers light shade and plenty of leaf mould in a slightly acid soil[200]. Prefers a rich sandy soil[1]. The rootstock has a pleasant refreshing smell of cucumber[245]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.55 Portulaca oleracea

Green Purslane, Little hogweed 3 tlin 12 cyuc 4 kcak 2 tcan 3 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hoa7tmwatli fvifxre7t hionli

drutta Portulaca oleracea is a ANNUAL growing to  $0.3\,\mathrm{m}$  (1ft) by  $0.3\,\mathrm{m}$  (1ft) in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is frost tender. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: SaltLeaves and stems - raw or cooked[1, 4, 12, 27, 37]. The young leaves are a very acceptable addition to salads, their mucilaginous quality also making them a good substitute for okra as a thickener in soups[4, 183]. Older leaves are used as a potherb[4]. The leaves have a somewhat sour flavour[85]. A spicy and somewhat salty taste[9]. The leaves are a source of omega-3 fatty acids, though seed sources such as walnuts are magnitudes richer[222]. The leaves can be dried for later use[85]. They contain about 1.8% protein, 0.5% fat, 6.5% carbohydrate, 2.2% ash[179]. Another analysis gives the following figures per 100g ZMB. 245 - 296 calories, 17.6 - 34.5g protein, 2.4 - 5.3g fat, 35.5 - 63.2g carbohydrate, 8.5 - 14.6g fibre, 15.9 - 24.7g ash, 898 - 2078mg calcium, 320 -774mg phosphorus, 11.2 - 46.7mg iron, 55mg sodium, 505 - 3120mg potassium, 10560 - 20000ug B-carotene equivalent, 0.23 - 0.48mg thiamine, 1.12 - 1.6mg riboflavin, 5.58 -6.72mg niacin and 168 - 333mg ascorbic acid[218]. Seed raw or cooked[62, 102, 159]. The seed can be ground into a powder and mixed with cereals for use in gruels, bread, pancakes etc[183, 193]. The seed is rather small and fiddly to utilize[85]. In arid areas of Australia the plants grow quite large and can produce 10, 000 seeds per plant, a person can harvest several pounds of seed in a day. The seeding plants are uprooted and placed in a pile on sheets or something similar, in a few days the seeds are shed and can be collected from the sheet[193]. In Britain, however, yields are likely to be very low, especially in cool or wet summers[K]. The seed contains (per 100g ZMB) 21g protein, 18.9g fat 3.4g ash[218]. Fatty acids of the seeds are 10.9% palmitic, 3.7% stearic, 1.3% behenic, 28.7% oleic, 38.9% linoleic and 9.9% linolenic[218]. The ash of burnt plants is used as a salt substitute[183].

dwatta Antiscorbutic Depurative Diuretic Febrifuge Skin Tonic VermifugeThe plant is antibacterial, antiscorbutic, depurative, diuretic and febrifuge[4, 7, 147, 152, 238]. The leaves are a rich source of omega-3 fatty acids, which is thought to be important in preventing heart attacks and strengthening the immune system[238]. Seed sources such as walnuts, however, are much richer sources[222]. The fresh juice is used in the treatment of strangury, coughs, sores etc[4, 7, 147, 152]. The leaves are poulticed and applied to burns[222], both they and the plant juice are particularly effective in the treatment of skin diseases and insect stings[7, 238]. A tea made from the leaves is used in the treatment of stomach aches and headaches[222]. The leaf juice is applied to earaches, it is also said to alleviate caterpillar stings[222]. The leaves can be harvested at any time before the plant flowers, they are used fresh or dried[238]. This remedy is not given to pregnant women or to patients with digestive problems[238]. The seeds are tonic and vermifuge[218, 240]. They are prescribed for dyspepsia and opacities of the cornea[218].

nrakta S. Europe. A not infrequent casual in Britain. ksacta Fields, waste ground, roadside verges, cultivated ground and by the sea[7].

propta Seed - for an early crop, the seed is best sown under protection in early spring and can then be planted out in

# 4.2.122 Erythronium dens

Dog's-Tooth Violet

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 0.2 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Erythronium dens-canis is a BULB growing to  $0.2\,\mathrm{m}$  (0ft 8in) by  $0.1\,\mathrm{m}$  (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to June, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Skin contact with the bulbs has been known to cause dermatitis in sensitive people[65].

kcakta Edible Parts: Leaves RootEdible Uses: Bulb - raw or cooked and used as a vegetable[46]. It can be dried to make a flour[22, 46, 61] and is also the source of a starch used in making 'vermicelli' and cakes[183]. Leaves - cooked[46, 61, 183]. Eating the leaves will greatly reduce the vigour of the bulb, so can only be recommended in times of emergency[K].

nrakta Europe. ksacta Woods, scrub and mountain grassland, to 1700 metres[50].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame. Water lightly in summer, it should germinate in autumn or winter[164, 200]. Stored seed reguires a period of cold stratification[164]. Sow as early in spring as possible in a cold frame. Sow the seed thinly so that it will not be necessary to prick them out for their first year of growth. Give an occasional liquid feed to the seedlings to make sure that they do not become nutrient deficient. When the plants are dormant, pot up the small bulbs putting 2 -3 bulbs in each pot. Grow them on in a shady position in the greenhouse for another 2 3 years and then plant them out into their permanent positions when they are dormant in late summer. Division of the bulbs in the summer as the leaves die down[1]. Larger bulbs can be replanted immediately into their permanent positions, but it is best to pot up smaller bulbs and grow them on in a shady position in a greenhouse for a year before planting them out when dormant in late summer.

nwatta Prefers slightly acid soil conditions but succeeds in chalky soils if these contain plenty of humus[164]. Requires semi-shade, preferably provided by trees or shrubs, and a well-drained soil[42, 164]. Succeeds in almost any light soil, preferring one that is rich in humus[1]. Thrives in light grass[90, 200]. This species does not flower very freely, increasing mainly by its stoloniferous habit[164]. Flowers are produced in 3 - 4 years from seed[164]. Bulbs should be planted about 7cm deep[1]. There are many named forms, selected for their ornamental value[207]. Many of these cultivars have a habit to divide freely to form clumps containing many small non-flowering bulbs[257]. To remedy this, the bulbs should be lifted and divided, replanting them singly about 10cm below soil level[258].

#### 4.2.123 Viola canadensis

Canada Violet, Canadian white violet, Creepingroot violet 3 tlin 8 cyuc 3 kcak 2 tcan 1 dwat 0.4 m hkuc hmimhtut cyutl tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Viola canadensis is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[62, 177, 183]. A very mild flavour, when boiled as greens they are best mixed with other stronger tasting leaves[183]. When added to soup they thicken it in much the same way as okra[62, 85, 159].

Flowers - raw[62, 85]. The leaves are a good tea substitute[62, 85, 183].

tcanta A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Emetic PoulticeA tea made from the roots has been used in the treatment of pain in the bladder region[222, 257]. The roots and leaves have traditionally been used to induce vomiting, they have also been poulticed and applied to skin abrasions and boils[222].

nrakta N. America - Saskatchewan and south to Nebraska and the Rocky mountains. ksacta Rich soils in deciduous woods and forests in the mountains[43, 62, 187].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Easily grown in any fertile soil in full sun or partial shade[233]. Prefers a cool position[233] in a moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5. Hardy to about -25°c[187]. All members of this genus have more or less edible leaves and flower buds, though those species with vellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159]. This species has mainly white flowers that are at first yellowish at the base then turn violet[222]. There are some named varieties selected for their ornamental value[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.124 Viola cucullata

Marsh Blue Violet

119

3 tlin 8 cyuc 3 kcak 3 tcan 1 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Viola cucullata is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[61, 105]. When added to soup they thicken it in much the same way as okra[85, 159, 177]. A tea can be made from the leaves[85].

tcanta RepellentA good ground cover plant but it is slow to thicken up and may need weeding for the first year or so[197]. An infusion of the root has been used to soak corn seeds before planting them in order to keep off insects[257]. Faunal Associations: The floral nectar of Marsh Violet attracts bumblebees, mason bees (Osmia spp.). Halictid bees, Andrenid bees, bee flies (Bombyliidae), butterflies, and skippers (Robertson, 1929). Some of the bees also collect pollen. An oligolectic bee, Andrena violae, visits the flowers of Marsh Violet and other Viola spp. (violets). The caterpillars of several Fritillary butterflies feed on the foliage of violets primarily in open areas: Boloria bellona (Meadow Fritillary), Boloria selene myrina (Silver-Bordered Fritillary), Euptoieta claudia (Variegated Fritillary), Speveria approdite (Approdite Fritillary), Speyeria atlantis (Atlantis Fritillary), Speyeria cybele (Great Spangled Fritillary), and Speyeria idalia (Regal Fritillary). Other insect feeders include caterpillars of the moths permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring. Harvest the shoots when they are about 10-  $15\,\mathrm{cm}$  long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy[221], larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. A very easy species to grow, it will tolerate almost any soil or situation though it prefers the fullest amount of sun[221]. Plants are hardy to at least -15°c[200]. This is a smaller growing geographic form of the species[208]. A very freeflowering plant, indeed it has one of the longest flowering periods of any species in this genus[271]. If the plant is cut back as the flowers fade, it will usually produce a second flush of flowers later in the season[271]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. This species, however, especially under garden conditions, is more likely to produce hybrids than most other members of the genus[271]. The plants are self-fertile[221]. There are several named varieties selected for their ornamental value[200]. 'Wheatley Violet' has somewhat hairy leaves with a pleasant sweetness[K]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 4.2.119 Streptopus streptopoides

Small twistedstalk

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Streptopus streptopoides is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Young leaves and shoots - raw or cooked. A cucumber flavour[172]. Fruit - raw or cooked. A watermelon flavour[172]. The orange-red berries are about 6mm in diameter[270].

nrakta E. Asia - China, Japan, Korea. North-western N. America. ksacta Dense coniferous mid-montane woods[60]. Moist woods, river banks and alder thickets[172].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[200]. Sow stored seed in a cold frame as soon as it is received. The seed, especially if it has been stored, can be very slow to germinate, sometimes taking 18 months or more. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in a shady part of the greenhouse or cold frame. It will normally take 2 or more growing seasons before the roots are large enough to plant out - this is best done when the plant is dormant in the autumn. Division as the plant comes into growth in early spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame for their first year, planting them out in the following spring.

nwatta Requires a cool leafy soil in shade or partial shade[200]. Thrives in a moist light soil containing organic matter[1]. Hardy to at least -20°c.

# 4.2.120 Ribes fragrans

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xra7t hionli

drutta Ribes fragrans is a deciduous Shrub growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A gooseberry with a sweet and pleasant flavour[2, 105]. The fruit is about 8mm in diameter[200].

nrakta E. Asia - Mongolia, Siberia. ksacta Mountain slopes among rocks and on stony taluses to lower parts of the bald mountain zone[74].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to  $9^{\circ}c$  and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 -  $15 \, \rm cm$  with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°c[200]. The whole plant is aromatic with a smell reminiscent of balm[200]. This species is closely related to R. hudsonianum[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

# 4.2.121 Rhexia virginica

Deer Grass, Handsome Harry 3 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Rhexia virginica is a PERENNIAL growing to  $0.3 \, \mathrm{m}$  (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Drin-kleaves - raw or cooked[105]. A sweetish slightly acid taste[106, 183, K]. It makes a pleasant salad[183]. Roots - raw. They can be chopped and added to salads or used as a pleasant nut-like nibble[183]. A sour drink is made from the leaves and stems[257].

dwatta MiscellanyA tea made from the leaves and stems is used as a throat cleaner[257].

nrakta Eastern N. America - Maine to Ontario, south to Florida, Missouri and Louisiana. ksacta Peat, wet sands and gravels to 700 metres[43]. Usually found in moist acid sandy

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination should take place within 10 weeks. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold greenhouse or frame for their first winter. Plant out in late spring[K]. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Requires a moist but freely draining neutral or acid peaty soil[200]. Incorporate sand or grit into the soil if necessary at planting time[200]. Grows well in a bog garden[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-21.

late spring[4]. Outdoor sowings in situ take place from late spring to late summer, successional sowings being made every two to three weeks if a constant supply of the leaves is required[4]. In the seed is harvested when fully ripe, then dried and stored in a cool, dry place out of the sunlight[244]. The essential oil can be extracted from the required[4].

nwatta Requires a moist light rich well-drained soil in a sunny position[4, 37, 200]. Plants will not produce good quality leaves when growing in dry conditions[4]. A perennial plant in warmer climates than Britain, purslane is killed by frost but can be grown as a half-hardy annual in this country[1]. It can become an aggressive weed in areas where the climate suits it[274]. The flowers only open in full sunlight[244]. Purslane is occasionally cultivated for its edible leaves, there are some named varieties[183]. The plants take about six to eight weeks to produce a crop from seed and can then be harvested on a cut and come again principle, providing edible leaves for most of the summer[4].

# 4.2.56 Carum carvi

Carawa

3 tlin 9 cyuc 4 kcak 3 tcan 3 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Carum carvi is a BIENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). It is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Caraway is said to contain the alleged 'psychotroph' myristicine [218]. Excessive intake can lead to kidney and liver damage [301]

kcakta Edible Parts: Leaves Root SeedEdible Uses: Condiment TeaSeed - raw or cooked. A spicy flavour, it is used as a flavouring in confectionery and bread, also as a flavouring in salads, vegetables etc[2, 4, 5, 9, 18, 20, 27, 183]. It is high in protein and fat[14]. The seed is often chewed after a meal in order to sweeten the breath and also to relieve heartburn after a rich meal[244]. Per 100g, the seed contains 333 calories, 10g water, 20g protein, 14.5g fat, 50g carbohydrate, 12.5g fibre, 6g ash, 689mg calcium, 568mg phosphorus, 16.2mg iron, 258mg magnesium, 17mg sodium, 1351mg potassium, 5.5mg zinc, 363 IU vitamin A, 0.383mg thiamine, 0.379mg riboflavin, 3.61mg niacin[218]. An essential oil from the seed is used as a flavouring in ice creams, candy, soft drinks etc[183, 238]. It is an essential ingredient of the liqueur kümmel[244]. Root - cooked[183]. Used as a vegetable like parsnips[2, 4, 9, 14, 55, 115]. Stronger in taste than parsnips, but liked by many[207]. A delicious vegetable[244]. Leaves - raw or as a flavouring in soups etc[2, 14, 27, 55, 115]. The young leaves are much less spicy than the seeds and are a good salad[9], having a mild parsley-dill flavour[238]. They give an aromatic tang to salads[244]. Older leaves can be cooked as a spinach[183]. The crushed seeds are brewed into a tea[183]. It has a soothing effect on the digestion[244].

tcanta Essential ParasiticideAn essential oil from the seed is used in perfumery, for scenting soap, as a parasiticide etc[7, 46, 74, 171]. Twenty-five kilos of seed yield about 1 kilo of essential oil[4]. The essential oil yield of the seed from plants cultivated in Poland is up to 10.33%[240]. Caraway is also used as a breath freshener.

dwatta Antiseptic Antispasmodic Aromatic Carminative Digestive Emmenagogue Expectorant Galactogogue Ophthalmic Parasiticide StimulantCaraway has a long history of use as a household remedy especially in the treatment of digestive complaints where its antispasmodic action soothes the digestive tract and its carminative action relieves bloating caused by wind and improves the appetite[4, 238, 254]. It is often added to laxative medicines to prevent griping[238]. The seed is antiseptic, antispasmodic, aromatic, carminative, digestive, emmenagogue, expectorant, galactogogue and stimulant[4, 7, 9, 21, 46, 165, 222, 240]. It can be chewed raw for the almost immediate relief of indigestion and can also be made into infusions[238]. The seed is also used in the treatment of bronchitis and are an ingredient of cough remedies, especially useful for children[254]. The seed is also said to increase the production of breast milk in nursing mothers[254]. The seed is harvested when fully ripe, then dried and stored in a cool, dry place out of the sunlight[244]. The essential oil can be extracted from the seed and has similar properties[4]. A tea made from the seed is a pleasant stomachic and carminative, it has been used to treat flatulent colic[207, 222]. The seed is used in Tibetan medicine where it is considered to have an acrid taste and a heating potency[241]. It is used to treat failing vision and loss of appetite[241]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Carum carvi for dyspeptic complaints (see [302] for critics of commission E).

nrakta Europe. Rarely naturalized in Britain. Perhaps native in S.E. England[17]. ksacta Moist meadows, arable land and waste places from lowland to mountain elevations[9, 165, 244].

propta Seed - it is best sown in situ as soon as it is ripe in late summer and early autumn[4, 200]. The seed can also be sown March/April in situ[200], though in areas with cool summers the plants might not produce a crop of ripe seeds[238]. Plants are very sensitive to root disturbance and should not be transplanted.

nwatta Succeeds in ordinary garden soil as long as it is not too wet in winter[1]. Prefers a moist soil in full sun or partial shade[4, 200]. Tolerates a pH in the range 4.8 to 7.6. Caraway is a well-known herb that has been cultivated for its culinary and medicinal uses since ancient times[244]. It is frequently cultivated in the modern herb garden and sometimes also commercially[4, 46], there are some named varieties[183]. Plants growing in more northerly latitudes and also in full sun are richer in essential oils and therefore more aromatic[4, 245]. Plants strongly resent root disturbance[200]. They often self-sow freely when in a suitable location[244]. This species is deep rooted[201] and is a good plant for breaking up the sub-soil on heavy, wet land[18, 20]. It dislikes growing near fennel or wormwood[14, 20] but is a good companion for most plants, especially those that are shallow-rooted[201]. The flowers attract parasitic wasps to the garden, these prey on aphids and so help to reduce populations of insect pests[238].

# 4.2.57 Claytonia sibirica

Pink Purslane, Siberian springbeauty 3 tlin 7 cyuc 4 kcak 3 tcan 1 dwat 0.2 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli

frusflatpriklwis hpa7tmwatli fyifxre7t hjonli drutta Claytonia sibirica is an evergreen Annual/Perennial growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from April to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Édible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 62, 183]. They usually have a fairly bland flavour and are quite nice in a salad or cooked as a green vegetable. The leaves have a distinct earthy after-taste rather like raw beetroot[K]. They are available all year round but can turn rather bitter in the summer especially if the plant is growing in a hot dry position[K]. Although on the small side, the leaves are produced in abundance and are very easily harvested[K].

tcanta A good ground cover plant for a shady position[208]. This species is a short-lived perennial but it usually self-sows freely and gives a dense weed-excluding ground cover[K].

dwatta Antidandruff Diuretic Ophthalmic PoulticeThe plant is diuretic[257]. A poultice of the chewed leaves has been applied to cuts and sores[257]. The juice of the plant has been used as eye drops for sore red eyes[257]. A cold infusion of the stems has been used as an antidandruff wash for the hair[257].

nrakta E. Asia - Siberia. Western N. America - Alaska to California. Naturalized in Britain. ksacta Damp woods, shaded streamsides etc, especially on sandy acid soils[17, 50]. Thickets of red alder, dogwood, vine-leaf maple, moist shaded coniferous forests from sea level to 2000 metres[270].

propta Seed - sow spring or autumn in situ. The seed usually germinates rapidly.

nwatta A very tolerant and easily grown plant, it prefers a moist peaty soil[1] and is unhappy in dry situations[K]. It succeeds in full sun[200] though is happier when given some shade and also grows in the dense shade of beech trees[88]. Plants usually self-sow freely[200, K]. This is an excellent and trouble-free salad plant. It is extremely cold-hardy and can provide edible leaves all year round in all areas of the country even if it is not given protection[K]. Montia sibirica (L.) Howell is a synonym of Claytonia sibirica L. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

#### 4.2.58 Dentaria diphylla

Crinkleroot.

3 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 0.3 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dentaria diphylla is a PERENNIAL growing to  $0.3 \, \mathrm{m}$  (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[46, 61, 161]. It has a crisp texture and a pleasant pungent taste[43], rather like water cress or horseradish[183]. It can be added to salads or used as a relish[105, 183]. The root has a pungent acrid taste when first harvested, the Indians cleaned the roots, heaped them on a blanket, covered them to exclude air and then left them to ferment for 4 - 5 days. After this the roots developed a sweet taste[207]. Leaves - raw or cooked[257]. The cooking water was changed once in order to remove the bitterness[257].

dwatta Cardiac Carminative Febrifuge Miscellany Odontalgic StomachicThe peppery root is used as a folk remedy in the treatment of toothache[222]. It has also been chewed in the treatment of colds, an infusion drunk to treat gas and other stomach problems, and it has been made into a poultice for headaches[222, 257]. A tea made from the root is gargled in the treatment of sore throat, hoarseness etc[222, 257]. An infusion of the plant has been used to treat fevers in children[257]. Combined with Acorus calamus root, it has been used in the treatment of heart diseases[257].

nrakta Eastern N. America - Ontario to S. Carolina, Kentucky and Minnesota. ksacta Rich damp woods and meadows[43, 187].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at  $15^{\circ}$ c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring

mwatta An easily grown plant, preferring a rich light moist soil and a shady position[1]. This species is hardy to about -20°c[187]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Ephemeral emerging in spring and dying back by summer every vear [1-2]. The root pattern

is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.59 Prunus pumila

Dwarf American Cherry, Sandcherry, Western sandcherry, Eastern sandcherry, Great Lakes sandcherry 3 tlin 8 cvuc 4 kcak 2 tcan 1 dwat 0.6 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Prunus pumila is a deciduous Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in May, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[2, 159, 161]. A reasonable size, up to 10mm in diameter with one large seed[200], this is the largest of the N. American cherries[213]. A rich and pleasantly acid taste when fully ripe though they are sometimes slightly bitter[2, 11, 101, 183]. Eaten out of hand, used in preserves or dried for later use[183]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye RootstockA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Used as a rootstock for the sour cherry[160].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Eastern N. America - New Brunswick to Manitoba, Maine, New Jersey, Indiana and Wisconsin. ksacta Dunes and sand, or on calcareous rocky shores[43].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[1, 11]. Thrives in a loamy soil, doing well on lime-stone[11]. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Requires a sunny position[11]. Established plants are very drought resistant[160]. This species is hardy to about -35°c when the plants are fully dormant[160], though the young growth in spring is fairly tender[K]. Plants are susceptible to mildew in low areas[160]. Plants thrive in areas with a short growing season[160]. The fruits are highly resistant to all fruit worms[160]. Plants can produce fruit in 3 years from seed[160]. A single plant, growing at Hilliers Arboretum in 1999, produced a good crop of fruit with viable seed, so the species is almost certainly self-fertile[K]. Most members of this genus are shallow-rooted and will produce suckers if the

excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit Leaves SeedEdible Uses: Fruit - raw or cooked[2, 105]. Juicy, sub-acid to sweet[22, 46, 61, 183]. The unripe fruits can be pickled[177, 183]. The fruit is about 12mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. The buds are cooked and eaten[183]. (Is this the flower or leaf buds?)

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. An excellent windbreak hedgerow. Plants produce suckers freely. A true bush cherry, easy to protect fruit from predating birds. Partially Self-Pollinating/Self-Fertile will produce better fruit in terms of yields and quantity when planted with other varieties of Nanking Cherries. Flowers: Beautiful pinkish - white fragrant flowers attract a lot of beneficial insects.

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - N. and W. China to the Himalayas. ksacta Slopes and in ravines, 1700 - 2400 metres in the Himalayas[145]. Forest on mountain slopes, forest margins, thickets and meadows at elevations of 100 - 3700 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Grows well in partial shade[31], though it fruits better when in a sunny position[11, 200]. Requires a sheltered position[11]. Thrives in hot summers[188]. Cultivated in Asia for its edible fruits, there are some named varieties[58, 183]. The fruits are not freely borne in Britain[11]. The flowers are produced on the previous years growth[182] Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a tap root similar to a carrot going directly down

#### 4.2.117 Tragopogon pratensis

Goat's Beard

3 tlin 7 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Tragopogon pratensis is a ANNUAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from

June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Leaves Root StemEdible Uses: Root - raw or cooked[2, 9, 12, 52, 100]. The roots have a sweet flavour due to their inulin content[7]. The young roots can be eaten raw whilst older roots are best cooked like parsnips or salsify[9]. They are often blanched before use[183]. Young leaves and shoots - raw or cooked[2, 5, 12, 52, 62, 183]. They can be added to mixed salads or used in soups etc[7, 9]. The leaves are best used as they come into growth in the spring[9]. The flowering stem, including the buds, is cooked and served like asparagus[183].

tcanta CosmeticAn infusion of the petals is used to clear the skin and lighten freckles[7]. A distilled water made from the plant is used in cleansing lotions for dry skins[7].

dwatta Astringent Depurative Diuretic Expectorant StomachicGoat's beard is considered to be a useful remedy for the liver and gallbladder[254]. It appears to have a detoxifying effect and may stimulate the appetite and digestion. Its high inulin content makes this herb a useful food for diabetics since inulin is a nutrient made of fructose rather than glucose units and therefore does not raise blood sugar levels[254]. The root is astringent, depurative, diuretic, expectorant, nutritive and stomachic[7, 21]. A syrup made from the root gives great relief in cases of obstinate coughs and bronchitis[7]. A decoction of the root is given in the treatment of heartburn, loss of appetite and disorders of the breast or liver[240]. The root is harvested in the autumn and dried for later use[7]. The fresh juice of young plants is said to be a good dissolver of bile, relieving the stomach without side effects[4]

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Caucasus, Siberia, Iran. ksacta Meadows, pastures, dunes, waysides and waste places[17].

propta Seed - sow spring in situ. Make sure to water the seed in if the weather is dry.

nwatta Succeeds in ordinary garden soils, including heavy clays[200]. Goat's beard was formerly cultivated as a vegetable, though it has now fallen into disuse[2, 4]. Grows well in the summer meadow[24]. The flowers open at daybreak and close before noon[4].

# 4.2.118 Campanula carpatica turbinata

3 tlin 7 cyuc 3 kcak 2 tcan 0 dwat 0.3 m hkuc

htut cyutli tcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Campanula carpatica turbinata is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked. A pleasant sweet flavour, but the leaves are a bit hairy[K]. Flowers - raw or cooked. Slightly sweet, they make a very pleasant and decorative addition to the salad bowl[K].

tcanta Plants make a good ground cover when planted about 30cm apart each way, forming a spreading clump[208]. nrakta S. E. Europe - Carpathian Mountains, ksacta Not

known

propta Seed - surface sow spring in a cold frame. Seed
usually germinates in 2 - 4 weeks at 18°c. Very easy from
seed[221]. When they are large enough to handle, prick the

seedlings out into individual pots and grow them on in a cold

frame for at least their first winter. Plant them out into their

Seed - raw[161]. A chewing gum can be made from the latex contained in the stem and leaves[46, 61, 92, 183]. Root[183]. No further details.

tcanta Dye Fibre Gum Latex Oil Paper Pollution StuffingThe following uses have been recorded for A. speciosa, it is fairly safe to assume they can also be applied to this closely related species[K]. A good quality tough fibre is obtained from the bark[92, 99]. It is used in twine, coarse cloth. paper etc[92, 99]. The fibre is 10 - 45mm long[189]. It is easily harvested in late autumn, after the plants have died down, by simply pulling it off the dead stems[168, 169]. When making paper, the stems can be retted by leaving them in the ground until they are dry in the winter or they can be harvested in late summer, the leaves removed and the stems steamed to remove the fibre[189]. The stems are then cooked for two hours with lye and pounded with mallets[189]. The paper colour varies from white to creamy green depending on how the paper is made[189]. If the stems are used in the summer the latex will often find its way onto the fibres and is hard to remove[189]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[168, 169]. It is a Kapok substitute, used in Life Jackets or as a stuffing material[169]. It is very water repellent. The floss has also been used to mop up oil spills at sea. Rubber can be made from latex contained in the leaves and the stems[57, 92, 112]. The vield is up to 3%[112]. Pods contain an oil and a wax which are of potential importance. A green dye is obtained from the flowers and leaves combined[168].

dwatta Contraceptive WartsThe following uses have been recorded for A. speciosa, it is fairly safe to assume they can also be applied to this closely related species[K]. The latex is used as a cure for warts[168]. A tea made from the whole plant has been used as a contraceptive after childbirth[213].

nrakta Western N. America - Wyoming to Colorado, south to Nevada and S. Arizona. ksacta Sandy soils of prairies and roadsides[228].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Prefers a well-drained light rich or peaty soil and a sunny position[1, 134, 200]. This species is closely related to A. purpurascens[200]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207].

# 4.2.115 Cleome serrulata

Rocky Mountain Beeplant 3 tlin 8 cyuc 3 kcak 2 tcan 1 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Cleome serrulata is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves Seed SeedpodEdible Uses: Young shoots, leaves and flowers are cooked and used as potherbs[46, 105, 161, 183]. The plants were gathered and, after removing an alkaline taste[46], were eaten with cornmeal porridge[61, 183]. The plant smells like a skunk, but it was an important potherb for the native North American Indians and the early European settlers in America[207]. Seed - raw or cooked[257]. It can be dried and ground into a meal then used as a mush or mixed with flour to make bread etc[85, 183, 207, 257]. Seedpods - cooked[183]. The hardened cakes of dyestuff (see note on the plants other uses) can be soaked in hot water and then eaten fried[207].

tcanta Deodorant DyeA black dye is obtained[46, 61, 85] by boiling down the whole plant[95]. It is used as a paint for decorating pottery[207]. The young plants are harvested in mid-summer, boiled well in water, the woody parts of the plant are removed and the decoction is boiled again until it becomes thick and turns black. This thick liquid is then poured onto a board to dry in cakes and can be kept for an indefinite period. When needed it is soaked in hot water until the correct consistency for paint is achieved[207]. A decoction of the leaves has been used as a body and shoe deodorant[257]

dwatta Deodorant FebrifugeAn infusion of the plant is drunk in the treatment of fevers and stomach disorders[213, 257]. A poultice made from the pounded, soaked leaves has been applied to sore eyes[257].

nrakta Western N. America - Washington to Saskatchewan and south to California.. ksacta Waste land, plains and lower mountains[60], often on sandy soils[85].

propta Seed - surface sow or only lightly cover the seed in spring in a greenhouse[164]. The seed usually germinates in 5 - 14 days at 25°c[164]. When large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. Day time temperatures below 20°c depress ermination but a night time fall to 20° is necessary[164].

nwatta Prefers a light fertile soil in a warm dry sunny position with plenty of room to spread[200]. A frost tender plant, it can be grown as a summer annual in Britain[200]. A very good bee plant, it is often planted by apiarists in America[207]. This plant was probably cultivated by the N. American Indians[85]. The Indians would allow the plant to produce seed when it was growing wild in the cornfields in order to ensure a supply the following year[216].

# 4.2.116 Prunus tomentosa

Nanking Cherry

3 tlin 9 cyuc 3 kcak 2 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus tomentosa is a deciduous Shrub growing to 1.5 m (5ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from March to April, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In

roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

#### 4.2.60 Smilacina stellata

Star-Flowered Lily Of The Valley 3 tlin 7 cyuc 4 koak 0 tcan 2 dwat 0.6 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Smilacina stellata is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Fruit - raw or cooked[105, 161]. The fruit is about the size of a pea and is produced on the plant in small terminal clusters of about 2 - 8 berries[256]. It has a nice bitter-sweet flavour that is somewhat reminiscent of treacle[85, K]. The fruit is a good source of vitamin C, it has been used to prevent scurvy[213]. The fruit is said to be laxative in large quantities when eaten raw, especially if you are not used to eating it, though thorough cooking removes this laxative effect[K]. Young leaves - raw or cooked. The young shoots, as they emerge in spring, can be used as an asparagus substitute[85]. The young shoots and leaves are cooked and used as greens[212]. Root - cooked. It should be soaked in alkaline water first to get rid of a disagreeable taste[85, 213]. It can be eaten like potatoes[213].

tcanta Plants can be grown as a ground cover when planted about 60cm apart each way[208]. An inferior cover to S. racemosa[208].

dwatta Vitamin CStar-flowered lily of the valley was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints [257]. It is little, if at all, used in modern herbalism. A tea made from the roots is drunk to regulate menstrual disorders[213]. A decoction of the leaves is taken 2 - 3 times a day in the treatment of rheumatism and colds[257]. Half a cup of leaf tea drunk daily for a week by a woman is said to prevent conception[213, 257]. The root is analgesic, antiseptic, haemostatic, ophthalmic, stomachic and vulnerary[257]. An infusion has been used in the treatment of stomach complaints, internal pains and to regulate menstrual disorders[257]. The dried powdered root has been used in treating wounds and bleeding[213, 257]. The crushed root has been used as a poultice on sprains, boils, swellings and limbs affected by rheumatism[257]. The pulped root has been used as ear drops to treat ear aches[257]. An infusion of the roots has been used as a wash for inflamed eyes[257].

nrakta N. America - British Columbia to California and east to Virginia and Newfoundland. ksacta Woods, thickets and open meadows, on gravelly and alluvial soils[43, 85]. Sand dunes, marginal woodlands, oak openings from sea level to 3200 metres[270]

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be very slow to germinate, often taking 18 months. Stored seed should be sown in a cold frame as soon as possible, it may take 2 years or longer to germinate. Grow the seedlings on in a shady part of a greenhouse for their first year without pricking them out, giving them liquid or foliar feeds as required to ensure that they do not become nutrient deficient. Divide the young plants up into individual pots in the autumn when they are dormant, and grow them on for at least another year in a shady part of the greenhouse. When the plants have reached a sufficient size. plant them out in the autumn whilst they are dormant. Division in spring or early autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Requires a deep fertile humus rich moisture retentive soil, neutral to slightly acid, that does not dry out in the growing season, and a shady position[200]. Does well in a woodland garden[200]. Plants have a creeping rhizome and can form extensive patches[187]. Fruits well in a shady woodland position at Kew[K]. Hardy to about -  $25^\circ$ c[187]. Plants are slow to establish but then can become invasive[208]. The flowers are powerfully scented[245].

# 4.2.61 Mentha x piperita vulgaris

Black Peppermint

3 tlin 7 cyuc 4 kcak 3 tcan 5 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha x piperita vulgaris is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista In large quantities this plant, especially in the form of the extracted essential oil, can cause abortions so should not be used by pregnant women.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A strong peppermint flavour, they are used as a flavouring in salads or cooked foods[2, 27, 105]. This plant should not be used by pregnant women, see the notes above on toxicity. An essential oil from the leaves and flowers is used as a flavouring in sweets, chewing gum, ice cream etc[183]. A herb tea is made from the fresh or dried leaves[21, 183].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. It is used medicinally and as a food flavouring[2, 46, 57]. It is also an ingredient of oral hygiene preparations, toiletries etc[238]. Peppermint leaves are used as an ingredient of pot-pourri[238]. They were formerly used as a strewing herb[14]. The plant repels insects, rats etc[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. Dynamic accumulator.

dwatta Abortifacient Anodyne Antiseptic Antispasmodic Aromatherapy Carminative Cholagogue Diaphoretic Refrigerant Stomachic Tonic VasodilatorBlack peppermint is a very important and commonly used herbal remedy, being employed by allopathic doctors as well as herbalists[9]. It is also widely used as a domestic remedy. This cultivar is considered to be stronger acting than white peppermint (Mentha x piperita officinalis). A tea made from the leaves has traditionally been used in the treatment of fevers, headaches. digestive disorders (especially flatulence) and various minor ailments[222, 238]. The herb is abortifacient, anodyne, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, refrigerant, stomachic, tonic and vasodilator[4, 9, 21, 165, 238]. An infusion is used in the treatment of irritable bowel syndrome, digestive problems, spastic colon etc[254]. Externally a lotion is applied to the skin to relieve pain and reduce sensitivity[254]. The leaves and stems can be used fresh or dried, they are harvested for drying in August as the flowers start to open[4]. The essential oil in the leaves is antiseptic and strongly antibacterial, though it is toxic in large doses[222, 254]. When diluted it can be used as an inhalant and chest rub for respiratory infections[254]. The essential oil is used in aromatherapy. Its keyword is 'Cooling'[210].

nrakta Britain. ksacta A natural hybrid, M. aquatica x M. spicata, found in moist soils in ditches, waste places etc[9].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring

or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for the production of essential oils, but plants also succeed in partial shade. Prefers a slightly acid soil[16]. A commonly grown herb[4], it is often cultivated commercially for its essential oil[61]. This is the black form of peppermint and it is said to produce a superior essential oil, making it the preferred choice as a food flavouring and for medicinal purposes. The oil is of better quality when the plant is grown on dry soils[115]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 4.2.62 Quercus x hybrid

Burgambel oak

3 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 30 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus x hybrid is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta FodderCarbon Farming Solutions - Industrial Crop: tannin (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Fodder: mast. Drought-tolerant; suitable for xeriscaping

dwatta DysenteryNone Report. As a cross between Quercus macrocarpa and Quercus gambelii we may expect some of the medicinal qualities to be present. Quercus macrocarpa has Antispasmodic: Astringent: and Tonic qualities. The bark is astringent and tonic[61]. An infusion has been used in the treatment of diarrhoea[257]. A decoction of the root or inner bark has been used in the treatment of cramps[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. Quercus gambelii has Analgesic; Astringent; and Cathartic properties. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The acorns have been eaten to give greater sexual potency[257]. The root bark is analgesic and cathartic[257]. A decoction has been used to treat postpartum pain and facilitate delivery of the placenta[257].

nrakta Origin: Natural hybrid in W. N. America. ksacta A cross between the bur oak, whose native range is in the eastern U.S., and the Gambel oak, whose native range is in the southwestern U.S. and Mexico.

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their

permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Experimental Crop Fodder: Mast Industrial Crop: Tannin Management: Standard Staple Crop: Balanced carbClimate: boreal to warm temperate. Humidity: semi-arid to humid. A naturally occurring cross between the bur oak, whose native range is in the eastern U.S., and the Gambel oak, whose native range is in the southwestern U.S. and Mexico. It is a member of the white oak group and produces abundant acorns annually. The mature size of the tree can vary from large tree (typical of bur oaks) to medium tree/large shrub (typical of Gambel oaks) depending on its environment. Both parents are known to be tough and drought-tolerant. Burgambel acorns are low in tannins and relatively guick to bear, between three and six years [1-1]. The low tanning make them more palatable. Burgambel begins producing acorns at a young age when the trees are only 3-6 feet tall. The acorns ripen early in the season. Burgambel averages 1-2 ft. in height per year. Carbon Farming Solutions - Cultivation: experimental as food. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 4.2.63 Acer saccharinum

Silver Maple, River Maple, Soft Maple 3 tlin 9 cyuc 3 kcak 4 tcan 1 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Acer saccharinum is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is in flower from February to March, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable PH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains sugar and can be used as a drink or be concentrated into a syrup by boiling off the water[4, 61, 82, 159]. The syrup is used as a sweetener on many foods. The yield is only half that of A. saccharum[2]. It is said to be sweeter and whiter than A. saccharum[183]. The sap can be harvested in the late winter, the flow is best on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[177, 213]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. Good crops are produced nearly every year in the wild[229]. The seed is about 12mm long and is produced in small clusters[82]. Inner bark - cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161, 177, 257]. The related Oregon Maple (Acer macrophyllum) has yellow flower clusters, sweet with nectar, eaten raw[183]. No information was found for this species. Carbon farming - Staple Crop: sugar.

tcanta Companion Dye Fodder Preservative Rust Shelterbelt WoodThe leaves are packed around apples, rootcrops to to help preserve them[18, 20]. A fairly wind-tolerant tree, it can be used in shelterbelt plantings[200]. The branches are rather brittle, however, and can break off even in minor torms[226]. The stems are used in making baskets[257]. The boiled inner bark yields a brown dye[106]. Mixed with lead sulphate this produces a blue/black dye which can also be used as an ink[106]. A black dye is obtained from the twigs and bark[257]. The bark can be boiled, along with hemlock (Tsuga spp]) and swamp oak bark (Quercus bicolor) to make a wash to remove rust from iron and steel, and to prevent further rusting[257]. Wood - rather brittle, close-grained, hard,

ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 4.2.113 Asclepias incarnata

Swamp Milkweed, Swamp Butterfly Weed, Marsh Milkweed 3 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Asclepias incarnata is a PERENNIAL growing to 1.2 m (4ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. The leaves and the stems might be poisonous[20].

kcakta Edible Parts: Flowers Leaves Oil SeedpodEdible Uses: Oil SweetenerUnopened flower buds - cooked[46, 61, 161]. Tasting somewhat like peas[85]. They can also be dried and stored for later use[183]. Young shoots - cooked. An asparagus substitute[85, 106]. Tips of older shoots are cooked like spinach[85]. Young seed pods, harvested when 3 - 4 cm long - cooked. A pea-like flavour, they are very appetizing[85]. The flower clusters can be boiled down to make a sugary syrun[85].

tcanta Fibre Latex Oil Pollution Stuffing WaxA good quality fibre is obtained from the bark[46, 57, 61, 95, 112, 169]. It is used in twine, cloth etc[112]. It is easily harvested in late autumn, after the plants have died down, by simply pulling it off the dead stems[112]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[57, 171]. It is a Kapok substitute, it is used in Life Jackets or as a stuffing material[169, 171]. It is very water repellent. The floss has also been used to mop up oil spills at sea. Rubber can be made from latex contained in the leaves and stems[57]. Pods contain an oil and a wax which are of potential importance[171]. The dogbane-milkweed family Asclepias, Apocynum, Calotropis, and Trachomitum spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dualpurpose fibres, offering bast fibres from the stem and seed finer or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Anthelmintic Carminative Diuretic Emetic Laxative StomachicA tea made from the roots is anthelmintic, carminative, diuretic, emetic, strongly laxative and stomachic[4, 61, 222, 257]. The tea is said to remove tapeworms from the body in one hour[257]. It has also been used in the treatment of asthma, rheumatism, syphilis, worms and as a heart tonic[4, 207, 222]. An infusion of the roots is used as a strengthening bath for children and adults[257].

nrakta N. America - Quebec to Manitoba and Wyoming, south to Texas and New Mexico. ksacta Swamps, wet thickets and shores[43].

propta Seed best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions

up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

Nwatta Experimental Crop Industrial Crop: Hydrocar-

bon Management: HayLandscape Uses:Border, Foundation. Massing. Prefers a well-drained light rich or peaty soil[1, 2001. Requires a moist soil and a sunny position, doing well by water[111, 134]. Succeeds on dry soils and on all soil types[112]. Plants are hardy to at least -25°c[187]. A very ornamental plant[1], the flowers are very attractive to butterflies[169]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. Special Features: Attractive foliage, North American native, Naturalizing, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Fragrant flowers. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.114 Asclepias hallii

Purple Silkweed, Hall's milkweed 3 tlin 7 cyuc 3 koak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Asclepias hallii is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274].

kcakta Edible Parts: Flowers Leaves Oil Seed Seed-podEdible Uses: Gum Oil SweetenerThe following uses have been recorded for A. speciosa, it is fairly safe to assume they can also be applied to this closely related species[K]. Flower buds - raw or cooked[61, 92]. Tasting somewhat like peas[85]. Young shoots and leaves - cooked[46, 61, 62, 92, 95]. An asparagus substitute[85, 183]. They should not be eaten raw[85]. Tips of older shoots are cooked like spinach[85, 183]. Young seed pods, 3 - 4 cm long, cooked. Very appetizing[85]. Flower clusters can be boiled down to make a sugary syrup[85] or they can be eaten raw[161, 183].

and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. The older leaves are poisonous if eaten in large quantities[20, 21]. The plant contains cardioactive compounds and is potentially toxic[222].

kcakta Edible Parts: Flowers Leaves Oil Oil Seed SeedpodEdible Uses: Gum Oil Oil SweetenerUnopened flower buds - cooked. They taste somewhat like peas. They are used like broccoli[183]. Flowers and young flower buds - cooked. They have a mucilaginous texture and a pleasant flavour, they can be used as a flavouring and a thickener in soups etc[55, 102, 257]. The flower clusters can be boiled down to make a sugary syrup[2, 85]. The flowers are harvested in the early morning with the dew still on them[95]. When boiled up they make a brown sugar[95]. Young shoots - cooked. An asparagus substitute[2, 4, 43, 55, 62, 95, 183]. They should be used when less than 20cm tall[159]. A slightly bitter taste[159]. Tips of older shoots are cooked like spinach[85, 183]. Young seed pods, 3 - 4 cm long, cooked[2, 43, 55, 85]. They are very appetizing. Best used when about 2 - 4cm long and before the seed floss forms, on older pods remove any seed floss before cooking them[85, 159]. If picked at the right time, the pods resemble okra[183]. The sprouted seeds can be eaten[183]. An edible oil is obtained from the seed[55, 1711. The latex in the stems is a suitable replacement for chicle and can be made into a chewing gum[46, 61, 269]. It is not really suitable for use in tyres[269]. The latex is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112].

tcanta Adhesive Fibre Gum Latex Oil Oil Pollution Stuffing WickA good quality fibre is obtained from the inner bark of the stems. It is long and guite strong, but brittle[269]. It can be used in making twine, cloth, paper etc[95, 112, 169]. The fibre is of poor quality in wet seasons[112]. It is easily harvested in late autumn after the plant has died down by simply pulling the fibres off the dried stems[169]. It is estimated that yields of 1.356 kilos per hectare could be obtained from wild plants[269]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[112, 159, 169, 171]. It is a Kapok substitute, used in Life Jackets or as a stuffing material[112]. Very water repellent, it can yield up to 550 kilos per hectare[112]. The floss absorbs oil whilst repelling water and so has also been used to mop up oil spills at sea. Candlewicks can be made from the seed floss[112, 207]. In cultivation, only 1 - 3% of the flowers produce mature nods[269]. It is estimated that yields of 1.368 kilos per hectare could be obtained from wild plants[269]. Rubber can be made from latex contained in the leaves and the stems[46, 57, 102, 159]. It is found mainly in the leaves and is destroyed by frost[112]. Yields of 197 kilos per hectare can be expected from wild plants, it is estimated that by selection these vields could be increased to 897 kilos[269]. Yields are higher on dry soils[112]. The latex can also be used as a glue for fixing precious stones into necklaces, earrings etc[257]. The latex contains 0.1 - 1.5% caoutchouc, 16 - 17% dry matter, and 1.23% ash. It also contains the digitalis-like mixture of a- and b-asclepiadin, the antitumor b-sitosterol, and a- and b-amyrin and its acetate, dextrose and wax[269]. Pods contain an oil and a wax which are of potential importance. The seed contains up to 20% of an edible semi-drying oil[74, 112]. It is also used in making liquid soap[74]. The dogbanemilkweed family Asclepias, Apocynum, Calotropis, and Trachomitum spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed finer or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Anodyne Contraceptive Diaphoretic Diuretic Emetic Expectorant Homeopathy Purgative WartsThe root is anodyne, diaphoretic, diuretic, emetic, expectorant and purgative[4, 21, 222]. It has been used in the treatment of asthma, kidney stones, venereal disease etc[254, 257]. Caution is advised, see the notes above on toxicity. An infusion

of the pounded roots has been used by the women of some native North American Indian tribes to promote temporary sterility[213, 257]. The leaves and/or the latex are used in folk remedies for treating cancer and tumours[269]. The milky latex from the stems and leaves is used in the treatment of warts[4, 159, 222, 257]. The latex needs to be applied at least daily over a period of up to a few weeks to be effective. The stems can be cooked and applied as a poultice on rheumatic joints[257]. One reported Mohawk antifertility concoction contained milkweed and jack-in-the-pulpit, both considered contraceptive. Dried and pulverized, a fistful of milkweed and three Arisaema rhizomes were infused in a pint of water for 20 minutes. The infusion was drunk, a cupful an hour, to induce temporary sterility[269]. The rhizome is used in homeopathy as an antioedemic and emmenagogue in the treatment of dropsy and dysmenorrhoea[269].

nrakta Eastern N. America - New Brunswick to Saskatchewan, south to N. Carolina, Kansas and Georgia. ksacta Thickets, roadsides, dry fields and waste places[21, 43]. propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

Experimental Crop Industrial nwatta Fiber Industrial Crop: Hydrocarbon Management: Hay-Succeeds in any good soil[187]. Prefers a well-drained light rich or peaty soil[1, 200]. Requires a moist peaty soil and a sunny position[111, 134]. Plants are hardy to about -25°c[187]. A very ornamental plant[1], though it can be invasive by means of its spreading root system[200]. The flowers diffuse a delicious scent into the garden. This scent attracts bees, who obtain copious supplies of nectar from the plants[50, 74, K], though unfortunately the plants do not always flower in Britain[K]. The flower of many members of this genus can tran insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207]. This plant has a very wide range of uses and merits attention as a food, fibre and rubber crop[K]. It was possibly cultivated at one time by the North American Indians for its many uses[159]. It is considered by some to be the greatest underachiever among plants. Its potential appears great, yet until now it has never been continuously processed for commercial purposes[269]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. Special Features:North American native, Invasive, Naturalizing, Attracts butterflies, Fragrant flowers. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the abovestrong, easily worked but not durable. It weighs 32lb per 4.2.64 Iuglans cinerea cubic metre. It has many uses such as veneer, cooperage, furniture, flooring and pulp[11, 46, 82, 227, 235]. Carbon Farming - Industrial Crop: biomass. Agroforestry Services: crop shade. Fodder: bank. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve

dwatta Antispasmodic Astringent Dysentery Ophthalmic Skin VDAn infusion of the bark is used in the treatment of coughs, cramps and dysentery[257]. The infusion is also applied externally to old, stubborn running sores[257]. A compound infusion is used in the treatment of 'female complaints'[257]. The inner bark is boiled and used with water as a wash for sore eyes[257]. An infusion is used internally in the treatment of diarrhoea[257]. An infusion of the root bark has been used in the treatment of gonorrhoea[257].

nrakta Eastern N. America - New Brunswick to Florida, west to Oklahoma, Kansas and Nebraska, ksacta Banks of rivers, usually in sandy soils[43, 82]. Trees are occasionally found in deep often submerged swamps[82].

propta Seed - best sown as soon as it is ripe in the spring in a cold frame. It usually germinates immediately and by the end of summer has formed a small tree with several pairs of leaves[82]. Stored seed guickly loses its viability. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter

nwatta Agroforestry Services: Crop shade Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: Standard Staple Crop: SugarLandscape Uses: Erosion control, Firewood, Aggressive surface roots possible, Woodland garden. Of easy cultivation, it prefers a good moist well-drained soil[1, 11] but does well in much wetter soils than most member of the genus. Succeeds in most soils including chalk[98]. Another report says that this species is liable to become chlorotic as a result of iron deficiency when it is grown on alkaline soils. Grows well in heavy clay soils. Prefers a moderately sunny position[11, 200]. Tolerates atmospheric pollution[200]. Fairly windtolerant[200]. The wood is brittle and branches are liable to break off the tree in high winds[11, 200]. Trees can tolerate short periods of flooding, but are very susceptible to fire[229]. A very ornamental[1] and fast growing tree[11, 98], but it is short-lived[227], seldom surviving longer than 125 - 140 years[229]. The tree has invasive roots and these often interfere with sewer pipes and drainage tiles around houses[226]. The silver maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. Special Features: Attracts birds. North American native. Naturalizing. Carbon farming - Cultivation: experimental, Management: standard, coppice. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

Butternut - White Walnut, Butternut 3 tlin 7 cyuc 3 kcak 3 tcan 3 dwat 25 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Juglans cinerea is a deciduous Tree growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The naphthoquinone constituents may cause gastric (stomach) irritation. Avoid in patients with gallstones [301].

kcakta Edible Parts: Oil Sap SeedEdible Uses: Oil SweetenerSeed - eaten raw or ground into a powder and used with cereal flours in making cakes, biscuits, muffins, bread etc[183]. Oily and sweet tasting with a rich agreeable flavour[11, 62, 63, 101, 183]. The oil in the seed is not very stable and the seed soon becomes rancid once it is opened[82]. The kernel is usually only about 20% by weight of the whole seed[160] and is hard to extract[226]. The unripe fruit can be pickled[183]. The seed is 3 - 6cm in diameter and is produced in clusters of 3 - 5 fruits[82, 229]. An edible oil is obtained from the seed[101, 117, 183], it tends to go rancid quickly. The sweet sap is tapped in spring and can be used as a refreshing drink[101]. It can also be boiled down to a syrup or sugar, or added to maple syrup[82, 101, 117,

tcanta Dye Herbicide Oil WoodA yellow to orange dye is obtained from the seed husks[46, 61, 82] and from the bark[57]. It is dark brown[95, 101]. It does not require a mordant[169]. The seed husks can be dried and stored for later use[169]. A light brown dye is obtained from the young twigs, leaves, buds and unripe fruit[117, 169, 213]. It does not require a mordant[169]. The leaves can also be dried and stored for later use[169]. A black dye is obtained from the young roots[257]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of this species produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200, 201]. Wood - coarse-grained, light, soft, not strong, very attractive[46, 61, 82, 117]. It weighs 25lb per cubic foot[235]. It is not as valuable a crop as the black walnut (J. nigra), but is used indoors for furniture, doors etc[229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astringent Cholagogue Dysentery Febrifuge Laxative Odontalgic StomachicButternut was used by various native North American Indian tribes as a laxative and tonic remedy to treat a variety of conditions including rheumatic and arthritic joints, headaches, dysentery, constipation and wounds[254]. In modern herbalism it is considered to be a valuable remedy for chronic constipation, gently encouraging regular bowel movements. It is especially beneficial when combined with a carminative herb such as Angelica archangelica[254]. The guills or inner bark are one of the few potent laxatives that are safe to use in pregnancy [301. Butternut also lowers cholesterol levels and promotes the clearance of waste products by the liver[254]. An infusion of the inner-bark is used as a cholagogue, febrifuge, mild laxative and stomachic[4, 46, 61, 82, 159, 165, 213, 222]. It is effective in small doses without causing cramps[222]. The bark is best collected in the autumn[213]. Best collected in late spring according to another report[4]. An infusion of the dried outer bark is used in the treatment of toothache and dysentery[226]. The oil from the nuts is used in the treatment of tapeworms and fungal infections[4, 222].

nrakta Eastern N. America - New Brunswick to Georgia west to Arkansas and North Dakota. ksacta Usually found in rich moist soils of woods and river terraces[43, 82], but it also grows on dry rocky soils, especially if these are on limestone[226]...

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80].

nwatta Management: Standard Regional Crop Staple Crop: Protein-oilLandscape Uses:Specimen. Requires a deep well-drained loam and a position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Prefers a sandy soil with a pH around 6 to 7[160]. Dislikes compacted soils or clay sub-soils, otherwise trees grow well on most soils[160]. This is the most cold-resistant of the walnuts[117], tolerating temperatures down to about -35°c in N. America when fully dormant[160]. It is less hardy in Britain, unfortunately, because the wood does not ripen so well here due to our cooler summers. The young growth in spring can be damaged by late frosts[200]. Sometimes cultivated in N. America for its edible seed, there are some named varieties[63, 117, 183]. Trees can come into bearing in 6 - 10 years from seed and fruiting is usually biennial[160]. The trees are quite short-lived, seldom exceeding 80 - 90 years[229]. They require about 105 frost-free days in order to ripen a crop in N. America[160]. Unfortunately, they have not proved successful as a nut tree in Britain, usually failing to produce a crop[11]. This is probably due to our cooler summers[11]. It is sometimes planted as a timber tree in Denmark and Rumania [50]. Plants produce a deep taproot and are intolerant of root disturbance. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first few winters since they are somewhat tender when young[1, 11]. Trees cast a dense shade which reduces the amount of species able to grow below them[201]. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. Plants should only be pruned when they are fully dormant in winter or when they are in full leaf, otherwise any cuts will bleed profusely[200]. Hybridizes with J. ailantifolia, there are some named varieties of this hybrid that are grown for their edible seed[160]. Special Features: North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 4.2.65 Tilia americana

American Basswood, Carolina basswood, Basswood, AmericanBasswood, American Linden

3 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 25 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tilia americana is a deciduous Tree growing to 25 m (82ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in July, and the seeds ripen in October. The

species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Frequent consumption of the tea made from the flowers may cause heart damage[222].

kcakta Edible Parts: Flowers Leaves SapEdible Uses: Chocolate Sweetner TeaYoung leaves - raw or cooked[257]. A mild flavour and a tender but mucilaginous texture, they are very nice in salads[K]. The leaves can be cooked as greens[257]. Sap - obtained from next to the bark and used as a refreshing drink[105, 161, 177]. It can also be concentrated into a syrup and used as a sweetener[183]. Flowers - raw. They can be added to salads[183]. The flowers are used as a tea substitute. They are sweet and fragrant[183]. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2, 105, 177, 183]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta Fibre Shelterbelt WoodA tough fibre is obtained from the inner bark[46, 227]. The bark is soaked in water then boiled. It is then rubbed on a stick to separate the fibres which can then be used for making thread for sewing, fine yarn for weaving bags, clothing etc and cordage for making nets, shoes, twine, mats etc[189, 226, 227, 257]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - soft, straight grained, light, weak, not durable, easily worked, resistant to splitting, it holds nails badly, holds glue, paint and lacquer well, seasons well but shrinks considerably. It weighs 28lb per cubic foot[227], is odourless and bland-tasting[226]. A commercially important timber in its native range[226, 229]. The white wood is excellent for turning and carving, it is used for making woodenware such as spoons, cheap furniture, pulp etc[46, 82, 171, 227, 229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antispasmodic Demulcent Diaphoretic Diuretic Dysentery Ophthalmic Poultice Sedative VermifugeA tea made from the inner bark is applied to burns - it soothes and softens the skin[213]. It is taken internally in the treatment of lung complaints, dysentery, heart burn and weak stomach[222, 257]. The bark is diuretic[257]. An infusion has been taken to promote urination[257]. A decoction of the bark, mixed with cornmeal, has been used as a poultice to draw out boils[222, 257]. A tea made from the fresh or dried flowers is antispasmodic, diaphoretic and sedative [226]. It is used in the treatment of hypertension, hardening of the arteries, digestive complaints associated with anxiety, feverish colds, respiratory catarrh, migraine etc[238]. Lime flowers are said to develop narcotic properties as they age and so they should only be harvested when freshly opened[238]. An infusion of the leaves has been used as an eyewash[257]. A poultice of the leaves has been used in the treatment of burns and scalds, broken bones and swollen areas[257]. A tea or tincture made from the leaves, flowers and buds has traditionally been used for nervous headaches, restlessness and painful digestion[222]. Use with caution, see notes above on toxicity. A decoction of the roots and the bark has been taken in the treatment of internal haemorrhaging [257]. A decoction of the roots has been used as a vermifuge to rid the body of worms[257].

nrakta Central and Eastern N. America - New Brunswick to Florida, west to Texas and Manitoba. ksacta Rich, often moist, soils of woods and bottomlands, often forming pure stands[82, 227].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter.

fields, dry banks and waste ground, especially on calcareous and gravelly soils[4, 17].

propta Seed - best sown as soon as it is ripe in a cold frame in the autumn[200]. The germination of spring sown seed can be erratic[200], it is best sown in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. The seed remains viable for about 5 years[4]. A fast-growing plant, the seedlings can reach flowering size in their first year[238]. If you have sufficient freshly ripe seed then it is well worth trying a sowing outdoors in situ in the autumn. Division in spring or autumn[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in late spring or early summer. Harvest the shoots with plenty of underground stem when they are about 8 -10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Easily grown in a light sandy soil in a sunny position[200]. Succeeds in heavier soils if the drainage is very good. Plants are hardy to about -25°c[187]. Catmint emits a scent that is irresistible to many cats, who will then avidly attack the plant[4, 7, 20, 46, 200]. The smell is said to be similar to certain cat hormones and is more effective with male cats. Ouite often a cat will completely destroy even a fairly large plant, small plants especially might need protection until well established[K]. Sometimes grown in the herb garden, there are some named varieties[183]. 'Citriodora' has lemon-scented leaves that are more attractive to people and less attractive to cats[183, 187]. If the plants are cut back hard when they are flowering a second crop of leaves will be produced[238]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Catmint is a good companion plant to grow in the garden[238]. It is said to repel various cabbage pests, aphis (including peach aphis), flea beetles, cucumber beetles, squash bugs and ants from plants they grow near to[238]. The flowers are very attractive to bees[108].

#### 4.2.110 Ribes aciculare

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes aciculare is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Large, sweet and tasty[2, 74]. The red fruit is up to 15mm in diameter[266].

nrakta E. Asia - northern China, Siberia. ksacta Open stony mountain and hill slopes[74]. Forest margins, thickets and rocky slopes at elevations of 1500 - 2100 metres in northern China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 0 - 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Quite tolerant of shade though not fruiting so well in such a position[11]. The dormant plant is hardy to about -20°c[200]. This species is closely related to R. burejense[200]. Plants

can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

# 4.2.111 Campanula latifolia

Large Campanula, Giant bellflower 3 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 1.5 m hkuc

3 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 1.5 m hkuc pcimhmim cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula latifolia is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Young shoots - raw or cooked[5, 177]. Contains up to 400mg% of vitamin C[174]. Root - raw[74]. This report is rather vague and needs further investigation. Flowers - raw or cooked. A pleasant sweetness[K].

dwatta Emetic Vitamin CThe flowers are emetic[61].
nrakta Much of Europe, including Britain, north to Norway east to Siberia and W. Asia. ksacta Woodlands, lush meadows and hedgerows, frequently on slightly acid soils[1, 31, 271].

propta Seed - surface sow in spring in a cold frame. Three or four weeks pre-chilling of the seed improves the germination rate[138]. The seed usually germinates in 2 - 4 weeks at 18°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can also be sown outdoors in situ during the spring. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta A very robust plant, capable of succeeding in the wild garden and tolerating considerable neglect[271]. It succeeds in most fertile well-drained soils[233], though it prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Prefers a humus-rich soil in shade or partial shade[271]. Grows well in cool moist woodlands with light shade where it can spread freely[1]. Plants occasionally grow in old walls[219] and also succeed in the dry shade of trees[233]. Plants are hardy to at least -15°c[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very ornamental plant, there are some named varieties[187]. The species can be guite invasive, though most of the cultivars that have been selected for flower colour are less rampant[271].

# 4.2.112 Asclepias syriaca

Common Milkweed, Silkweed, Milkweed 3 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Asclepias syriaca is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths

nrakta Europe, including Britain, from Iceland south and east to Spain, temperate Asia and Mongolia. ksacta Wet ground in swamps, marshes, fens, wet woods and meadows, wet rock ledges and by rivers, but not on acid peats[17].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Massing, Rock garden, Seashore, Specimen, Woodland garden. Requires a humusrich moist soil in semi-shade(200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils[1, 17]. Does well in marshy soils[24, 200]. Grows well in heavy clay soils. The flowers have a strong sweet smell[4], which for many people is sickly[245]. The leaves are also aromatic[187], though the scent is very different from the flowers[4]. The leaves are pleasantly aromatic[245]. A good bee plant[24, 30]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Suitable for cut flowers. Suitable for cut flowers. Suitable for cut flowers.

#### 4.2.108 Campanula rapunculoides

Creeping Bellflower, Rampion bellflower 3 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula rapunculoides is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves and young shoots - raw or cooked[85, 177]. Rich in vitamin C. A pleasant mild flavour[K]. Root - raw or cooked[2, 105, 177]. A nut-like flavour, very palatable[85]. The young roots are best[85]. Somewhat sweet, they are a pleasant addition to the salad bowl[183].

dwatta Vitamin CThe plant has been used as a cure for hydrophobia in Russia[271].

nrakta Europe, north to 65°N., east to W. Asia and the Caucasus. Introduced in Britain. ksacta Fields and woods[100]. Naturalised in Britain where it grows in fields and more or less disturbed grassy areas such as railway banks, occasionally in woods, usually near to houses[17].

propta Seed surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c[138]. Easy[221]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring[200]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[200]. Very easy, any part of the root will produce a new plant[221].

nwatta An easily grown plant succeeding in almost any soil[221], though it prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. It is slower growing and less spreading when grown in heavier soils[271]. Plants are hardy to at least -15°c[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. A beautiful plant, it was at

one time cultivated as a culinary plant but has fallen into disuse[4]. The plant produces a mass of thick white roots which can spread at an alarming rate, especially in light soils. It can often fill an entire bed with its tenaceous roots, killing off less vigorous plants[271]. It is best grown in the wild garden where it can be allowed to romp without harm[221, 271]. Plants can also succeed when growing in thin grass[233]. Plants produce seed freely and often self-sow[221]. Slugs are very attracted to this plant, we have had great problems growing it on our Cornish trial grounds because the slugs eat out all the new shoots in spring and can kill even wellestablished specimens[K]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 4.2.109 Nepeta cataria

Catmint, Catnip

3 tlin 7 cyuc 3 kcak 0 tcan 2 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Nepeta cataria is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to November, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil

pcista Catnip has diuretic properties and may increase amount and frequency of urination. Smoking catnip can produce euphoria and visual hallucinations. Sedation. Women with inflammatory diseases of the pelvis or are pregnant should not use. Care if using and driving or using machines [3011]

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaYoung leaves - raw[7, 20]. A mint-like flavour, they make an aromatic flavouring in salads[7, K], Older leaves are used as a flavouring in cooked foods[2, 27, 105]. They can be used fresh or dried to make an aromatic herb tea[21, 105, 183]. The tea should be infused in a closed container in order to preserve the essential oils, boiling is said to spoil it[218].

tcanta Essential Herbicide Pot-pourri RepellentThe plant is said to deter insects such as ants and flea beetles[14, 20, 201] as well as rats and mice[4, 200, 201]. (The idea behind it being a rat repellent is probably based on the plants attraction to cats, see notes above.) A strong infusion can be used to repel fleas from carpets or the fur of animals[201]. An extract from the leaves (called nepetalactone) has herbicidal and insect repellent properties[222]. The freshly harvested flowering tops contain 0.3 - 1% essential oil by distillation[218]. It is mainly used for medicinal purposes[218]. The dried leaves retain their fragrance and can be used in pot-pourri[245].

dwatta Antianxiety Antispasmodic Antitussive Astringent Carminative Diaphoretic Emmenagogue Nervine Refrigerant Sedative Stimulant Stomachic TonicCatmint has a long history of use as a household herbal remedy, being employed especially in treating disorders of the digestive system and, as it stimulates sweating, it is useful in reducing fevers[254]. The herbs pleasant taste and gentle action makes it suitable for treating colds, flu and fevers in children. It is more effective when used in conjunction with elder flower (Sambucus nigra)[254]. The leaves and flowering tops are strongly antispasmodic, antitussive, astringent, carminative, diaphoretic, slightly emmenagogue, refrigerant, sedative, slightly stimulant, stomachic and tonic[4, 7, 9, 14, 21, 165, 218, 238]. The flowering stems are harvested in August when the plant is in full flower, they are dried and stored for use as required[4]. An infusion produces free perspiration, it is considered to be beneficial in the treatment of fevers and colds[4]. It is also very useful in the treatment of restlessness and nervousness, being very useful as a mild nervine for children[4]. A tea made from the leaves can also be used[213]. The infusion is also applied externally to bruises, especially black eves[245].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, W. and C. Asia to the Himalayas ksacta Roadsides and near streams[7]. Hedgerows, borders of

112

Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Landscape Uses:Pollard, Screen, Specimen, Street tree. Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soils[200]. Dislikes exposed positions[200]. Another entry in the same book says that it is fairly wind tolerant[200]. Succeeds in full sun or semishade[188]. A fast-growing and moderately long-lived tree in the wild, it starts producing seed when about 15 years old and continues for at least another 85 years[229]. It is generally unsatisfactory in Britain, preferring a continental climate and growing more slowly and not usually producing fertile seed in areas with cool summers[200]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. They are highly shade-tolerant according to another report[226]. Trees respond well to coppicing, sending up lots of suckers from the roots[226]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K], A good bee plant[61. 159]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Ouite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]

# 4.2.66 Aronia melanocarpa

Black Chokeberry, Black Berried Aronia 3 tlin 8 cyuc 3 kcak 2 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Aronia melanoca pa is a deciduous Shrub growing to 2.5 m (8ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Pectin Pectin Fruit - cooked. A good flavour but very astringent[183]. The fruit should be fully ripe before being eaten and is best after a frost or two[K]. It makes a good jelly when sugar is added and is also dried and used for making pemmican[183]. The fruit is rich in pectin and can be added to fruits that are low in this substance when making jams etc[183]. Pectin is also said to protect the body against radiation[201]. The fruit is about 9mm in diameter[200].

tcanta Miscellany Pectin PectinThe fruit is a source of pectin[183], a substance that is used to thicken jams etc and as a culture medium in laboratories.

dwatta MiscellanyAn infusion of the berries has been used in the treatment of colds[257].

nrakta Eastern N. America - Nova Scotia to Ontario, south to Florida and Michigan. ksacta Swamps and low woodlands, it is sometimes also found in drier soils[200, 235].

propta Seed - best sown as soon as it is ripe in pots outdoors or in a cold frame[113]. Pre-soak stored seed overnight and then cold stratify for 3 months at  $2^{\circ}$ c[113]. The seed germinates in 1 - 3 months at  $15^{\circ}$ c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring. Cuttings of half-ripe wood, July/August in a frame[113]. Division of suckers in the dormant season[200]. Very easy, they can be planted straight out into their permanent positions. Lavering[200].

nwatta Landscape Uses:Screen, Specimen, Prefers a moist peaty soil in full sun or partial shade[200]. Succeeds in most soils but dislikes shallow chalk[200]. More tolerant of dry soils than other members of this genus[200]. Plants are hardy to about -25°c. There is at least one cultivar developed for its improved fruit. 'Nero' has fruits twice the size of the species with a vitamin C content of 15 - 30 mg (per 100g?). The fruit is borne in clusters of about 15, it is more flavourful and the yield is about twice that of wild forms[183]. Other cultivars developed mainly for their ornamental value include 'Viking' with extra large berries and 'Aron' with numerous large berries[182]. The sub-species A. melanocarpa elata Rehd. and A. melanocarpa grandifolia (Lindl.)Schneid. are more vigorous than the type species with larger flowers and fruits[200]. This genus is closely related to Sorbus species [200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Naturalizing, Wetlands plant, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant. forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 4.2.67 Quercus macrocarpa

Burr Oak, Mossy Cup Oak

89

3 tlin 8 cyuc 3 kcak 4 tcan 2 dwat m hkuc hmimhtut cyutli hgatkyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Quercus macrocarpa is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: SeedEdible Uses: Seed cooked[101, 105, 161, 257]. Very large, the seed can be up to 5cm x 4cm[82, 200], though it is somewhat variable in size and shape[227]. The seed can be ground into a powder and used in making bread, dumplings etc and as a thickener in soups[183]. The seed of this species is considered to be one of the most palatable of all the oaks[159, 183]. Many trees have sweet seeds with little tannin and the seed can be eaten raw or cooked. If the seed is bitter then this is due to the presence of tannins, these can be leached out by thoroughly washing the dried and ground up seed in water, though many

minerals will also be lost. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Mordant Repellent Tannin WoodAgroforestry Uses: The tree has been widely tested for use in rehabilitation of the soil. It has been successfully planted on coal spoils in the north-central and northern Great Plains, and in the Western Interior Coal Province which encompasses Missouri. Kansas, and Oklahoma. It may be either seeded or transplanted onto disturbed areas[1050]. Other Uses: The leaves of most species in this genus are more or less rich in tannins. A mulch of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and this inhibit plant growth[20, K]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark has been used as a mordant for fixing dyes[257]. The wood is hard, heavy, strong, tough, very durable, close grained. It weighs about 46lb per cubic metre[227]. This species is of considerable importance as a timber tree, it is used for all types of construction, in making baskets, flooring, cabinet making, ship building, cooperagem fence posts etc[46, 61, 82, 149 , 171 , 227 , 229 , 338 ]. The wood is a good fuel[82].

dwatta Antispasmodic Astringent Dysentery TonicThe bark is astringent and tonic[61]. An infusion has been used in the treatment of diarrhoea[257]. A decoction of the root or inner bark has been used in the treatment of cramps[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[41].

nrakta Eastern N. America - Nova Scotia to Manitoba, Wyoming, Massachusetts, Georgia, Kansas and Texas. ksacta Found in a variety of habitats from dry hillsides to moist bottomlands, rich woods and fertile slopes, mainly on limestone soils[43, 229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen. Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Succeeds in a hot dry position. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A slow-growing tree[188]. Established plants are drought resistant[229] and tolerant of atmospheric pollution[226]. Trees have a thick, fire-resistant bark[274]. Occasionally cultivated for its edible seed, there are some named varieties[183]. Slow growing in the wild, it takes about 30 years to start producing seed, though it then continues to crop for the next 200 - 300 years with large crops being produced every 2 - 3 years[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Prefers warmer summers than are usually experienced in Britain, often growing poorly in this country and failing to properly ripen its wood, resulting in frost damage overwinter[11, 200]. A tree at the Hillier Arboretum in Hampshire was growing well in September 1993. It was 9 metres tall but had a lot of mildew, there was no sign of seeds[K]. There is a dwarf form of this species:- Q. macrocarpa depressa (Nutt.)Engelm. grows about 2 metres tall with corky branches and smaller seeds than the species, usually about 1cm long[227]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones

show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 4.2.68 Ouercus rubra

Red Oak, Northern red oak 3 tlin 7 cyuc 3 koak 3 tcan 2 dwat 25 m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Quercus rubra is a deciduous Tree growing to 25 m (82ft) by 18 m (59ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[161, 177, 257]. A staple food for several native North American Indian tribes[257]. Up to 3cm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[183]. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Dye Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Tannin is obtained from the bark[82, 171]. A reddish-brown dye can be obtained from the bark[257]. Wood - coarse-grained, hard, strong, heavy, not durable[46, 82, 171, 226]. It weighs 41lb per cubic foot[235]. An important lumber source in America, it is highly valued for flooring, furniture, veneer, construction etc[46, 82, 171, 226].

dwatta Antidiarrhoeal Antiseptic Antiviral Astringent Cancer Dysentery Emetic Febrifuge Salve TonicThe bark and inner bark is antiseptic, astringent, emetic, febrifuge and tonic[257]. It is used in the treatment of diarrhoea, chronic dysentery, indigestion, asthma, severe coughs, hoarseness, intermittent fevers, bleeding etc[222, 257]. Externally, it is used as a wash for skin eruptions, rashes, burns etc[222, 257]. The bark can be chewed as a treatment for mouth sores[257]. The bark contains tannins, experimentally these have been shown to be antiviral, antiseptic, anticancer and also carcinogenic[222]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Nova Scotia to Georgia, west to Oklahoma and Minnesota. ksacta Dry or upland woods[43]. Found in a variety of soils, it grows best in those

drutta Amaranthus tricolor is a ANNUAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from April to October, in flower from June to August, and the seeds ripen from July to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

pcista No members of this genus are known to be poisonus, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves Seed StemEdible Uses: Leaves - raw or cooked. Often used at the young seedling stage[2, 46, 61], they are also cooked as a spinach and have a very mild flavour[183]. An excellent hot weather substitute for spinach[183]. The leaves contain about 3.5% protein, 0.25% fat, 6.6% carbohydrate, 3.1% ash, 24mg iron per 100g, 464mg calcium per 100g, they are rich in vitamin A and have a fair content of vitamins B1 and C[179]. On a zero moisture basis 100g of the leaves contains up to 2441mg calcium, 1008mg phosphorus, 51mg iron, 34mg sodium, 4475mg potassium, 37,623 micrograms beta-carotene equivalent, 0.68mg thiamine, 2.37mg riboflavin, 11.48mg niacin and 730mg ascorbic acid[218]. The crisp interior of large stems makes a tasty vegetable[183]. It can be eaten raw or cooked as an asparagus substitute[2, 61]. Seed - cooked[22, 177]. Very small, about 1mm in diameter[266], but easy to harvest and very nutritious. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. The seed contains saponins[218]. If this is the case it is probably best to either soak the seed for at least 12 hours and then rinse thoroughly before cooking or to give the seed a long slow cooking in order to destroy the sanonins[K]

tcanta DyeYellow and green dyes can be obtained from the whole plant[168].

dwatta AstringentThe whole plant is astringent[240]. A decoction of the root is used with Cucurbita moschata to control haemorrhage following abortion[218]. A decoction of very old plants is taken internally to improve vision and strengthen the liver.

nrakta Tropical Asia ksacta A widely cultivated plant, it is not known in a truly wild situation.

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A minimum soil temperature of 10°c is required for germination, germination is better at temperatures above 20°c[206]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

nwatta Landscape Uses:Border, Container, Foundation, Specimen. Prefers a light well-drained fertile soil in a sunny position[200, 206], though it does succeed in heavier soils[206]. Tolerates fairly acid soils[206]. Tolerates a pH in the range 4.3 to 7.8. This is basically a tropical plant and so requires a hot sheltered position in temperate climates if it is to do well[206, K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. A polymorphic species[1], it is often cultivated for its edible leaves, there are many named varieties[206]. This species is often cultivated in Asia for its edible leaves and seed[46, 58]. It is a very ornamental plant and is often grown in the flower garden[200]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. Special Features: Attractive foliage. Edible, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

# 4.2.107 Filipendula ulmaria

Meadowsweet, Queen of the meadow, Double Lady of the Meadow, European Meadowsweet

3 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 1.2 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Filipendula ulmaria is a PERENNIAL growing to 1.2 m (4ft) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Avoid for asthmatics. Use by children for diarhoea not recommended or for children under 12 due to salicylate content (risk of Reye's syndrome) [301].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Condiment TeaAll parts of the plant are edible. Root -cooked[2, 141]. Young leaves - cooked as a flavouring in soups[177]. Young leaves, flowers and roots are brewed into a tea[183]. The dried leaves are used as a flavouring[12, 100], especially as a sweetener in herb teas[13, 183]. The flowers are used as a flavouring in various alcoholic beverages and in stewed fruits[183]. Adding them to wine or beer is said to make a very heady brew[244]. They are also made into a syrup which can be used in cooling drinks and fruit salads[183].

tcanta Dye Essential Pot-pourri StrewingA black dye is obtained from the roots. It is brown[141]. A yellow dye is obtained from the plant tops[106]. An essential oil obtained from the flower buds is used in perfumery[46, 61]. The whole plant, but especially the leaves[245], was formerly used as a strewing herb, imparting an almond-like fragrance[4, 66]. Strongly aromatic, its delightful perfume would completely fill the room[244]. Both flowers and leaves have been used in pot-pourri, retaining their scent for several months. The scent of the dried flowers becoming more and more pleasant with age[245].

dwatta Alterative Antiinflammatory Antirheumatic Antiseptic Aromatic Astringent Diaphoretic Diuretic Dysentery Homeopathy Stomachic TonicMeadowsweet has a very long history of herbal use, it was one of the three most sacred herbs of the Druids[238]. The leaves and flowering stems are alterative, anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, diuretic, stomachic and tonic[4, 9, 21, 165]. The plant is harvested in July when it is in flower and can be dried for later use[4]. The flower head contains salicylic acid, from which the drug aspirin can be synthesised[200, 238]. Unlike the extracted aspirin, which can cause gastric ulceration at high doses, the combination of constituents in meadowsweet act to protect the inner lining of the stomach and intestines whilst still providing the antiinflammatory benefits of aspirin[254]. The herb is a valuable medicine in the treatment of diarrhoea, indeed it is considered almost specific in the treatment of children's diarrhoea[4]. It is also considered to be a useful stomachic, being used to treat hyperacidity, heartburn, gastritis and peptic ulcers, for which it is one of the most effective plant remedies[4, 238]. It is also frequently used in the treatment of afflictions of the blood[4]. Meadowsweet is also effective against the organisms causing diphtheria, dysentery and pneumonia[238]. This remedy should not be given to people who are hypersensitive to aspirin[238]. A strong decoction of the boiled root is said to be effective, when used externally, in the treatment of sores and ulcers[244]. A homeopathic remedy is made from the fresh root[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Filipendula ulmaria Meadowsweet for cough, bronchitis, fever and cold (see [302] for critics of commission E).

being grown for compost material [200]. Plants can be invasive, often spreading freely by means of self-sown seed. The root system is very deep and difficult to eradicate, even small fragments of root left in the soil can produce new plants. Special Features:Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-21. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen fibrous or tap root [1-2].

#### 4.2.104 Prunus cerasus frutescens

Bush Sour Cherry

3 tlin 7 cyuc 3 kcak 3 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Prunus cerasus frutescens is a deciduous Tree growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Gum Gum Oil Oil TeaFruit - raw or cooked[1, 2, 5, 11, 12]. Neisther bitter nor sweet, the fruit is pleasantly acid and can be eaten out of hand, used in pies, preserves etc or dried for later use[183]. The fruit is about 10mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eath the seed if it is too bitter - see the notes above on toxicity. An edible oil is obtained from the seed[46, 61]. When refined it is used as a salad oil[183]. The leaves are used as a tea substitute[46, 61, 183]. A gum obtained from the trunk is used for chewing[61, 64].

tcanta Adhesive Dye Gum Gum Hedge Hedge Oil Oil WoodAn edible drying oil obtained from the seed is also used in cosmetics[61]. The gum obtained from the stem is also used as an adhesive[61, 64]. Plants can be grown as a hedge[50], succeeding in fairly exposed positions[K]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration improves digestion and gives a sense of well-being[238].

nrakta S.E. Europe to W. Asia. ksacta Not known in the wild[11].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200].

Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Prefers an acid soil according to another report[5]. Succeeds in sun or partial shade though it fruits better in a sunny position[11. 2001. Hardy to about -20°c[184]. A shrub with a suckering habit, this subspecies has long been cultivated for its edible fruit, especially in Russia[11]. There are several named varieties[200] including 'Ostheim' which has been cultivated in Britain[11]. This subspecies has smaller fruits[200]. Most members of this genus are shallow-rooted[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

# 4.2.105 Lonicera villosa

Mountain fly honeysuckle, Fuller's honeysuckle 3 tiin 9 cyuc 3 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

ntut cyuti tcup nwich inasjiutnyik npa/tii natprikiwis hpa/timwatli xre/t hjonli drutta Lonicera villosa is a deciduous Shrub growing to 1.5 m (5ft) at a slow rate. It is in flower from April to May.

1.5 m (5ft) at a slow rate. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or preserved[43, 105, 200]. A milder flavour than most edible honeysuckles, they can be eaten raw but are mainly used in making jams, jellies and refreshing drinks[183]. There is a distinct bitterness in the flavour, even when fully ripe[K].

nrakta N. America - Newfoundland to Alaska, south to Pennsylvania, Wisconsin and California. ksacta Peaty or rocky barrens, bogs and bushy places[43], especially on limestone.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good moist soil in a sunny position, fruiting less well when grown in the shade[200]. Closely related to L. caerulea[200]. Polymorphic. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

# 4.2.106 Amaranthus tricolor

Chinese Spinach, Joseph's-coat, Fountain Plant, Tampala , Summer Poinsettia

3 tlin 11 cyuc 3 kcak 2 tcan 1 dwat 1 m hkuc htut cyutli hgattcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyif hjonli that are deep and fine textured, and the largest trees are found in protected ravines or on sheltered slopes[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers a hotter summer than is usually experienced in Britain[200], but trees still grow well in Britain[11, 200]. A fairly fast-growing tree[188], it is cultivated for its timber in C. Europe. Trees normally require 20 - 25 years to reach flowering size, and may take another 20 years before heavy crops of seed are produced[229]. Seed production is cyclic, heavy crops being produced every 2 - 5 years in the wild[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Trees are able to regenerate from root suckers if the top is killed by a forest fire[226]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 4.2.69 Mertensia maritima

Oyster Plant

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat m hkuc

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Mertensia maritima is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects? Self. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw or cooked[172, 183]. They are said to taste of oysters[5]. No-one has yet noticed a resemblance to oysters though not many of the tasters have ever eaten oysters! The flavour is fairly bland, the leaf is thick and has a very mucilaginous texture - it is probably this texture that reminds people of oysters[K]. Root[22, 46, 61, 105]. Eaten by the Inuit of Alaska[183, 257]. Flowers - raw[172].

nrakta Throughout the temperate regions of both hemispheres, including Britain. ksacta Shingle by the sea[17]. Uncommon and declining[200].

propta Seed - sow as soon as it is ripe in a cold frame. Spring sown seed is also successful[K]. Germination usually takes place within a month. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in April or early September. With care since the plant resents root disturbance.

nwatta Thrives in nutritionally poor sandy or gravelly soils in a sunny position[200]. Requires a very well-drained soil[188]. Dislikes shade[233]. Plants are resentful of root disturbance and should be planted out into their permanent positions as soon as possible[200]. This species is not very easy to cultivate[1]. Plants are very susceptible to slug damage[188, K] The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to

suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 4.2.70 Vitis aestivalis argentifolia

ummer Grane

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 25 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis aestivalis argentifolia is a deciduous Climber growing to 25 m (82ft 0in) at fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and fenale organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves SapEdible Uses: Fruit - raw, cooked in jellies, jams, pies etc or dried for later use[J. 2, 22, 46, 183]. Sweet and agreeably flavoured[2, 183]. The taste is best after a frost[101]. The dried fruits are eaten as snacks or used in baked goods[183]. The fruit is about 8mm in diameter[200]. Leaves - cooked[55, 159]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. A sweet watery sap is obtained from the stem[101, 183]. Used as a refreshing drink. Young tendrils raw or cooked[55, 85, 159].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern and Eastern N. America - Ontario to Alabama. Locally naturalized in Europe[50]. ksacta Dry woods and thickets[43]

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Lavering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. The flowers are sweetly scented with the aroma of mignonette[245]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This subspecies has a more northerly and inland range than the type and might therefore be more suitable for fruit production in Britain (particularly the northern provenances). Plants in this genus are notably susceptible to honey fungus[200].

# 4.2.71 Betula lenta

Cherry Birch, Sweet birch, Black Birch, Cherry Birch 3 tlin 7 cyuc 3 kcak 4 tcan 3 dwat 24 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflat-priklwis hoa7tmwatli hionli

drutta Betula lenta is a deciduous Tree growing to 24 m (78ft 9in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds

ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The essential oil obtained from the bark contains 97 - 99% methyl salicylate. This is very toxic when taken orally, and it can also be absorbed through the skin, resulting in human fatalities. As little as 4, 700 mg can be fatal in children[269]. The aromatic and aliphatic hydrocarbons in birch tar are irritating to the skin. Do not use in patients with oedema or with poor kidney or heart functions [301]

kcakta Edible Parts: Inner bark SapEdible Uses: Condiment Sweetener TeaInner bark - cooked or dried and ground into a powder[4, 62, 102]. Sweet and spicy[177]. The dried inner bark can be used as a thickener in soups etc or can be added to flour when making bread etc. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[K]. Sap - raw or cooked[2, 46, 102]. A sweet flavour[61, 177]. It is harvested in early spring, before the leaves unfurl, by tapping the trunk. The flow is best on sunny days following a heavy frost. A delicious drink, it can also be concentrated into a syrup or sugar[183]. The sap can be fermented to make birch beer or vinegar[183]. An old English recipe for the beer is as follows:- "To every Gallon of Birch-water put a quart of Honey, well stirr'd together; then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up . . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269]. The dried leaves and bark from the larger roots are a delightful tea substitute[177, 183]. A wholesome, agreeable tea is made from the essential oil contained in the inner bark and twigs[21, 55, 62]. This essential oil is also used as a wintergreen flavouring in foods[183].

tcanta Essential Fuel Tannin WoodAn essential oil is obtained from the bark and twigs, it is distilled in quantity and is an item of commerce[235]. It can be used medicinally, as a food flavouring, as an ingredient in cosmetic shampoos and also to make a wholesome tea[11, 21, 46, 171, 269]. The oil, when decolourized, is similar to 'Oil of Wintergreen' (obtained from Gaultheria procumbens) and is considered to be of superior quality[245]. The tree is coppied every 5 years and all parts are distilled for the oil[245]. The tree grows up to 3 metres tall in this 5 year period[245]. The greatest yield of oil is obtained if the tree is harvested in the summer[245]. The oil distilled from the wood is insect repellent[269].1 The bark contains up to 16% tannin[223]. The thin outer bark is waterproof and has been used as the outer cladding on dwellings, canoes etc[257]. It has also been used to make baskets, dishes, buckets etc[257]. Wood - very strong, close grained, hard, heavy. The wood is richly marked[4], it weighs 40lb per cubic foot and is exploited commercially for making floors, furniture, tools etc[11, 46, 61, 82, 171, 229]. It makes an excellent fuel[11, 46, 61, 229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Analgesic Anthelmintic Antiinflammatory Antiseborrheic Astringent Diaphoretic Diuretic Dysentery Rubefacient Stimulant UrinaryThe bark is anthelmintic, astringent, diaphoretic, diuretic and stimulant[4, 21]. A tea made from the bark is used in the treatment of fevers, stomach aches and lung ailments[222, 257], it is said to be an excellent tonic in cases of dysentery and to be useful in the treatment. of gravel and female obstructions[4]. An essential oil distilled from the bark is anti-inflammatory, analgesic and rubefacient[222]. It is used in the treatment of rheumatism, bladder infections, neuralgia etc[222]. The oil, called 'oil of wintergreen', used to be produced commercially, but it is now manufactured synthetically[222]. A tea made from the twigs is used in the treatment of fevers[222]. The leaves can be chewed or used in an infusion in the treatment of dysentery[257]. The German Commission E Monographs, a therapeutic quide to herbal medicine, approve Betula species for infections of the urinary tract, kidney and bladder stones,

rheumatism (see [302] for critics of commission E).

nrakta Eastern N. America - Quebec to Georgia, west to Alberta and Ohio. ksacta Rich woodlands, preferring north-facing slopes and moist soils[43, 62]. It is also found on rocky soils[229].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position[78, 80, 134]. Spring sown seed should be surface sown in a sunny position in a cold frame[113, 134]. If the germination is poor, raising the temperature by covering the seed with glass can help[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it can be sown in an outdoor seedbed, either as soon as it is ripe or in the early spring -do not cover the spring sown seed. Grow the plants on in the seedbed for 2 years before planting them out into their permanent positions in the winter[78, 80, 113, 134].

nwatta Landscape Uses:Specimen, Woodland garden. An easily grown plant it succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. Cherry birch is said to tolerate an annual precipitation of ca 60 to 150cm, an average annual temperature range of 5 to 12°C, and a pH of 4.5 to 7.5[269]. Hybridizes freely with other members of this genus[50]. The bruised foliage has a strong smell of wintergreen[200]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees can be coppiced on a cycle of 5 years or more[245]. Trees are notably susceptible to honey fungus[200]. Special Features: Attracts birds. North American native. Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

#### 4.2.72 Acer negundo

ox Elder

3 tlin 8 cyuc 3 kcak 3 tcan 1 dwat 21 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta Acer negundo is a deciduous Tree growing to 21 m (69ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from April to May, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy clay soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains a reasonable quantity of sugar and can be used as a refreshing drink or be concentrated into a syrup[11, 46, 61, 82, 159]. The syrup is used as a sweetener on many foods. The sugar content is inferior to A. saccharum according to one report[149] whilst another says that it is highly valued as a producer of sweet sap[183]. The sugar from the sap of this tree is said to be whiter than that from other maples[183]. To obtain the sap, bore a hole

remedy, though it is little used in conventional herbalism. The herb is antispasmodic, astringent, demulcent, emollient, hypnotic, laxative and tonic[4, 7, 172, 192]. It is used in the treatment of diarrhoea, mucous colitis and irritable bowel syndrome[254]. The plant is used in Germany and Austria to treat prostate problems[254]. A poultice of the leaves is applied to mouth ulcers[222]. An extract of the leaves has anti-inflammatory activity[222]. An ointment made from the leaves has been used to soothe skin problems in children[254]. A tea made from the leaves and roots is a folk remedy for dysentery and abdominal cramps[222]. A poultice made from the peeled roots is applied to burns, skin sores, swellings, boils etc[222, 257].

nrakta Europe, including Britain, temperate Asia and N. America. ksacta Rocky ground, waste areas, woodland edges and gardens[7, 13].

propta Seed - sow early spring in situ or as soon as the seed is ripe[111]. This plant is more than capable of finding its own way into most gardens and does not usually require an invitation. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, it prefers a well-drained but moisture retentive soil in a sunny position[200], though it succeeds in most soils[1]. It prefers a moist soil[111], but also succeeds on dry banks[188]. It is best grown in open woodland[1]. Plants are hardy to at least -20°c[187]. The rosebay willowherb spreads vigorously by means of a creeping rhizome, and often forms large patches[187]. It is apt to become a weed especially through its seed which is very light and capable of travelling long distances in the wind. It is often one of the first plants to colonize disturbed areas such as scenes of fires[1, 200]. A very ornamental plant[1], it is the floral emblem of the Yukon[172]. A food plant for the caterpillars of several lepidoptera species[24], it is also a good bee plant[74, 94]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc., and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 4.2.103 Symphytum officinale

Comfrey, Common comfrey 3 tlin 10 cyuc 3 kcak 4 tcan 5 dwat 1.2 m hkuc hmimhtut cyutli tcup hwichi hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Symphytum officinale is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used. Use topically on unbroken skin. May cause loss of appetite, abdominal pain, vomiting. Do not use with Eucalyptus. Do not combine with herbs containing pyrrolizidine alkaloids (e.g. agrimony, alpine ragwort, help, tansy ragwort) [301].

kcakta Edible Parts: LeavesEdible Uses: Gum TeaYoung leaves - cooked or raw[2, 4, 5, 9, 46, 61]. The leaf is hairy and the texture is mucilaginous. It may be full of minerals but it is not pleasant eating for most tastes. It can be chopped up finely and added to salads, in this way the hairiness is not so obvious[183, K]. Young shoots can be used as an asparagus substitute[46]. The blanched stalks are used[183]. Older leaves can be dried and used as a tea[26]. The peeled roots are cut up and added to soups[183]. A tea is made from the dried leaves and roots[183]. The roasted roots are used with dandelion and chicory roots for making coffee[183].

tcanta Biomass Compost GumThe plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap[26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun[100]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anodyne Antidiarrhoeal Antirheumatic Astringent Demulcent Eczema Emollient Expectorant Haemostatic Homeopathy Refrigerant VulneraryComfrey is a commonly used herbal medicine with a long and proven history in the treatment of various complaints. The root and the leaves are used, the root being more active, and they can be taken internally or used externally as a poultice[4, 222]. Comfrey is especially useful in the external treatment of cuts, bruises, sprains, sores, eczema, varicose veins, broken bones etc. internally it is used in the treatment of a wide range of pulmonary complaints, internal bleeding etc[4, 238, K]. The plant contains a substance called 'allantoin', a cell proliferant that speeds up the healing process[4, 21, 26, 165, 222, 2381. This substance is now synthesized in the pharmaceutical industry and used in healing creams[238]. The root and leaves are anodyne, astringent (mild), demulcent, emollient, expectorant, haemostatic, refrigerant, vulnerary[4, 21, 26, 165, 222]. Some caution is advised, however, especially in the internal use of the herb. External applications and internally taken teas or tinctures of the leaves are considered to be completely safe, but internal applications of tablets or capsules are felt to have too many drawbacks for safe usage[238]. See also the notes above on toxicity. The leaves are harvested in early summer before the plant flowers, the roots are harvested in the autumn. Both are dried for later use[238]. A homeopathic remedy is made from the fresh root. harvested before the plant flowers[232]. This has a very limited range of application, but is of great benefit in the treatment of broken bones and eye injuries[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Symphytum officinale for blunt injuries (see [302] for critics of commission E).

nrakta Europe, including Britain, south and east from Scandanavia to Spain, Siberia and Turkey. ksacta Damp, often shady localities, in meadows, woods etc, especially near streams and rivers[9, 17, 244].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Landscape Uses:Border, Ground cover, Specimen. Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is

nrakta Western N. America - British Columbia to California. ksacta Dry slopes and sandy heathy places from near the sea to 800 metres[184].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Most species require shelter from strong winds[200], but judging by the native range of this species it might succeed in maritime exposure[K]. Hardy to about -15°c[184]. Plants are sometimes cut back by late frosts[11] A very ornamental plant[60], it is sometimes cultivated for its edible fruit, there are some named varieties[183]. One report says that it does not fruit freely in Britain[11], but a shrub growing in the shade of oak trees at the RHS gardens in Wisley was seen to be heavy with fruit in the autumns of 1987 and 1988[K]. A shade loving plant, growing well in a woodland[182]. Plants in this genus are notably resistant to honey fungus[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Special Features:North American native, Edible, Inconspicuous flowers or blooms

#### 4.2.101 Rubus odoratus

Thimbleberry, Purpleflowering raspberry 3 tlin 7 cyuc 3 kcak 3 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rubus odoratus is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 257]. Somewhat tart and dry[2], it is usually cooked and used in pies, jellies, preserves etc[183]. Horiut can be dried for later use[257]. This species rarely fruits well in Britain, probably due to our cooler summers[11].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]. Plants are very vigorous and can be grown as a tall ground cover for large areas[208].

dwatta Astringent Diuretic Dysentery Kidney Odontalgic Salve StomachicThe leaves are highly astringent[207]. They are used in the treatment of dysentery and diarrhoea[238]. The leaves have been used as a wash for old and foul sores, boils etc[257]. A decoction or infusion of the branches has been used to settle the stomach[257]. A decoction of the leaves and stems has been used to treat kidney complaints[257]. The root is astringent. A decoction of the root or the root bark has been used as a treatment for diarrhoea and colds[257]. The root has been used in the treatment of toothaches[257]. The berries have been used as a diuretic[257].

nrakta Eastern N. America - Quebec to Ontario and south to Tennessee. Occasionally naturalized in Britain. ks-acta Moist thickets and woodland borders[43].

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month

at 3°c if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Grows well in a sandy soil but does not like clay[182]. Prefers a semi-shaded position. Does well in a woodland garden though it is less likely to fruit well in such a position. A very ornamental plant[1], it is hardy to about -30°c[184]. The glandular hairs on the stems have a powerful resinous scent somewhat like cedarwood[245]. A vigorous suckering shrub, it has perennial stems without prickles[200]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 4.2.102 Epilobium angustifolium

Willow Herb

3 tlin 7 cyuc 3 kcak 2 tcan 2 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Epilobium angustifolium is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista An infusion of the leaves is said to stupefy a per-

kcakta Edible Parts: Flowers Leaves Root StemEdible Uses: TeaLeaves and young shoot tips - raw or cooked[2, 5, 12, 62, 172, 183]. They can be used in salads or cooked as a vegetable[9]. When boiled they make a wholesome vegetable and are a good source of vitamins A and C[2, 257]. Only use the leaves when they are young[85]. Although they are said to be edible, another report says that an infusion of them can stupefy[4]. Young shoots - cooked. They make a good asparagus substitute[2, 9, 183, 213]. Root - raw, cooked or dried and ground into a powder[74, 172]. Used in spring, it has a sweet taste[12, 74]. Flower stalks - raw or cooked[85, 106, 172, 183]. Added to salads, they are used when the flowers are in bud[183]. The pith of young or older stems - raw or cooked[62, 99, 183]. Slightly sweet, tender and pleasing to eat, though there is not much of it[85, 172]. Gelatinous[161], it can be used as a flavouring in soups[183]. The stems are said to be a good laxative, but are best not eaten on an empty stomach[256]. A tea is made from the dried leaves[9, 62, 85, 94, 183], it is sweet and pleasant[172]. Called 'kaporie' tea in Russia, it contains 10% tannin[222]. The leaves are also used as an adulterant of China tea[2].

tcanta Fibre Stuffing Tinder Weather protectionA fibre obtained from the outer stems is used to make cordage[99, 207, 256]. The 'cottony' seed hairs are used as a stuffing material[99, 118] or as a tinder[106, 172]. The powdered inner cortex is applied to the hands and face to give protection from the cold[99, 172, 257].

dwatta Antiinflammatory Antispasmodic Astringent Demulcent Dysentery Emollient Hypnotic Laxative Poultice TonicWillow herb is often used as a domestic herbal on the sunny side of the trunk into the sapwood about 1 metre above the ground at anytime from about January 1st until the leaves appear[85]. The flow is best on a warm day after a frost[213]. The best sap production comes from cold-winter areas with continental climates. Inner bark - raw or cooked. It can be dried, ground into a powder and then used as a thickener in soups etc or be added to cereal flours when making bread, cakes etc[257]. The inner bark can also be boiled until the sugar crystallizes out of it[257]. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[213]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. The seed is up to 12mm long and is produced in small clusters[821.

tcanta Musical Preservative Shelterbelt WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fairly wind-tolerant tree, it can be used in mixed plantings as a part of shelterbelt plantings[200]. Wood - soft, weak, light, close grained. It weighs 27lb per cubic foot[235]. Of little commercial value, it is used for boxes, cheap furniture, pulp, fuel etc[46, 61, 82, 149, 229]. Large trunk burls or knots have been used to make drums[257].

dwatta EmeticA tea made from the inner bark is used as an emetic[222, 257].

nrakta N. America - Nova Scotia to Florida, west to California and Manitoba. ksacta Found in a variety of soil types, growing best in lowland sites along rivers, streams, ponds or seasonally flooded flats[229].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting. rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. The cuttings of this species usually root easily. Budding onto A. negundo in early summer usually works well. The bud should develop a small shoot in the summer otherwise it is unlikely to survive the winter.

nwatta Of easy cultivation, succeeding in most soils[202] but preferring a rich moist well-drained soil and a sunny position[11]. Grows well in heavy clay soils and in sandy soils[188]. Plants often become chlorotic on very alkaline soils[202]. Plants are hardy to about -18°c[202]. A fast growing but short-lived tree in the wild, living for 75 -100 years[149, 229]. It is fairly wind-tolerant[200], but the branches have a tendency to break in strong winds[226]. This species is cultivated commercially in Illinois for its sap[183]. Another report says that this is one of the least productive species for sugar[226]. A very ornamental plant[1], there are several named varieties[200]. This tree is a bad companion plant that is said to inhibit the growth of neighbouring plants[18, 20]. This species is notably resistant to honey fungus[88, 200]. Very tolerant of pruning, it can regenerate from old wood if it is cut back hard[202]. Dioecious. Male and female plants must be grown if seed is required.

# 4.2.73 Ouercus alba

White Oak, Hybrid oak 3 tlin 9 cyuc 3 kcak 4 tcan 2 dwat 20 m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus alba is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy

(clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[226]. Somewhat sweet[229]. The seed is about 1 - 3cm long[200] and ripens in its first year[235]. It contains about 6% protein and 65% carbohydrates[213]. It is low in tannin and needs little if any leaching. It is said that those seeds with red or pink blotches on the shell are the sweetest[183]. Any bitter tanning can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The seed can be roasted and then eaten, its taste is something like a cross between sunflower seeds and popcorn[183]. The roasted seed is a coffee substitute that is free from caffeine[226].

tcanta Fuel Repellent Tannin WoodAgroforestry Uses: White oak is potentially valuable for use in reforestation projects, and appears to have potential for use on other types of disturbed sites. It has been planted on strip-mined lands in Ohio, Indiana, and Illinois, and has exhibited good growth and survival on cast overburden and graded topsoil overlying mine spoils. It is well adapted to loamy and clayey spoils with a pH of 5.5 to 8.0[1050 | Other Uses: The leaves of most species in this genus are more or less rich in tannins. A mulch of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and this inhibit plant growth[20, K]. The bark is a rich source of tannin[171, 226]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff[4]. A brown dve is obtained from the bark or from the galls, it does not require a mordant[226]. Yellow, chrome and gold can also be obtained if mordants are used[226]. The wood is strong, very heavy, hard, tough, strong, close grained, durable[46, 82, 171, 213, 227]. It weighs about 46lb per cubic foot[227]. When properly dried treated, the wood glues well, machines very well and accepts a variety of finishes One of the most important timbers in N. America, it is used for cabinet making, furniture, panelling, flooring, construction, mine props, agricultural tools etc[46] 82, 171, 213, 1050]. It is highly valued for making the staves of barrels for storing wine and liquor[274, 338]. The wood is a good fuel giving off a lot of heat[46, 1050]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiseptic Astringent Dysentery TonicWhite oak was often used medicinally by several native North American Indian tribes, who valued it especially for its antiseptic and astringent properties and used it in the treatment of many complaints[257]. It is little, if at all, used in modern herbalism. The inner bark contains 6 - 11% tannin, it has powerful antiseptic and astringent properties and is also expectorant and tonic[61, 102, 213, 257]. The bark is boiled and the liquid drunk in the treatment of bleeding piles and diarrhoea, intermittent fevers, coughs and colds, consumption, asthma, lost voice etc[213, 257]. The bark has been chewed as a treatment for mouth sores[257]. Externally, it is used as a wash for skin eruptions, burns, rashes, bruises, ulcers etc and as a vaginal douche[222, 257]. It has also been used as a wash for muscular pains[257]. The bark is best collected in the spring[213]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages. chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Maine to Florida, west to Texas and Minnesota. ksacta Dry woods[43], gravelly ridges, sandy plains, rich uplands and moist bottoms[82]. The best specimens are found in deep rich well-drained loamy soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. The white oak prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage over the winter[200]. There are, however, a number of trees 20 metres tall in Britain, mainly in the south-east of the country[11]. Sometimes cultivated for its edible seed, there are some named varieties[183]. Trees take about 30 years before they start to bear good crops of seed, they then have heavy crops about every 3 years with light crops in the other years[227]. They continue to yield commercial crops for about 120 years[227]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young, though they may require protection for the first winter or two[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 4.2.74 Betula nigra

wis hpa7tmwatli hjonli

River Birch, Black Birch, Red Birch, Water Birch, River Birch 3 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

drutta Betula nigra is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in March, and the seeds ripen in June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The aromatic and aliphatic hydrocarbons in birch tar are irritating to the skin. Do not use in patients with oedema or with poor kidney or heart functions [301]

kcakta Edible Parts: SapEdible Uses: SweetenerSap - raw or cooked[2]. A sweet flavour[177]. Harvested in early spring, before the leaves unfurl. The trunk is tapped by drilling a hole about 6mm wide and about 4cm deep. The sap flows best on warm sunny days following a hard frost. It makes a refreshing drink[55, 95] and can also be concentrated into a syrup or sugar[183]. The sap can be fermented to make birch beer or vinegar[183]. An old English recipe for the beer is as follows: "To every Gallon of Birch-water put a guart of Honey, well stirr'd together; then boil it almost

propta Seed - it quickly loses viability if it is allowed to out. It can be stored moist and cool overwinter but is best in as soon as it is ripe in an outdoor seed bed, though it to be protected from mice, squirrels etc. Small quantities it work...and when the Test begins to settle, bottle it up.

. . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269].

tcanta Besom Soil stabilization WoodYoung branches are used to make besoms, whisks etc[6]. This species has an extensive root system and is sometimes planted for erosion control along the banks of streams[227]. Wood - light, strong, close grained and hard, but it contains many knots because of the numerous branches along the trunk. It weighs 36lb per cubic foot. Of little use commercially, though it is sometimes used for furniture, turnery etc[46, 61, 82, 227, 220]

dwatta Antiseborrheic Diuretic Dysentery Salve Stomackic UrinaryA salve was made by boiling the buds until they were thick and pasty, sulphur was added and this was then applied externally to skin sores and ringworm[213]. The leaves have been chewed, or used as an infusion, in the treatment of dysentery[257]. An infusion of the bark has been used to treat stomach problems, 'milky' urine and difficult urination with discharge[257]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Betula species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E)

nrakta Eastern N. America - New Hampshire to Florida. ksacta Banks of streams, by swamps etc, in deep rich soil that is often inundated for weeks at a time[43].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position[78, 80, 134]. Spring sown seed should be surface sown in a sunny position in a cold frame[113, 134]. If the germination is poor, raising the temperature by covering the seed with glass can help[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it can be sown in an outdoor seedbed, either as soon as it is ripe or in the early spring - do not cover the spring sown seed. Grow the plants on in the seedbed for 2 years before planting them out into their permanent positions in the winter[78, 80, 113, 134]

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Woodland garden. Succeeds in a well-drained loamy soil in a sheltered position11, 43, 200]. Grows well in heavy clay soils. Likes its roots within reach of water[11]. Dislikes wet soils according to another report[200]. Shade tolerant[200]. Hybridizes freely with other members of this genus[50]. A good plant to grow near the compost heap, aiding the fermentation process[20]. Trees are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Attracts butterflies, Inconspicuous flowers or blooms.

#### 4.2.75 Vitis aestivalis

Summer Grape, Long grape 3 tlin 7 cyuc 3 koak 0 tcan 1 dwat 20 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutia Vitis aestivalis is a deciduous Climber growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves SapEdible Uses: Fruit -raw, cooked in jellies, jams, pies etc or dried for later use[1, 2, 22, 46, 183]. Agreeably flavoured[11, 200]. The taste is best after a frost[101]. The dried fruits are eaten as snacks or used in baked goods[183]. The fruit is about 8mm in diameter[200] and is produced in fairly large bunches[235].

ground in the spring, peeled and eaten raw or cooked like asparagus[85, 101, 161, 183]. The leaves and twigs are used as a tea substitute[161, 183].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

dwatta Antiemetic Astringent Birthing aid Cardiac Decongestant Oxytoxic Refrigerant StimulantAntiemetic[13, 165]. The leaves and roots are anti-inflammatory, astringent, decongestant, ophthalmic, oxytocic and stimulant[4, 13, 165, 222, 254]. A tea made from them is used in the treatment of diarrhoea, as a tonic for the uterus to strengthen pregnant women, and as an aid in childbirth[4, 222, 257]. The tea has also been shown as effective in relieving painful menstrual cramps[222]. The active ingredients both stimulate and relax the uterus[222]. They can be used during the last three months of pregnancy and during childbirth, but should not be used earlier[238]. Externally, the leaves and roots are used as a gargle to treat tonsillitis and mouth inflammations, as a poultice and wash to treat sores, conjunctivitis, minor wounds, burns and varicose ulcers[238, 257]. The leaves are harvested in the summer and dried for later use[9]. The fruit is antiscorbutic and diuretic[7]. Fresh raspberry juice, mixed with a little honey, makes an excellent refrigerant beverage to be taken in the heat of a fever[21]. Made into a syrup, it is said to have a beneficial effect on the heart[21].

nrakta N. America - Newfoundland to British Columbia, south to New Mexico. ksacta Thickets, clearings and woodland borders[204]. In dry or rocky situations[235].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. A parent of some of the cultivated raspberries[11, 34], it is often used in modern breeding programmes[119]. This species has biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 4.2.99 Rubus parviflorus

Thimbleberry 3 tlin 7 cyuc 3 kcak 3 tcan 3 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rubus parviflorus is a deciduous Shrub growing to 2.5 m (8ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Fruit StemEdible Uses: Fruit - raw or cooked[62, 101, 118, 183]. It makes excellent jams and preserves[257]. The fruit can also be dried for later use[183]. A sweet and pleasant flavour[2, 85, 94] though this is not always properly developed in the cooler summers of Britain[11]. The fruit is very seedy[155]. Rich in vitamin C[183]. The hemispherical fruit is about 20mm in diameter[200]. Young shoots - peeled and eaten cooked or raw[2, 85, 101, 118, 172]. The shoots are harvested as they emerge in the spring, and whilst they are still young and tender[161, 183]. They can be cooked like asparagus[257]. The shoots are rich in vitamin C[183]. Flowers - raw[172].

tcanta Dye Lining SoapThe leaves are used to line baskets etc for carrying soft fruit or other delicate items[99, 118]. Plants are very vigorous and can be grown as a tall ground cover for large areas[208]. A soap is obtained from the boiled bark[99, 118, 257]. A purple to dull blue dye is obtained from the fruit[168].

dwatta Antiemetic Antiphlogistic Appetizer Astringent Blood tonic Dysentery Poultice Salve Stomachic Tonic Vitamin C Women's complaintsThe leaves are antiemetic, astringent, blood tonic and stomachic[172, 257]. An infusion is used internally in the treatment of stomach complaints, diarrhoea and dysentery, anaemia, the spitting up of blood and to treat vomiting[238, 257]. An infusion has been taken by women when their periods are unusually long[257]. A poultice of the dried powdered leaves has been used to treat. wounds and burns[257]. The leaves have been crushed and rubbed over the skin to treat pimples and blackheads[257]. A poultice of the leaf ashes, mixed with oil, has been used to treat swellings[257]. The young shoots are alterative and antiscorbutic[257]. The roots are appetizer, astringent, stomachic and tonic[172, 257]. An infusion has been used by thin people to help them gain weight[257]. An infusion has also been used in the treatment of stomach disorders, diarrhoea and dysentery[238, 257]. A decoction of the roots has been taken in the treatment of pimples and blackheads[257].

nrakta Western N. America - Alaska to Ontario and California. Occasionally naturalized in Britain[17]. ksacta Woodlands, canyons and open areas[62].

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month at 3°c if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Can be grown in a woodland garden though it is less likely to fruit well in such a position[K]. This plant has perennial stems without prickles[200] and is less invasive than the related R. odoratus[182]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.100 Vaccinium ovatum

Evergreen Huckleberry, Florist's Huckleberry, Shot Huckleberry, Californian Huckleberry

3 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 2.5 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium ovatum is an evergreen Shrub growing to 2.5 m (8ft 2in) at a slow rate. It is if rost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw, cooked or dried for later use[3, 101, 105, 118, 183, 257]. Somewhat sweet but slightly dry[183, 256]. The fruit is quite palatable but is nothing special[K]. A strong flavour, they are usually cooked in pies, preserves etc[177, 183]. The fruit will often hang on the bush until early winter[256]. The fruit is about 6mm in diameter[200]. A tea is made from the leaves and dried fruit[101].

dwatta Antiseptic Astringent Birthing aid Carminative HypoglycaemicThe leaves are antiseptic, astringent, carminative and hypoglycaemic[172]. An infusion of the leaves and sugar have been given to a mother after childbirth to help her regain her strength[257]. A decoction of the leaves has been used in the treatment of diabetes[257].

spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in a shady position[11]. Requires a moist acid soil and woodland conditions but without competition from other plants[11, 184, 200]. Another report says that it requires an exposed position[3]. Dislikes alkaline soils[184]. Best if given shade from the early morning sun in spring[200]. A very hardy plant, tolerating temperatures down to about -30°c[184]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Plants are often self-layering in the wild and form thickets[184]. This species is closely related to V. furcatum[184].

# 4.2.97 Berberis vulgaris

European Barberry, Common barberry 3 tlin 7 cyuc 3 kcak 4 tcan 3 dwat 3 m kuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis vulgaris is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf from March to November, in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

pcista Bark in doses of 4 mg or more; stupor, nosebleeds, vomiting, diarrhoea and kidney irritation. Contraindicated during pregnancy as abortion risk[301].

kcakta Edible Parts: Fruit LeavesEdible Uses: Condiment TeaFruit - raw or cooked[2, 3, 5, 7, 9, 11, 95, 183]. Rich in vitamin C[268], the fruit has a very acid flavour and is mainly used in preserves[100], though children and some adults seem to like it raw when it is fully ripe[K]. A refreshing lemon-like drink can be made from the fruit[183]. The fruits are about 10mm long[200]. Young leaves - used as a flavouring or as an acid nibble[177, 183]. They can be used in much the same way as sorrel (Rumex acetosa)[9]. The dried young leaves and shoot tips make a refreshing tea[9, 183].

tcanta Beads Dye Fuel Hedge Hedge WoodPlants can be grown as a medium-size hedge in exposed positions but they cannot tolerate extreme maritime exposure[75]. They are very tolerant of trimming but can also be left untrimmed if required[K]. A good quality yellow dye is obtained from the roots, bark and stem[4, 13, 46, 100, 244]. As well as being used on cloth, it is also used to stain wood[244]. The unripe fruit is dried and used as beads[106]. Wood - soft, very hard, fine grained, yellow. Used for carving, toothpicks, mosaics etc[13, 46, 61]. It is also used as a fuel[146].

dwatta Antibacterial Antidiarrhoeal Antipruritic Antirheumatic Antiseptic Antispasmodic Appetizer Astringent Cancer Cholagogue Diaphoretic Diuretic Dysentery Expectorant Hepatic Homeopathy Laxative Malaria Ophthalmic Purgative Refrigerant Stomachic TB Tonic Vitamin CBarberries have long been used as a herbal remedy for the treatment of a variety of complaints. All parts of the plant can be used though the yellow root bark is the most concentrated source of active ingredients. The plant is mainly used nowadays as a tonic to the gallbladder to improve the flow of bile and ameliorate conditions such as gallbladder pain, gallstones and jaundice[254]. The bark and root bark are antiseptic, astringent, cholagogue, hepatic, purgative, refrigerant, stomachic and tonic[4, 7, 9, 21, 46, 165, 222]. The bark is harvested in the summer and can be dried for storing[4]. It is especially useful in cases of jaundice, general debility and biliousness[4], but should be used with caution[165]. The flowers and the stem bark are antirheumatic[218]. The roots are astringent and antiseptic[222]. They have been pulverized in a little water and used to treat mouth ulcers[213]. A tea of the roots and stems has been used to treat stomach ulcers[213]. The root bark has also been used as a purgative and treatment for diarrhoea[213] and is diaphoretic[222]. A

tincture of the root bark has been used in the treatment of rheumatism, sciatica etc[222]. The root bark is a rich source of the alkaloid berberine -about 6%[240]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218] and is also effective in the treatment of hypersensitive eyes, inflamed lids and conjunctivitis[244]. A tea made from the fruits is antipruritic, antiseptic, appetizer, astringent, diuretic, expectorant and laxative[7, 222]. It is also used as a febrifuge[213]. The fruit, or freshly pressed juice, is used in the treatment of liver and gall bladder problems, kidney stones, menstrual pains etc[9]. The leaves are astringent and antiscorbutic[7]. A tea made from the leaves is used in the treatment of coughs[222]. The plant (probably the inner bark) is used by homeopaths as a valuable remedy for kidney and liver insufficiency[244]. Other uses include malaria, and opium and morphine withdrawal[301].

nrakta Barberry Coast. Naturalized, or possibly native, in Britain[17]. ksacta Light deciduous woodland, hedges, roadsides, clearings etc., preferring a sunny position and a chalky soil[9, 268].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Germination averages out at about 90%[98, 113]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[3, 200].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Prefers a light rich rather dry soil according to another report[37]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11. 200] but requires a moist soil when grown in the shade of trees[14]. Hardy to about -35°c[184]. A very ornamental plant[11], the barberry was at one time cultivated for its edible fruit, there are several named varieties[11, 200]. 'Dulcis' the fruit of which is sweet or slightly sour[200]. 'Asperma' is a seedless form that was often used in France to make a jam[182, 183]. An alternate host of 'black-stem rust' of wheat so it has been extensively grubbed up from its habitats[3, 11, 13, 74]. Hybridizes freely with other members of this genus[1], though it usually breeds fairly true to type[80]. Can be pruned back quite severely, it resprouts well from the base[200].

# 4.2.98 Rubus strigosus

American Red Raspberry, Grayleaf red raspberry 3 tlin 7 cyuc 3 koak 1 tcan 3 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rubus strigosus is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit StemEdible Uses: TeaFruit - raw or cooked in pies, preserves etc[1, 2, 3, 34, 85, 101, 183]. Young shoots - harvested as they emerge through the

Leaves - cooked[55, 159]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. A sweet watery sap is obtained from the stem[101, 183]. Used as a refreshing drink. Young tendrils - raw or cooked[55, 85, 150]

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

dwatta Diuretic Febrifuge Hepatic Poultice Stomachic UrinaryThe leaves are hepatic[257]. They have been used in the treatment of the liver[257]. The wilted leaves have been applied as a poultice to the breasts to draw away soreness after the birth of a child[257. A decoction of the leaves and stems has been taken in the treatment of stomach aches, fevers and headaches[257]. An infusion of the bark has been used to treat urinary complaints[257].

nrakta Southern and Eastern N. America - Ontario to Alabama. Locally naturalized in Europe[50]. ksacta Dry woods and thickets[43]. Stream bottom woods, usually on sandy soils, in Texas[274].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. They grow particularly well up elm trees[18]. The flowers are sweetly scented with the aroma of mignonette[245]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This species is a parent of some cultivars that are grown for their edible fruits in N. America[1, 61]. Resistant to Phylloxera disease, a disease that almost destroyed the European grape crops[61]. This species can be used as a rootstock in areas where the disease is prevalent and can also be used in breeding programmes with V. vinifera in order to impart resistance to that species[183]. Plants in this genus are notably susceptible to honey funmis[200]

#### 4.2.76 Celtis occidentalis

Hackberry, Common hackberry 3 tlin 9 cyuc 3 kcak 2 tcan 1 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Celtis occidentalis is a deciduous Tree growing to 20 m (65ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit raw[2, 3, 55, 149]. Very sweet and pleasant tasting, they can be eaten out of hand or can be used for making jellies, preserves etc[183]. The fruit is often produced abundantly in Britain, it is about the size of a blackcurrant, but there is very little flesh surrounding a large seed and it is therefore a very fiddly crop[K]. The fruit is dark orange to purple- or blue-black when fully ripe, usually about 7-11mm in diameter, though occasionally up to 20mm[270]. The flesh is dry and mealy but with a pleasant sweet taste[K]. Seed[57]. No

more details. The fruit and seed can be ground up finely together and used as a flavouring[161, 183]. The N. American Indians ate them with parched corn[183].

tcanta Dye Fuel Miscellany Shelterbelt WoodA dye is obtained from the roots[61]. No more details are given. Fairly wind-tolerant, it can be planted as part of a shelterbelt[200]. Wood - rather soft, weak, coarse-grained, heavy. It weighs 45lb per cubic foot and is sometimes used commercially for cheap furniture, veneer, fencing fuel etc[46, 61, 82, 171, 227]

dwatta Miscellany VDAn extract obtained from the wood has been used in the treatment of jaundice[226]. A decoction of the bark has been used in the treatment of sore throats[257]. When combined with powdered shells it has been used to treat VD[257].

nrakta Eastern N. America - Quebec to Manitoba, North Carolina, Missouri and Oklahoma. ksacta Dry to moist and rich woods, river banks, rocky barrens etc[43]. Frequently found on limestone soils[229].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cuttings

nwatta Landscape Uses:Firewood, Aggressive surface roots possible, Street tree, Woodland garden. Succeeds in any reasonably good soil, preferring a good fertile welldrained loamy soil[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Tolerates alkaline soils[160]. Established plants are very drought resistant[149, 160, 200]. Wind resistant[160]. Trees transplant easily[226]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. Plants in the wild are very variable in size, ranging from small shrubs to large trees[43] They are fast-growing[98, 229], and can be very long-lived, perhaps to 1000 years[200]. Only to 200 years according to another report[229]. They usually produce good crops of fruit annually[229]. Trees respond well to coppicing, readily sending up suckers after cutting or the top being killed off in a fire[226]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Naturalizing, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

#### 4.2.77 Ouercus x bebbiana

3 tlin 7 cyuc 3 kcak 0 tcan 2 dwat 15 m hkuc hmimhtut cyutli hgatkyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus x bebbiana is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are

either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[183]. The large seeds are sweet and can be eaten out of hand[183]. The seed can be ground into a powder and used in making bread, dumplings etc and as a thickener in soups[183]. If the seed is bitter then this is due to the presence of tannins, these can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffees substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, heavy, strong, tough, very durable, close grained.

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta A hybrid of garden origin. ksacta Not known in the wild.

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly. This species is a hybrid and may not breed true from seed[K].

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Succeeds in a hot dry position. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A vigorous, fast-growing hybrid species, some forms are capable of reaching 1.5 metres tall in 2 years[183].]. Established plants are drought resistant[229] and tolerant of atmospheric pollution[226]. This species is occasionally cultivated for its edible seed, there are some named varieties[183]. It is a hybrid of garden origin, Q. alba x Q. macrocarpa[183]. Both of its parents prefer warmer summers than are usually experienced in Britain. often growing poorly in this country and failing to properly ripen their wood, resulting in frost damage overwinter[11, 200]. The tree flowers on new growth produced in spring, the seed ripening in its first year [200, 229]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 4.2.78 Betula alleghaniensis

Yellow Birch, Swamp Birch 3 tlin 7 cyuc 3 koak 4 toan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Betula alleghaniensis is a deciduous Tree growing to 12 m (39th) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in April, and the seeds ripen in October. The species is monocious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable Ph. mildly acid, neutral and basic (mildly

alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: Inner bark SapEdible Uses: Condiment Sweetener TeaInner bark - cooked or dried and ground into a powder and used with cereals in making bread[62]. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[K]. Sap - raw or cooked. A sweet flavour[62, 102, 161, 1771. The sap is harvested in early spring, before the leaves unfurl, by tapping the trunk. It flows abundantly, but the sugar content is much lower than maple sap[226]. A pleasant drink, it can also be concentrated into a syrup or fermented into a beer[183, 226]. An old English recipe for the beer is as follows:- "To every Gallon of Birch-water put a guart of Honey, well stirr'd together: then boil it almost an hour with a few Cloves, and a little Limon-peel, keeping it well scumm'd. When it is sufficiently boil'd, and become cold, add to it three or four Spoonfuls of good Ale to make it work...and when the Test begins to settle, bottle it up . . . it is gentle, and very harmless in operation within the body, and exceedingly sharpens the Appetite, being drunk ante pastum."[269]. A tea is made from the twigs and leaves[62, 177]. The dried leaves are used according to another report[183]. An excellent flavour[226]. The twigs and leaves have the flavour of wintergreen and can be used as condiments[183].

tcanta Containers Fuel Waterproofing WoodThe bark is waterproof and has been used by native peoples as the outer skin of canoes, as roofing material on dwellings and to make containers such as buckets, baskets and dishes[257]. Wood - close-grained, very strong, hard, heavy. The wood is too dense to float[226]. An important source of hardwood lumber, it is used for furniture, boxes, tubs of wheels, floors etc[46, 61, 82, 171, 229]. It is also often used as a fuel[46, 61]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiseborrheic Cathartic EmeticYellow birch is little used medicinally, though a decoction of the bark has been used by the native North American Indians as a blood purifier, acting to cleanse the body by its emetic and cathartic properties[257]. The bark is a source of 'Oil of Wintergreen' [226]. This does have medicinal properties, though it is mainly used as a flavouring in medicines[226].

nrakta North-eastern N. America - Newfoundland to Virginia and Tennessee. ksacta Usually found in moist welldrained soils in rich woodlands on lower slopes, it is also found in cool marshlands in the south of its range

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position[78, 80, 134]. Spring sown seed should be surface sown in a sunny position in a cold frame[113, 134]. If the germination is poor, raising the temperature by covering the seed with glass can help[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it can be sown in an outdoor seedbed, either as soon as it is ripe or in the early spring - do not cover the spring sown seed. Grow the plants on in the seedbed for 2 years before planting them out into their permanent positions in the winter[78, 80, 113, 134].

nwatta Landscape Uses: Specimen, Woodland garden, Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. A slow-growing tree, it is relatively long-lived for a birch, with specimens 200 years old recorded[229]. Plants often grow taller than the 12 metres mentioned above[229]. The trees are highly susceptible to forest fires, even when wet the bark is highly inflammable[226]. The bruised foliage has a strong smell of wintergreen[200]. Hybridizes freely with other members of this genus[50]. Trees are notably susceptible to honey fungus[200]. Special Features: Attracts birds. North American native. Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperahtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus pumila is an evergreen Shrub growing to 3 m (9ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 1. It is in leaf all year, and the seeds ripen in September. The species is monocious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerated drought. The plant can tolerates strong winds but not maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: SeedEdible Uses: CondimentSeedrew or cooked[81, 105, 177]. Rich in oil, it has a slightly resinous flavour and a pleasant soft texture[K]. A reasonable size, the seed is up to 10mm x 7mm[200]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Charcoal Dye HerbicideA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 641. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. The wood is a source of charcoal[46].

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta N.E. Asia - China, Japan, Korea, Mongolia and Siberia. ksacta Often forms extensive thickets in exposed situations or above the tree line[11]. Mountains at elevations of 1000 - 2300 metres in northern China[266].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81]

nwatta Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Very wind resistant[11]. An exceedingly cold-hardy tree, tolerating temperatures down to about -70°c[200]. This species is closely re-

lated to P. cembra[1]. Plants are strongly outbreeding, selffertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. The cones do not open on the tree, the seed is extracted by breaking up the soft scales of the cone[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat. Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. An evergreen. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

#### 4.2.96 Viburnum lantanoides

Hobbleber

3 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli dvatxre7t hionli

drutta Viburnum lantanoides is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 62, 65]. Sweet and palatable, tasting somewhat like raisins or dates[101, 105, 183]. The fruits have a large seed and a thin flesh[183]. The taste is best after a frost[62, 65]. The ovoid fruit is about 15mm long and contains a single large seed[200].

dwatta Analgesic Blood purifier InfertilityThe leaves are analgesic[257]. They have been mashed and applied to the head as a poultie to ease a migraine[257]. A decoction of the roots has been used as a blood medicine[257]. The decoction has been used as a fertility aid by women[257].

nrakta Eastern N. America - New Brunswick to North Carolina, Ontario, Tennessee and Michigan. ksacta Moist woods and shady ravines[43, 62].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113] Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the

be chewed to treat a coated tongue[257]. An infusion of the root has been used as a wash for sore eyes[257]. The leaves are astringent[257]. An infusion can be used in the treatment of diarrhoea[257]. An infusion of the bark has been used in the treatment of urinary problems[257]. A decoction of the stems has been used as a diuretic[257].

nrakta Eastern N. America - Nova Scotia to Ontario, New York, Virginia and North Carolina. ksacta Dry thickets, clearings and woodland margins[43].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about  $3^\circ c$  and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a rame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[11, 200]. Plants have biennial stems, they produce a number of new stems from the perennial rootstock each year, these stems fruit in their second year and then die[200]. Often cultivated for its edible fruits in America, it is the parent of many named varieties. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 4.2.93 Berberis georgii

Barberry

3 tlin 7 cyuc 3 kcak 1 tcan 2 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis georgii is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. A very acid lemon-like flavour, it is nice in small quantities raw. When cooked it can be used in pies, preserves etc[K]. A very good size for a barberry, the fruit is up to  $10\,\mathrm{mm}$  long and  $4\,\mathrm{mm}$  wide[K]. A refreshing lemon-like drink can be made from the fruit.

tcanta DyeA yellow dye is obtained from the roots, bark and stem. \\

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A hybrid of uncertain parentage. ksacta Not known in a truly wild condition.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it

can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Plants are hardy to about -35°c. This species is a hybrid of unknown origin, probably involving B. vulgaris[11]. It is an exceptionally free-fruiting form[184] and is of interest in breeding programmes[K]. This species is probably an alternate host of black-stem rust of wheat. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

#### 4.2.94 Vaccinium ovalifolium

Black Huckleberry, Oval-leaf blueberry
3 tlin 7 cyuc 3 koak 0 tcan 1 dwat 3 m hkuc
hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat
hpa7tmwatli xre7t hionli

drutta Vaccinium ovalifolium is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 118, 161, 172, 257]. Mildly acidic[11, 200]. A pleasant sweet flavour[212]. The fruit is a reasonable source of vitamin C[257]. The fruit can also be dried for later use[183] when they have a flavour like raisins[256]. The fruit is about 10mm in diameter[2001].

dwatta Antiseptic Astringent Birthing aid Carminative Hypoglycaemic Vitamin CAntiseptic, astringent, carminative, hypoglycaemic[172]. An infusion of the leaves and sugar have been given to a mother after childbirth[257].

nrakta Northern N. America - Quebec to Michigan, Oregon and Alaska. ksacta Thickets, open woods and peaty slopes[43].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free sol, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. The fruit is borne singly rather than in clusters[183]. This species is closely related to V. parvifolium[182]. Plants in this genus are notably resistant to honey fungus[200].

### 4.2.95 Pinus pumila

Dwarf Siberian Pine 3 tlin 7 cyuc 3 kcak 3 tcan 2 dwat 3 m hkuc ture, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

# 4.2.79 Malus tschonoskii

Pillar apple, Crabapple 3 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis haa7tmwatli xre7t hionli

drutta Malus tschonoskii is a deciduous Tree growing to 12 m (39ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A gritty texture[1]. A reasonable size, about 2 - 3cm in diameter[200], but the fruit is not freely produced[11, 200]. A tree at Kew is fruiting well, producing fruits about 30mm in diameter and these fruits can hang on the tree all winter[K]. Even when harvested in February the fruits were quite firm, slightly juicy with a strong acid flavour rather like a lemon[K].

nrakta E. Asia - Japan. ksacta Woods in C. Japan[58,

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out he seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta Landscape Uses:Border, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. This tree is well suited to planting in public-access areas[200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

#### 4.2.80 Prunus americana lanata

3 tlin 7 cyuc 3 kcak 2 tcan 1 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus americana lanata is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[159]. Used mainly in jellies[177]. The fruit is about 25mm in diameter, it has a thick succulent flesh and contains one large seed[82, 200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - heavy, hard, close-grained, strong[82]. The tree is too small for the wood to be of commercial value[229].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Central and Southern N. America - Indiana to Illinois, south to Texas. ksacta Hillsides and river bottom lands[82].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil, doing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.81 Juniperus scopulorum

Rocky Mountain Juniper, Weeping Rocky Mountian Juniper, Colorado Red Cedar

3 tlin 7 cyuc 3 kcak 4 tcan 2 dwat 10 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus scopulorum is an evergreen Tree growing to 10 m (32ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from April to May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if

seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Coffee Condiment TeaFruit - raw or cooked[105, 161, 183]. Sweet and fleshy, but strongly flavoured[85, 229]. Resinous[227]. Often used as a flavouring, imparting a sage-like taste, for which purpose it is usually dried and ground into a powder[85, 183]. The fruit can also be dried and ground into a meal for making mush and cakes[183]. The fruits are about 5 - 8mm in diameter[200, 227]. The roasted fruit is a coffee substitute[183]. A tea is made from the fruits and young shoots[183].

tcanta Beads Disinfectant Incense Parasiticide Repellent Shelterbelt Tinder Wax WoodA fragrant wax on the fruits can be obtained by boiling the fruit and skimming off the wax as it floats to the surface. It is used to make aromatic candles but is only present in small quantities[85]. The boughs are used as an incense to fumigate houses and to drive off smells. The wood can be burnt or just hung in the room, or it can be boiled up in water and the water used to wash the walls, floor etc[99]. The bark is employed as a tinder and is also made into a slow match[216]. The dried seeds have been used as beads or as the 'rattle' in rattles[99, 216]. The fruits and the leaves are used as an insect repellent [169]. A strong infusion of the cones is used to kill ticks[99]. Plants can be grown as a ground cover, the cultivar 'Repens' is especially suitable[208]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. In N. America it is used to some extent in re-afforestation and shelterbelt plantings on the prairies[227]. Wood - extremely tough, aromatic, close grained, light, fairly strong in endwise compression but moderately weak in bending, hard, durable in the soil. Used for interior finishes, bows, hoops, hafts, wheels etc[99, 149,

dwatta Antidandruff Appetizer Diaphoretic Disinfectant Diuretic Haemostatic Kidney Laxative Parasiticide Poultice Sedative Stomachic Tonic VDRocky Mountain juniper was widely employed medicinally by many native North American Indian tribes who used it in particular to treat problems connected with the chest and kidneys[257]. It is little, if at all, used in modern herbalism. A tea made from the terminal shoots has been used in the treatment of VD by some N. American Indian tribes[213]. The treatment has to be taken over a long period of time[257]. The fruits are appetizer, diuretic and stomachic[257]. An infusion has been used in the treatment of stomach, kidney and bladder problems[213, 257]. An infusion of the twigs has been used in the treatment of fevers, pneumonia, coughs and colds[257]. A poultice of the mashed and dampened branches has been applied to skin sores[257]. The leaves are diaphoretic, disinfectant, febrifuge, haemostatic, laxative, sedative and tonic[99, 216, 2571. A decoction has been used in the treatment of internal bleeding, constipation and constant coughing[257]. The leaves have been boiled, then mixed with turpentine and used as an external treatment on rheumatic joints[257]. The leaves have been rubbed into the hair in order to treat dandruff[213, 257].

nrakta Western N. America - British Columbia to Mexico and California. ksacta Scattered singly on dry rocky ridges, foothills and bluffs[82, 85] in montane areas or in dry habitats of the coastal forest region[226]. The best specimens are found on slightly alkaline soils[229].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 811. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses: Alpine garden, Border, Screen. Specimen, Street tree, Succeeds in most soils, including chalk[200], so long as they are well drained, preferring a neutral or slightly alkaline soil[1, 11]. A drought tolerant species once established, succeeding in hot dry positions[200]. Plants are fairly wind-resistant[200]. A long-lived but slow-growing tree in its native range[227], it is very slow growing in Britain where it only makes a shrub[185]. Closely allied to J. virginiana[1, 81] and hybridising with it where the ranges meet[226]. It differs mainly in the fruit, which takes two years to mature in this species instead of one[226]. Plants are resistant to honey fungus[88]. This tree is apparently resistant to the rust fungus that attacks the closely related J. virginiana[149]. Dioecious. Male and female plants must be grown if seed is required. Special Features: North American native, Fragrant foliage, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

#### 4.2.82 Prunus cerasus caproniana

Kentish Red Cherry

3 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Prunus cerasus caproniana is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Gum Gum Oil Oil TeaFruit - raw or cooked[1, 2, 5, 11, 12], Neither bitter nor sweet, the fruit is pleasantly acid and can be eaten out of hand, used in pies, preserves etc or dried for later use[183]. The juice is colourless[11]. The fruit is about 18mm in diameter and contains one large seed[200]. Seed raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible oil is obtained from the seed[46, 61]. When refined it is used as a salad oil[183]. The leaves are used as a tea substitute[46, 61, 183]. A gum obtained from the trunk is used for chewing[61, 64].

tcanta Adhesive Dye Gum Gum Hedge Hedge Oil Oil WoodAn edible drying oil obtained from the seed is also used in cosmetics[61]. The gum obtained from the stem is also used as an adhesive[61, 64]. Plants can be grown as a hedge[50], succeeding in fairly exposed positions[K], A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S.E. Europe to W. Asia. ksacta Not known in the

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate [80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11, 200]. Grows well in heavy clay soils. Prefers a circumneutral soil and a sunny position with its roots in the shade[11, 200]. When grown in deep shade it usually fails to flower and fruit[186]. Succeeds in wet soils but dislikes water-logged soils or very dry sites[186]. Tolerates maritime exposure[186]. The fruit attracts many species of birds, several gall wasps and other insects use the plant as a host[186] A very polymorphic species, it is divided into a great number of closely related species by some botanists[1, 17]. The leaves, when bruised, have a delicious fragrance[245]. The flowers are also fragrant. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.91 x Sorbaronia hybrid

Aronia x mountain ash

3 tlin 8 cvuc 3 kcak 2 tcan 0 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli prik hpa7tmwatli

drutta x Sorbaronia hybrid is a deciduous Tree growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista None Known

kcakta Edible Fruit. Fruit - cooked. A good flavour but very astringent[183]. The fruit should be fully ripe before being eaten and is best after a frost or two. It makes a good jelly when sugar is added and is also dried and used for making pemmican[183]. The fruit is rich in pectin and can be added to fruits that are low in this substance when making jams etc[183]. Pectin is also said to protect the body against radiation[201]. The fruit is upto 12mm in diameter depending on the hybrid

tcanta The fruit is a source of pectin[183], a substance that is used to thicken jams etc and as a culture medium in laboratories.

nrakta Hybrid ksacta A cultivated plant.

propta Seed - best sown as soon as it is ripe in pots outdoors or in a cold frame[113]. Pre-soak stored seed overnight and then cold stratify for 3 months at 2°c[113]. The seed germinates in 1 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring. Cuttings of half-ripe wood, July/August in a frame[113]. Division of suckers in the dormant season[200]. Very easy, they can be planted straight out into their permanent positions. Layering[200].

nwatta A group of some half a dozen hybrids between Aronia and Sorbus - all shrubs or small trees. Where the whitebeam is the Sorbus parent the leaves are simple (x S. alpina and x S. dippelii). The other cultivated hybrids have Sorbus aucuparia or S. americana as the other parent, and the leaves are partly pinnate. Species include x Sorbaronia alpina A deciduous shrub with red fruits, x Sorbaronia dippelii a bushy-headed shrub with fruits top-shaped or roundish, 9mm 1/3 in, long, blue-black in color, × Sorbaronia hybrida a laxly branched shrub or small tree with dark purple fruit, globular or broad-ellipsoid, about 12mm 3/8 in. wide, (treesandshrubsonline.org/articles/x-sorbaronia/), For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. Landscape Uses: Screen, Specimen. Prefers a moist peaty soil in full sun or partial shade[200]. Succeeds in most soils but dislikes shallow chalk[200]. Plants are hardy to about -25°c. Special Features: Attracts birds, Naturalizing, Wetlands plant, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2]. The cultivar Ivan's Beauty is a small spreading tree 2.5m 8ft tall with small, dark purple fruit, about 12mm 1/2inch in diameter with an intense tart-sweet flavour. Excellent for jams, wine, jelly or sauces. Very high in vitamin C. Can be stored under refrigeration until spring. It has striking, large glossary dark-green leaves and large clusters of pinkish flowers. Ideal for edible landscaping.

# 4.2.92 Rubus allegheniensis

Alleghany Blackberry, Graves' blackberry 3 tlin 7 cyuc 3 kcak 1 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Rubus allegheniensis is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit StemEdible Uses: Fruit - raw, cooked or dried for later use[34, 101, 161, 257]. A pleasant sweet and somewhat spicy flavour[3, 159, 171, 183]. The fruit is about 12mm in diameter[200] and can be 3cm long[235]. Young shoots - raw. They are harvested in the spring, peeled and used in salads[183].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

dwatta Antihaemorrhoidal Antirheumatic Astringent Diuretic Ophthalmic Stimulant TB Tonic UrinaryThe roots are antihaemorrhoidal, antirheumatic, astringent, stimulant and tonic[257]. An infusion can be used in the treatment of stomach complaints, diarrhoea, piles, coughs and colds, tuberculosis and rheumatism[257]. The infusion has also been used by women threatened with a miscarriage[257]. The root can

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not water-logged[11]. Grows well in heavy clay soils. Tolerates dry soils[200]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. This species is closely related to A. alnifolia[11]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

# 4.2.89 Malus pumila nervosa

Crab Apple

3 tlin 7 cyuc 3 kcak 2 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus pumila nervosa is a deciduous Tree growing to 5 m (16ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit can be up to 6cm in diameter[200]. Very astringent and quite harsh[K].

tcanta RootstockCan be used as a dwarfing rootstock for the cultivated apples.

nrakta Britain? ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood. November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Plants have been seen at Kew Gardens bearing huge crops of fruit[K]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.90 Rosa canina

on Rose

3 tlin 7 cyuc 3 kcak 4 tcan 3 dwat 3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rosa canina is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies), Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit SeedEdible Uses: Coffee TeaFruit - raw or cooked[2, 4, 13]. It can be used in making delicious jams, syrups etc[7]. The syrup is used as a nutritional supplement, especially for babies[238]. The fruit can also be dried and used as a tea[9, 12, 183]. Frost softens and sweetens the flesh[12]. The fruit is up to 30mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E[102], it can be ground and mixed with flour or added to other foods as a supplement. Be sure to remove the seed hairs[102]. The dried leaves are used as a tea substitute[46, 61, 183]. A coffee substitute according to another report[7]. Petals - raw or cooked[177]. The base of the petal may be bitter so is best removed[183]. Eaten as a vegetable in China[66]. The petals are also used to make an unusual scented iam[7]

tcanta Hedge HedgePlants make a dense and stockproof hedge, especially when trimmed[186].

dwatta Antirheumatic Astringent Bach Cancer Carminative Diuretic Laxative Ophthalmic Tonic Vermifuge Vitamin CThe petals, hips and galls are astringent, carminative, diuretic, laxative, ophthalmic and tonic[7, 9, 14, 21, 165]. The hips are taken internally in the treatment of colds, influenza, minor infectious diseases, scurvy, diarrhoea and gastritis[238]. A syrup made from the hips is used as a pleasant flavouring in medicines and is added to cough mixtures[238]. A distilled water made from the plant is slightly astringent and is used as a lotion for delicate skins[7]. The seeds have been used as a vermifuge[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Resignation' and 'Apathy' [209]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A. C and E. flavanoids and other bioactive compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. Ascorbic acid in Dog Rose shells (vitamin C, 0.2 to 2.4%).

nrakta Europe, including Britain, from Norway south and east to N. Africa and southwest Asia. ksacta Hedges, scrub, woods, roadsides, banks etc[9].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a

Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Prefers an acid soil according to another report[5]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Hardy to about -20°c[184]. This subspecies covers the cultivated bitter cherries known as Amarelle cherries this includes those forms grown in Britain as Kentish Red cherries[11]. They have been long cultivated for their edi-ble fruit and there are several named varieties[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants produce suckers freely[184]. Plants in this genus are notably susceptible to honey fungus[200].

# 4.2.83 Prunus cerasus austera

Morello Cherry

3 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Prunus cerasus austera is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Gum Gum Oil Oil TeaFruit -raw or cooked[1, 2, 5, 11, 12]. The fruit is neither bitter nor sweet, but is pleasantly acid[11] and it can be eaten out of hand, used in pies, preserves etc or dried for later use[183]. The fruit has a dark juice[11]. The fruit is about 18mm in diameter and contains one large seed[200]. Seed -raw or cooked. Do not eat the seed if it is too bitter see the notes above on toxicity. An edible oil is obtained from the seed[46, 61]. When refined it is used as a salad oil[183]. The leaves are used as a tea substitute[46, 61, 183]. A gum obtained from the trunk is used for chewing[61, 64].

tcanta Adhesive Dye Gum Gum Hedge Hedge Oil Oil WoodAn edible drying oil obtained from the seed is also used in cosmetics[61]. The gum obtained from the stem is also used as an adhesive[61, 64]. Plants can be grown as a hedge[50], succeeding in fairly exposed positions[K]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238]. nrakta S.E. Europe to W. Asia. ksacta Not known in the wild[11].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Prefers an acid soil according to another report[5]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants succeed when grown against a north-facing wall, the fruit ripens later in this position thus extending the season[11, K]. Hardy to about -20°c[184]. This subspecies covers the cultivated bitter cherries known as Morello cherries[11]. They have been long cultivated for their edible fruit and there are several named varieties[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants produce suckers freely[184]. Plants in this genus are notably susceptible to honey fungus[200].

# 4.2.84 Malus prunifolia rinkii

Chinese Apple

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus prunifolia rinkii is a deciduous Tree growing to 8 m (26ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. Bitter[200]. Not at all bitter, it makes quite pleasant eating[11]. Used fresh or in preserves etc[22, 46]. The fruit is about 3cm in diameter[200]. Young leaves - cooked[105, 177].

nrakta E. Asia - northern China. ksacta Not known in a truly wild state.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. Cultivated for its edible fruit in China, there are many named varieties[11, 22]. This species is a famous fruit tree in N and NE China[266]. Many cultivars have been bred during its long cultivation, the fruit of which differ in shape, color, size, and ripening period[266]. It is also used in apple breeding programmes for its frost resistance[74]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.85 Prunus americana

American Plum, American Wild Plum, Wild Plum 3 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prunus americana is a deciduous Tree growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw, cooked in pies etc or used in preserves[1, 2, 55, 62, 183]. The flesh is succulent and juicy, though it is rather acid with a tough skin[85, 159]. The best forms are pulpy and pleasant tasting[183, 227]. The fruit is best cooked[159], and it can also be dried for later use[85]. The fruit is about 25mm in diameter and contains one large seed[200]. Seed - raw or cooked[85, 183]. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Broom Disinfectant Dye Miscellany Rootstock Soil stabilization WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. A red dye can be obtained from the roots[257]. This species is widely used as a rootstock for cultivated plums in North America[160]. The tough, elastic twigs can be bound into bundles and used as brooms for sweeping the floor[257]. Trees often grow wild along streams, where their roots tend to prevent soil erosion[226]. Wood - heavy, hard, close-grained, strong[82]. It weighs 45lb per cubic foot[227]. Of no commercial value because the trunk is too small[227].

dwatta Antiasthmatic Astringent Disinfectant Diuretic Miscellany PoulticeA tea made from the scraped inner bark is used as a wash to treat various skin problems and as a mouth wash to treat sores[213]. A poultice of the inner bark is disinfectant and is used as a treatment on cuts and wounds[257]. The bark is astringent, diuretic and pectoral[257]. It has been used to make a cough syrup[257]. An infusion has been used in the treatment of diarrhoea, kidney and bladder complaints[257]. An infusion of the twigs has been used in the treatment of asthma[257]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocvanic acid (cvanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta N. America - New York to Florida, extending westwards as far as the Rocky Mountains. ksacta Rich soils

in mixed deciduous woodland, by streams, on the borders of swamps and in hedgerows[43, 62, 82].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame. Difficult, if not impossible. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Difficult, it not impossible. Suckers in late winter.

nwatta Landscape Uses:Border, Espalier, Pest tolerant. Specimen. Thrives in a well-drained moisture-retentive loamy soil, doing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Trees are probably hardy to as low as -50°c when fully dormant[160]. A fast-growing but short-lived tree in the wild[229], it is cultivated for its edible fruit in N. America, where there are many named varieties[1, 11, 46]. It flowers well in Britain but rarely fruits well here[11]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants often produce suckers at the roots and form thickets[227]. The branches are brittle[101]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native, Edible, All or parts of this plant are poisonous, Attracts butterflies, Blooms are very showy. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.86 Viburnum opulus

Guelder Rose, Cramp Bark, European cranberrybush, American cranberrybush, Crampbark, European Highb 3 tlin 8 cyuc 3 kcak 3 tcan 3 dwat 5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Viburnum opulus is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Large quantities of the fruit can cause vomiting and diarrhoea[10, 65]. The fruit is of very low or zero toxicity, it only causes mild upsets when eaten unripe or in large quantities[65, 76].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 5, 46]. The fruit is up to 8.5mm in diameter but with a large seed[200]. A sour taste, it is best cooked. The crushed fruit has an unpleasant smell[4]. Used as a cranberry substitute in making, jellies, preserves etc[183]. Some caution is advised, see notes on toxicity at top of the page.

tcanta Dye Hedge Hedge Ink WoodA red dye is obtained from the fruit[13]. An ink can be made from the dried berries[4]. Plants can be grown as a tall hedge[29], they are rather bare in winter though[K]. The wood can be used to make skewers[4].

dwatta Antispasmodic Astringent Birthing aid Homeopathy SedativeGuelder rose is a powerful antispasmodic and is much used in the treatment of asthma, cramps and other conditions such as colic or painful menstruation[254]. It is also used as a sedative remedy for nervous conditions[254]. The bark is antispasmodic, astringent and sedative[4, 9, 46, 165, 213]. The bark contains 'scopoletin', a coumarin that has a sedative affect on the uterus[238]. A tea is used internally to relieve all types of spasms, including menstrual cramps, spasms after childbirth and threatened miscarriage[9, 222, 238]. It is also used in the treatment of nervous complaints and debility[4, 46, 165, 213]. The bark is harvested in the autumn before the leaves change colour, or in the spring before the leaf buds open. It is dried for later use[238]. The leaves and fruits are antiscorbutic, emetic and laxative[4, 222]. A homeopathic remedy is made from the fresh bark[9]. It is used in the treatment of menstrual pain and spasms after childbirth[9].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, north and west Asia. ksacta Hedges, scrub and woodland, usually on damp soils[3, 13, 17].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich moist loamy soil in a sunny position[11]. Succeeds in semi-shade but does not grow or fruit so well in such a position[186]. Grows well in heavy clay soils and on chalk[184]. Does not do well on very acid soils. Best if given shade from the early morning sun in spring[200]. A very ornamental plant[1], it is hardy to about -30°c[184] and is often grown in the flower garden. There are many named varieties [184]. Guelder rose regenerates quickly if it is cut to the ground, it can also produce suckers and will often form thickets[186]. The plant is an alternative host for the broad bean aphid[11]. Special Features: Not North American native, Naturalizing, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root

# 4.2.87 Malus pumila paradisiaca

Paradise Apple

3 tlin 7 cyuc 3 kcak 2 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus pumila paradisiaca is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness.

It is hardy to UK zone 3 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 50]. The fruit can be up to 6cm in diameter[200]. tcanta RootstockCommonly used as a dwarfing rootstock for the cultivated apple, there are several named varieties[200]

nrakta Europe, ksacta Not known in the wild[50].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following vear. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. Commonly cultivated as a rootstock for the cultivated apple, there are several named varieties[200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 4.2.88 Amelanchier utahensis

Utah Serviceberry, Coville's serviceberry 3 tlin 7 cyuc 3 koak 2 tcan 1 dwat 5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifure7t hjonli

drutta Amelanchier utahensis is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit, raw or cooked[105, 172, 229, 257]. The fruit can also be dried and used as a raisin substitute[177, 183]. The fruit is rich in iron and copper[226]. It is produced in small clusters and is about 10mm in diameter[200].

tcanta WoodWood - heavy, hard and strong. The hardness of the wood makes it suitable for use as the spindle of a fire drill[257]. Trees are seldom large enough to be of commercial interest[229]. The wood has been used to make the rims of baskets[257].

dwatta Ophthalmic OxytoxicAn infusion of the inner bark is used to treat snow-blindness[172]. The plant has been used to ease childbirth during labour and delivery[257].

nrakta South-western N. America - Utah to New Mexico. ksacta Drier areas on rimrock valleys, gullies and hill-sides from sagebrush desert to middle elevations in mountains[11].

nwatta Prefers a fertile humus rich moisture-retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but they tolerate most other conditions[200]. A very ornamental plant, it grows well in woodland and copses[1, 42]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots are very attractive to slugs[K]. Hybridizes with other members of this genus[200]. Polygonatum biflorum var. commutatum (Schult. and Schult.f.) Morong is a synonym of Polygonatum biflorum (Walter) Elliott The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 4.2.208 Aquilegia vulgaris

Columbine, European columbine, Granny's Bonnet, European Crowfoot

3 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aguilegia vulgaris is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant is poisonous though the toxins are destroyed by heat or by drying[7, 19]. Although this plant contains alkaloids, no cases of poisoning to humans or other mammals have been recorded[76].

kcakta Edible Parts: FlowersEdible Uses: TeaFlowers raw. Rich in nectar, they are sweet and delightful[172], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K]. The flowers are also used as a tea substitute[177].

tcanta Parasiticide Parasiticide The seed is used as a parasiticide to rid the hair of lice[172]. The dried and crushed seed is used to kill external body parasites[53].

dwatta Antianxiety Astringent Depurative Diaphoretic Diuretic Homeopathy Parasiticide ParasiticideColumbine was formerly employed in herbal medicine mainly for its antiscorbutic effect, but it has fallen out of favour and is little used nowadays[268] The leaves root and seed are astringent, depurative, diaphoretic, diuretic, parasiticide[4, 7, 9, 19, 21]. Because of its toxic properties, this plant should not be taken internally without expert advice, though the root is sometimes used externally in poultices to treat ulcers and the commoner skin diseases [7, 268]. The plant can be harvested at any time from June to October[7]. Columbine has produced very unsatisfactory results and is not normally used medicinally[4]. A homeopathic remedy is made from the plant[7]. It is used in the treatment of affections of the nervous system[7].

nrakta Central and southern Europe, including Britain, south and east to N. Africa and Temperate China. ksacta Moist shady positions, especially on calcareous soils or fenland peat[7, 17, 31].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots

and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Landscape Uses:Border, Rock garden, Woodland garden. Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sunny position[1]. Thrives in partial shade[1, 111]. Intolerant of heavy clay[200]. Plants are hardy to at least -25°c[187]. Whilst the blue-flowered forms of this species have no scent, white flowered forms have a soft clove scent in order to attract pollinating insects[245]. Most species are short-lived, dying out after 2 - 3 years, though they usually produce seed prolifically[200]. This species usually self-sows freely in the garden, it is very apt to hybridize with other members of the genus and usually becomes the dominant partner in any hybridization[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54, 201]. It also attracts red spider mites to the garden, these can then move on to other crops such as apples, pears and strawberries[201]. It grows well with rhubarb[201]. Special Features: Attracts birds. Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1].

# 4.2.209 Lamium galeobdolon

Yellow Archangel

can tolerate drought.

3 tlin 9 cyuc 2 kcak 3 tcan 1 dwat 0.3 m hkuc pcimhmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lamium galeobdolon is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers moist soil and

kcakta Edible Parts: Flowers LeavesEdible Uses: Young leaves and shoots - cooked[183]. Young flowering tips cooked.

tcanta A good ground cover plant, spreading rapidly by means of its rooting stems and succeeding even in dense shade. It is very vigorous, however, and can smother small plants[31, 197, 200]. It does very well in woodlands[K].

dwatta Antispasmodic Astringent Diuretic Expectorant Styptic VasoconstrictorThe herb is antispasmodic, astringent, diuretic, expectorant, styptic and vasoconstrictor[4].

nrakta Europe, including Britain, from Sweden south and east to Spain and Iran. ksacta Woods and shady hedgerows[5, 31], usually on heavier soils. Sometimes becoming locally dominant, especially after coppicing[17].

propta Seed - usually self sows freely and should not reguire human intervention. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in situ as soon as it is ripe. Division in spring. Succeeds at almost any time in the growing season. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Landscape Uses:Ground cover, Massing, Woodland garden. A very easily grown plant, it tolerates most soils and conditions[200]. It grows well in heavy clay soils[17], though it prefers a light calcareous soil[1]. Dislikes dry soils[31]. This species succeeds even in dense shade, growing well under trees[31, 200]. Once established, it can also succeed in drought conditions under the shade of trees, providing there is plenty of humus in the soil[190]. There are at least four sub-species, L. galeobdolon montanum is the form generally found wild in Britain and it is a triploid. L. galeobdolon luteum and L. galeobdolon flavidum are both

drying in August as the flowers start to open[4]. The essential oil in the leaves is antiseptic and strongly antibacterial, though it is toxic in large doses[222, 254]. When diluted it can be used as an inhalant and chest rub for respiratory infections[254]. The essential oil is used in aromatherapy. Its keyword is 'Cooling'[210].

nrakta Britain. ksacta A natural hybrid, M. aquatica x M. spicata found in moist soils.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for the production of essential oils, but the plant also succeeds in partial shade. Prefers a slightly acid soil[16]. Often grown in the herb garden and also commercially for its essential oil. The whole plant has a pleasant aroma of peppermint. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Produces a better quality essential oil if the plant is grown in dry ground[115]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground

#### 4.2.127 Oxalis acetosella

3 tlin 7 cyuc 3 kcak 3 tcan 2 dwat 0.1 m hkuc pcimhmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Oxalis acetosella is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, cleistogamy. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers LeavesEdible Uses: Curdling agentLeaves - raw or cooked[2, 7, 12, 37]. A delicious lemony flavour, the leaves make a refreshing, thirstquenching munch and are also added to salads, soups, sauces etc[183]. This leaf should be used in moderation[4, 5, 9, 76]. see the notes above on toxicity. Flowers - raw. A decorative addition to salads[K]. The dried plant can be used as a curdling agent for plant milks[66].

tcanta CleanserThe juice of the leaves removes iron mould stains from linen[6, 66, 115]. Plants can be grown as a ground cover in woodland or under the shade of shrubs[208]. They should be spaced about 45cm apart each way[208].

dwatta Anodyne Antiscorbutic Astringent Diuretic Emmenagogue Expectorant Febrifuge Irritant StomachicThe fresh or dried leaves are anodyne, antiscorbutic, astringent, diuretic, emmenagoque, expectorant, febrifuge, irritant and stomachic[4, 7, 9, 21]. A decoction is used in the treatment of fevers, both to guench the thirst and allay the fever[4]. Externally, the leaves are crushed and applied locally to dispel boils and abscesses, they also have an astringent affect on wounds[7]. When used internally, some caution is advised due to the oxalic acid content of the leaves[4], the plant is contra-indicated for people suffering from gastritis or a calculus condition[7].

nrakta Europe, including Britain, from Iceland south and east to Spain, N. and C. Asia to Japan. ksacta Moist woods, moorland and on shady rocks[187].

propta Seed - best sown as soon as it is ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers moist shady conditions and a humus rich soil in shade or dappled sunlight[4, 9, 13, 27, 37, 200]. Dislikes very heavy and wet soils[17]. Plants are hardy to about -25°c[187]. A dainty woodland carpeter growing well in a woodland or wild garden[28, 200]. When well sited the plants can run aggressively and also self-sow[208]. The plant flowers in early spring, but does not produce much fertile seed at this time. Most of the fertile seed is produced from cleistogamous flowers during the summer[17].

# 4.2.128 Fragaria virginiana

Scarlet Strawberry, Virginia strawberry 3 tlin 7 cyuc 3 kcak 2 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Fragaria virginiana is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw. cooked or made into preserves[2, 27, 101, 183]. Sweet and succulent. Small but delicious[159]. The fruit is up to 20mm in diameter[200]. The dried leaves are a very pleasant tea substitute[55, 62, 183]. Rich in vitamin C[159].

tcanta TeethThe fruits are used as a tooth cleaner[55, 62]. They are held in the mouth, or rubbed over the teeth, to remove tartar[257]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiseptic Astringent Emmenagoque Galactogoque Odontalgic Poultice Vitamin CThe whole plant is antiseptic, astringent, emmenagogue, galactogogue and odontalgic[172]. It has been used to regulate the menstrual cycle[172]. A tea made from the leaves has been used as a nerve tonic and is slightly astringent[222]. A poultice made from the dried powdered leaves mixed with oil has been used to treat open sores[257]. A tea made from the roots is diuretic[222]. It has been used in the treatment of diarrhoea, irregular menses, gonorrhoea, stomach and lung ailments[222, 257].

nrakta Eastern N. America - Newfoundland to South Dakota, south to Florida and Oklahoma. ksacta Fields, open slopes and woodland edges[43].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[27, 200]. Tolerates semi-shade though fruit production will be reduced when plants grow in such a position. The plants appreciate a mulch of pine or spruce leaves[18]. Along with F, chiloensis, this species is probably a parent of the cultivated strawberries. The cultivar 'Little Scarlet' is a form of this species and this is still occasionally cultivated for its fruit in Britain[119]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 4.2.129 Amaranthus retroflexus

Pigweed, Redroot amaranth, Wild Beet 3 tlin 11 cyuc 3 kcak 2 tcan 2 dwat 0.9 m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyif hionli

drutta Amaranthus retroflexus is a ANNUAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 4 and is frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

pcista No members of this genus are known to be poisonus, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked as a spinach[2, 5, 62, 85, 159]. A mild flavour, it is often mixed with stronger flavoured leaves[183]. Very rich in iron, it is also a good source of vitamins A and C[201]. Seed - raw or cooked[2, 46, 61, 85]. Ground into a powder and used as a cereal substitute[5], it can also be sprouted and added to salads. The seed is very small, about 1mm in diameter[266], but easy to harvest and very nutritious. The flavour is greatly improved by roasting the seed before grinding it[183]. It is often added to maize meal[183]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digrestive system without being assimilated[K].

tcanta Dye FodderYellow and green dyes can be obtained from the whole plant[168]. Like many other species of Amaranthus, this plant may be harmful and even deadly when fed to cattle and pigs in large amounts. However, when supplied in moderation, it is regarded as an exceptionally nutritious fodder.

dwatta AstringentA tea made from the leaves is astringent[222]. It is used in the treatment of profuse menstruation, intestinal bleeding, diarrhoea etc[222, 238, 257]. An infusion has been used to treat hoarseness[257].

nrakta Tropical America. A casual in Britain[17]. ksacta A casual of cultivated land and waste places in Britain[17].

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. A good companion for potatoes, onions, corn, tomatoes, peppers and aubergines[20, 201]. A deep rooted plant, bringing up minerals from lower levels of the soil[201]. Formerly cultivated as a food crop by the N. American Indians[85]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

# 4.2.130 Asclepias tuberosa

Pleurisy Root, Butterfly milkweed, Rolfs' milkweed, Indian Paintbrush

3 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 0.8 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asclepias tuberosa is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific reports have been seen for this species, man, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. The plant is poisonous if eaten in large quantities[20, 62]. Very large doses can cause diarrhoea and vomiting[268].

kcakta Edible Parts: Flowers Leaves Oil Root SeedpodEdible Uses: Oil SweetenerWhilst most parts of this plant have been used as food, some caution is advised since large doses can cause diarrhoea and vomiting - see the notes above on toxicity. Flower buds - cooked. They taste somewhat like peas[85]. Young shoots - cooked. An asparagus substitute[2, 4, 46, 85, 183]. The tips of older shoots are cooked like spinach[85]. Young seed pods - cooked. Harvested when 3 - 4 cm long and before the seed floss begins to form, they are very appetizing[2, 4, 21, 61, 85]. The flower clusters can be boiled down to make a sugary syrup[2, 4, 85, 183]. In hot weather the flowers produce so much nectar that it crystallises out into small lumps which can be eaten like sweets, they are delicious[K]. Root - cooked[2, 4, 46, 61, 85, 105]. A nutty flavour[165]. Some reports say that it is poisonous[183]. An edible oil is obtained from the seed[112]. The seed is very small, however, and commercial usage would not be very viable.

tcanta Fibre Latex Oil Pollution StuffingA good quality fibre is obtained from the bark and is used in making twine, cloth etc[112]. It is easily harvested in late autumn after the plant has died down by simply pulling the fibres off the dried stems[169]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[169]. It is a kapok substitute, used in life jackets or as a stuffing material[169]. Very water repellent. The floss has also been used to mop up oil spills at sea. The plant is a potential source of latex, used for making rubber[57]. This species is the only member of the genus that does not have latex in its sap[213]. The seed-pods contain an oil and a wax which are of potential importance. Candle wicks are made from the seed floss. The seed contains up to 21% of a semi-drying oil[112]. The dogbane-milkweed family Asclepias, Apocynum, Calotropis, and Tra-

use[4, 238]. It is used both internally and externally in the treatment of a wide range of ailments, including as a poultice for wounds, ulcers and many other skin problems [4, 7, 244], and as a decoction for insomnia and cases where a strong diuretic is beneficial[4]. It has been shown of benefit in the treatment of glandular fever, ME, tonsillitis, hepatitis, cystitis etc[238]. The plant is often used as part of a spring tonic drink with other herbs[4]. A tea made from the plant has traditionally been used internally and externally in the treatment of cancer[4, 218, 222]. One report says that it is better to use a juice of the plant rather than a tea[254]. The effectiveness of this treatment has never been proved or disproved[7]. Both Asperuloside (a terpenoid) and Coumarin (a benzopyrone) occur in some species of Galium. Asperuloside can be converted into prostaglandins (hormone-like compounds that stimulate the uterus and affect blood vessels), making the genus of great interest to the pharmaceutical industry[238]. A homeopathic remedy has been made from the plant[7].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, N. and W. Asia. ksacta Hedgerows and as a weed of cultivated land[7]. Moist and grassy places on most types of soil[17].

propta Seed - best sown in situ as soon as the seed is ripe in late summer[200]. The seed can also be sown in spring though it may be very slow to germinate[200]. Once established, this plant does not really need any help to reproduce itself.

nwatta Prefers a loose moist leafy soil in some shade[200]. Plants tolerate dry soils, but they quickly become scorched when growing in full sun[200]. They do not thrive in a hot climate[200]. Another report says that plants succeed in most soils in full sun or heavy shade. A scrambling plant, the stems and leaves are covered with little hooked bristles by which it can adhere to other plants and climb into them[4]. A good species to grow in the wild garden, it provides food for the larvae of many butterfly species[30].

#### 4.2.206 Bupleurum falcatum

Thorow-Wax

3 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

druttå Bupleurum falcatum is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

kcakta Edible Parts: LeavesEdible Uses: RutinLeaves and young shoots - cooked[2, 105, 177]. The new growth in spring and autumn is used[178, 179]. It is a good source of rutin[179].

tcanta FuelThe old plant is used as a fuel[178, 179]. dwatta Alterative Analgesic Antibacterial Antiinflammatory Antiperiodic Antipyretic Antiviral Carminative Diaphoretic Emmenagogue Haemolytic Hepatic Malaria Pectoral Poultice SedativeA paste of the plant is applied to boils[272]. The juice of the roots, mixed with the juice of Centella asiatica, is used in the treatment of liver diseases[272]. This species is closely related to B. chinense and quite possibly has the same uses. It is certainly worthy of some research. The uses of B. chinense are as follows:- Bei chai hu root has been used in traditional Chinese medicine for at least 2,000 years[238]. It is a bitter herb that is used to harmonize the body, balancing the different organs and energies within the body[254]. It strengthens the digestive tract. acts as a tonic for the liver and circulatory system, lowers fevers and has anti-viral effects[238]. The root is alterative, analgesic, antibacterial, anti-inflammatory, antiperiodic, antipyretic, antiviral, carminative, diaphoretic, emmenagogue, haemolytic, hepatic, pectoral, sedative[116, 147, 174, 176, 178, 218, 238, 254]. It is taken internally in the treatment of malaria, blackwater fever, uterine and rectal prolapse, haemorrhoids, sluggish liver, menstrual disorders, abdominal bloating etc[238]. The roots are harvested in the autumn

and can be used fresh or dried[238]. The root contains saiko-sides[254]. These saponin-like substances have been shown to protect the liver from toxicity whilst also strengthening its function, even in people with immune system disorders[254]. These saikosides also stimulate the body's production of corticosteroids and increase their anti-inflammatory affect[254]. The plant is often used in preparations with other herbs to treat the side effects of steroids[218].

nrakta Scattered throughout Europe, including Britain, and Asia north to the subarctic, east to Japan. ksacta Waste places and hedgebanks[17].

propta Seed - sow spring in a cold frame. The seed usually germinates in 2 - 8 weeks at 15°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer or following spring. Division in spring. Very easy, larger clumps can be planted direct into their permanent positions. It is best to pot up smaller clumps and grow them on in a cold frame until they are well rooted before planting them out in the summer.

nwatta An easily cultivated plant[1], it succeeds in a sunny position in most fertile well-drained soils[138, 233, 238].

# 4.2.207 Polygonatum biflorum

Small Solomon's Seal

3 tlin 7 cyuc 2 kcak 2 tcan 1 dwat 1 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum biflorum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The fruit and seed are possibly poisonous[65].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - raw or cooked[159, 177]. An excellent vegetable when boiled and used as an asparagus substitute[183]. Root - cooked[61]. The flavour is somewhat bitter, to counteract this the root is sliced crosswise, cooked in alkaline water and the water changed during the cooking process[183]. When steamed and sun-dried nine times the root is delicious[179]. The roots are rich in starch, this can be extracted by beating or grinding the dried root, the starch can then be used to make bread or can be mixed in other foods such as soups[159, 183, 257].

tcanta IncenseThe root has been burnt as an incense[257]. It is said that when the root is burnt in the bedroom just before going to sleep, the person would sleep soundly and awaken refreshed, rested and feeling young[257].

dwatta Laxative Poultice SedativeA tea made from the roots is laxative[222]. It has been used in the treatment of indigestion, profuse menstruation, lung ailments, general debility etc[222]. It is a folk remedy for piles, rheumatism and skin irritations[222]. A poultice or a decoction of the fresh roots is applied to cuts, bruises, sores etc[222, 257].

nrakta N. America - New Brunswick to Michigan, south to Tennessee and Florida ksacta Dry to moist sandy, loamy or rocky deciduous woods and thickets, usually in upland areas[43].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

growing to 1.5 metres. It has a strong, rather resinous or formic acid from the nettles is believed to have a beneficial "floral" taste similar to chrysanthemum leaves and is used in soups or fried as a side dish[183]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Edible, Not North American native, Invasive, Attracts butterflies, Suitable for dried flowers, Fragrant flowers, Inconspicuous flowers or blooms.

#### 4.2.204 Urtica californica

Stinging Nettle, California nettle 3 tlin 10 cyuc 2 kcak 4 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Urtica californica is a PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista The leaves of the plants have stinging hairs, causing irritation to the skin[21, 200]. This action is neutralized by heat so the cooked leaves are perfectly safe and nutritious[200]. However, only young leaves should be used because older leaves develop gritty particles called cystoliths which act as an irritant to the kidneys[172].

kcakta Edible Parts: LeavesEdible Uses: DrinkYoung leaves - cooked[172]. A very nutritious food, high in vitamins and minerals, it makes an excellent spinach substitute and can also be added to soups and stews. Only use the young leaves and wear stout gloves when harvesting them to prevent getting stung. Although the fresh leaves have stinging hairs, thoroughly drying or cooking them destroys these hairs. Nettle beer is brewed from the young shoots[200].

tcanta Compost Dve Fibre Hair Liquid feed RepellentA strong flax-like fibre is obtained from the stems[200]. Used for making string and cloth, it also makes a good quality paper[115]. It is harvested as the plant begins to die down in early autumn and is retted before the fibres are extracted[4. 99]. The following uses have been listed for U. dioica, but they are almost certainly also applicable to this species. The plant matter left over after the fibres have been extracted are a good source of biomass and have been used in the manufacture of sugar, starch, protein and ethyl alcohol[4]. An oil obtained from the seeds is used as an illuminant[4]. An essential ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The leaves are also an excellent addition to the compost heap[12, 18, 20] and they can be soaked for 7 - 21 days in water to make a very nutritious liquid feed for plants[54]. This liquid feed is both insect repellent and a good foliar feed[14, 18, 53]. The growing plant increases the essential oil content of other nearby plants, thus making them more resistant to insect pests[18, 20, 54]. Although many different species of insects feed on nettles, flies are repelled by the plant so a bunch of freshly cut stems has been used as a repellent in food cupboards[4]. The juice of the plant, or a decoction formed by boiling the herb in a strong solution of salt, will curdle milks and thus acts as a rennet substitute[4]. This same juice, if rubbed into small seams of leaky wooden tubs, will coagulate and make the tub watertight again[4]. A hair wash is made from the infused leaves and this is used as a tonic and antidandruff treatment[172, 201]. A beautiful and permanent green dye is obtained from a decoction of the leaves and stems[4, 115]. A vellow dve is obtained from the root when boiled with alum[4, 115].

dwatta AntirheumaticThe fresh leaves of nettles have been rubbed or beaten onto the skin in the treatment of rheumatism etc[K]. This practice, called urtification, causes intense irritation to the skin as it is stung by the nettles. It is believed that this treatment works in two ways. Firstly, it acts as a counter-irritant, bringing more blood to the area to help remove the toxins that cause rheumatism. Secondly, the

effect upon the rheumatic joints.

nrakta South-western N. America - California. ksacta Wet brushy thickets along the immediate coast[71].

propta Seed - sow spring in a cold frame, only just covering the seed. Prick out the seedlings into individual pots when they are large enough to handle, and plant them out in the summer. Division succeeds at almost any time in the growing season. Very easy, plant them straight out into their permanent positions.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of the country. It is very closely related to U. Ivallii and is doubtfully distinct from it[71]. The Flora of North America treats this taxon as no more than a synonym of Urtica dioica gracilis[270]. The following notes are based on the general needs of the genus. Prefers a nitrogen-rich soil[200]. The best fibre is produced when plants are grown on deep fertile soils[200]. Dioecious. Male and female plants must be grown if seed is required. Note: Urtica californica Greene is a synonym of Urtica dioica subsp. gracilis (Aiton) Selander For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.205 Galium aparine

Goosegrass, Coachweed, Catchweed, Stickywilly 3 tlin 7 cyuc 2 kcak 3 tcan 3 dwat 1.2 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Galium aparine is a ANNUAL growing to 1.2 m (4ft) by 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is selffertile. It is noted for attracting wildlife. Suitable for: light. (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The sap of the plant can cause contact dermatitis in sensitive people[222]. Can cause severe skin irritation

kcakta Edible Parts: LeavesEdible Uses: Coffee TeaThe tender young shoot tips - raw or cooked as a pot-herb[5, 7, 53, 55, 62, 172, 183]. A rather bitter flavour that some people find unpalatable[244], they are best used in the spring[178]. They make a useful addition to vegetable soups[7, 244]. It is said that using this plant as a vegetable has a slimming effect on the body[238]. The roasted seed is a coffee substitute[2. 53, 62]. One of the best substitutes, it merely needs to be dried and lightly roasted and has much the flavour of coffee[4, 115, 183]. A decoction of the whole dried plant gives a drink equal to tea[2, 4].

tcanta Cleanser Dye Filter TinderA red dye is obtained from a decoction of the root[4, 7, 168]. When ingested it can dye the bones red[4]. The dried plant is used as a tinder[99]. The plant can be rubbed on the hands to remove pitch (tar)[99]. The stems are placed in a layer 8cm or more thick and then used as a sieve for filtering liquids[4, 115,

dwatta Alterative Antiphlogistic Aperient Astringent Cancer Depurative Diaphoretic Diuretic Eczema Febrifuge Homeopathy Skin Tonic VulneraryGoosegrass has a long history of domestic medicinal use and is also used widely by modern herbalists. A valuable diuretic, it is often taken to treat skin problems such as seborrhoea, eczema and psoriasis, and as a general detoxifying agent in serious illnesses such as cancer[254]. The whole plant, excluding the root, is alterative, antiphlogistic, aperient, astringent, depurative, diaphoretic, diuretic, febrifuge, tonic and vulnerary[4, 7, 9, 21, 165, 218, 222]. It is harvested in May and June as it comes into flower and can be used fresh or dried for later

chomitum spp) has been used for fiber industrial crops for 4.2.131 Polygonum viviparum millennia with a number in cultivation as regional crops. Al of these crops are dual-purpose fibres, offering bast fibres from the stem and seed finer or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Antispasmodic Carminative Cathartic Diaphoretic Diuretic Dysentery Expectorant Poultice Tonic VasodilatorPleurisy root is a bitter, nutty-flavoured tonic herb that increases perspiration, relieves spasms and acts as an expectorant[238]. It was much used by the North American Indians and acquired a reputation as a heal-all amongst the earlier white settlers[254, 257]. Its main use in present day herbalism is for relieving the pain and inflammation of pleurisy[254]. The root is antispasmodic, carminative, mildly cathartic, diaphoretic, diuretic, expectorant, tonic and vasodilator[4, 21, 46, 165]. The root was very popular as a medicinal herb for the treatment of a range of lung diseases, it was considered especially useful as an expectorant[4, 213, 254]. It has never been scientifically examined and warrants further investigation[213]. It has also been used internally with great advantage in the treatment of diarrhoea, dysentery, rheumatism etc[4]. Use with caution[21]. This remedy should not be prescribed for pregnant women[238]. See also the notes above on toxicity. The root is harvested in the autumn and can be used fresh or dried[238]. A poultice of the dried, powdered roots is used in the treatment of swellings, bruises, wounds, ulcers, lameness etc[222, 238, 268].

nrakta N. America - S. Ontario and New York to Minnesota, south to Florida and Colorado. ksacta Dry open sandy and gravelly soils and grassy places by the sides of roads[43,

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: HayLandscape Uses:Border, Container, Foundation, Massing, Rock garden, Seashore, Specimen Prefers a well-drained light, rich or peaty soil[1, 200]. Prefers a sandy soil and a sunny position[111, 233]. Prefers a slightly acid soil[238]. Prefers a dry soil[187, 238]. Plants are hardy to about -20°c[187]. Another report says that this species is only suited to the warmer areas of Britain[233]. A very ornamental plant[1], but it is not easy to establish or to keep in British gardens[233]. Resents root disturbance[4, 134], plants should be pot-grown from seed and planted out in their permanent positions when young. Plants are particularly at risk from slugs, however, and some protection will probably be required until the plants are established and also in the spring when the new shoots come into growth[K]. The flower can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207], Special Features: Attractive foliage, North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or

Alpine Bistort

3 tlin 7 cvuc 3 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Polygonum viviparum is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root SeedEdible Uses: Leaves - raw or cooked[62, 172]. They have a pleasant tart taste when cooked[85]. Seed - raw or cooked[172]. The seed is not often produced and even when it is, it is rather small and fiddly to utilize. It is rich in starch[91]. It is pickled in Nepal[272]. Root - raw or cooked[2, 61, 62, 91]. Starchy and pleasant but rather small[85, 161, 172]. Sweet, nutty and wholesome[183]. They taste best when roasted[183]. Bulbils from lower part of flowering stem - raw[62].

dwatta Astringent StypticThe root is astringent and styptic[172, 240]. It is used in the treatment of abscesses. as a gargle to treat sore throats and spongy gums, and as a lotion for ulcers[240].

nrakta Arctic and northern regions of Europe, including Britain, Asia and America. On mountains in south. ksacta Mountain grassland and wet rocks[17]

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Plants seem to be immune to the predations of rabbits[233]. Plants do not often produce viable seed, reproducing by means of bulbils formed on the lower portion of the flowering stem. For polyculture design as well as the above-ground architecture (form - tree, shrub etc., and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

#### 4.2.132 Fritillaria pudica

Yellow Fritillary

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Fritillaria pudica is a BULB growing to 0.2 m (Oft 8in) by 0.1 m (Oft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Root SeedpodEdible Uses: Bulbraw or cooked[46, 61, 161]. It can also be dried for later use[46]. Commonly eaten as a food by the native North Americans, the small bulbs were eaten raw and the larger ones cooked[270]. Rich in starch, it is best used in the autumn[172]. The raw bulb tastes like potatoes, when cooked it tastes like rice[212]. It can be eaten as a vegetable or can be added to soups etc[257]. The green seedpods can be eaten raw or cooked but are bitter[172]. A delicious flavour[212].

nrakta Western N. America - British Columbia to Wyoming, south to New Mexico. ksacta Grassland and sagebrush deserts to mixed coniferous forests, also on stony mountain slopes[60, 163], 400 - 2000 metres[90].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta Best grown on a gritty well-drained sunny bank[42]. Plants must be kept dry in the summer[90, 134]. A very variable[270] and ornamental plant[1], but it is not easy to grow outdoors, though it has lived a long time in a bulb frame[90]. Flowers are produced in 4 - 6 years from seed[164]. The bulb produces bulbils freely[90].

# 4.2.133 Empetrum nigrum

Crowberry, Black crowberry, Black Crowberry 3 tlin 8 cyuc 3 kcak 1 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli nyanhjen hjonli

drutta Empetrum nigrum is an evergreen Shrub growing to  $0.3~\mathrm{m}$  (1ft) by  $0.5~\mathrm{m}$  (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[1, 2, 3, 5, 65]. It can taste slightly acid or inspid[101]. Not very desirable[11], it tastes best after a frost[172]. A watery flavour, it is mainly used for making drinks, pies, preserves etc[183]. The Inuit dry or freeze them for winter use[183]. The fruit can hang on the plant all winter[172]. The fruit is about 7.5mm in diameter[200]. A tea can be made from the twiqs[183].

tcanta DyeA purple dye is obtained from the fruit[115]. Can be used for groundcover in exposed locations[200]. Plants should be spaced about 25cm apart each way[208].

dwatta Astringent Diuretic Kidney OphthalmicThe leafy branches have been used, especially for children with a fever, as a diuretic[257]. It has also been used to treat kidney problems[257]. A decoction or infusion of the stems, or the cooked berries, have been used in the treatment of diarrhoea[257]. A decoction of the leaves and stems, mixed with Hudson Bay tea and young spruce tree tips, has been used in the treatment of colds[257]. A decoction of the roots has been used as an eyewash to remove a growth[257].

nrakta Europe, including Britain, Iceland to the Pyrenees, east to Siberia and Bulgaria and also N. America ksacta Moors and mountain tops, and in the drier parts of blanket bogs171.

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be very slow to germinate, stored seed requires 5 months warm then 3 months cold stratification at 5°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 3cm with a heel, July/August in a frame. Takes 3 weeks. Good percentage[78, 200]. Cuttings of mature wood of the current year's growth, 3cm with a heel, October in a frame. Requires shade. Good percentage[78, 200].

nwatta Landscape Uses:Erosion control, Foundation, Ground cover, Massing, Rock garden. A calcifuge plant, it is easily grown in a lime-free soil[200]. Prefers a moist sandy peaty soil and some shade[1, 3]. The two names var. 'Rubrum' and var. 'Purpureum' are of doubtful application to this species and may refer to E. eamesii[200]. Plants are usually dioecious though hermaphrodite forms are known. Male and female plants will normally need to be grown if fruit and seed are required. Special Features: Attractive foliage, North American native, Inconspicuous flowers or blooms.

# 4.2.134 Campanula portenschlagiana

Adria Bellflower

3 tlin 7 cyuc 3 kcak 3 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hionli

drutta Campanula portenschlagiana is an evergreen Perennial growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[K]. The leaves are rather small, but they are produced all year round[K]. They have a mild flavour and make an acceptable ingredient in mixed salads, especially in the winter, but we find that, eaten in quantity, they become a bit unpleasant[K]. Flowers - raw. Very freely produced, they have a pleasant flavour and make a very decorative addition to salads[K].

tcanta A rampantly spreading plant, suitable for ground cover in a sunny position[197, 208].

nrakta S. Europe. Naturalized in Britain. ksacta Naturalized on walls and rocky banks in central and southern England.

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[200]. Very easy, the plant can be divided at almost any time of the year[221].

nwatta Prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil preferring full sun but also succeeding in partial shade[1, 200, 208]. This species prefers a slightly shaded position[221]. Plants can be grown on a dry stone wall[200] and succeed in poor soils[221]. Plants are hardy to at least -15°c[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. A rampant

# 4.2.202 Polygonatum sibiricum

Huang Jing

3 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum sibiricum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some members of this genus have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[105, 176]. They can be used as an asparagus substitute. Root - cooked[105, 176]. Rich in starch.

tcanta Insecticide MiscellanyThe plant has insecticidal properties[218].

dwatta Antibacterial Antifungal Antirheumatic Demulcent Lenitive Miscellany TonicThe root is antibacterial, antifungal, antirheumatic, antiseptic, demulcent, lenitive, tonic and vasodilator[176, 218]. Its use lowers the blood pressure and prevents atherosclerosis and fatty infiltration in the liver[176]. It is used in the treatment of dry coughs due to chronic bronchitis and pulmonary tuberculosis, fatigue and poor appetite[176].

nrakta E. Asia - N. China, Mongolia and Siberia. ksacta Woods and sandy places near the sea[74]. Forests, thickets and shaded slopes at elevations of 800 - 2800 metres in China[266].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

watta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. This species is closely related to P. verticilatum[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Plants adopt a semi-climbing habit, scrambling through small shrubs[187]. Hybridizes with other species in this genus.

### 4.2.203 Artemisia vulgaris

Mugwort, Common wormwood, Felon Herb, Chrysanthemum Weed, Wild Wormwood

3 tlin 9 cyuc 2 kcak 1 tcan 3 dwat 1.2 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Artemisia vulgaris is a PERENNIAL growing to 1.2 m (4ft) by 0.7 m (2ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant might be poisonous in large doses[21]. Skin contact can cause dermatitis in some people[222]. Prob-

ably unsafe for pregnant women as it may stimulate the uterus to contract and induce abortion [301].

kcakta Edible Parts: LeavesEdible Uses: Colouring CondimentLeaves - raw or cooked[2, 9, 12, 27, 177]. Aromatic and somewhat bitter[244]. Their addition to the diet aids the digestion and so they are often used in small quantities as a flavouring, especially with fatty foods[183, 244]. They are also used to give colour and flavour to glutinous-rice dumplings (Mochi)[183, 244]. The young shoots are used in spring[46]. In Japan the young leaves are used as a potherb[183]. The dried leaves and flowering tops are steeped into tea[183]. They have also been used as a flavouring in beer; though fell into virtual disuse once hops came into favour[4].

tcanta Insecticide Repellent TinderThe fresh or the dried plant repels insects, it can be used as a spray but caution is advised since it can also inhibit plant growth[20]. A weak tea made from the infused plant is a good all-purpose insecticide[201]. An essential oil from the plant kills insect larvae[218]. The down on the leaves makes a good tinder for starting fires[115]. A number of species of Lepidoptera (butterflies and moths) feed on the leaves and flowers.

dwatta Anticonvulsant Antidepressant Antiemetic Antiseptic Antispasmodic Appetizer Carminative Cholagogue Diaphoretic Digestive Diuretic Emmenagogue Expectorant Foot care Haemostatic Nervine Purgative Stimulant Tonic Women's complaintsMugwort has a long history of use in herbal medicine especially in matters connected to the digestive system, menstrual complaints and the treatment of worms[238]. It is slightly toxic, however, and should never be used by pregnant women, especially in their first trimester, since it can cause a miscarriage[7, 238]. Large. prolonged dosage can damage the nervous system[268]. All parts of the plant are anthelmintic, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, digestive, emmenagogue, expectorant, nervine, purgative, stimulant, slightly tonic and used in the treatment of women's complaints[4, 7, 13, 21, 147, 165, 178, 201]. The leaves are also said to be appetizer, diuretic, haemostatic and stomachic[176, 218, 222]. They can be used internally or externally[218]. An infusion of the leaves and flowering tops is used in the treatment of nervous and spasmodic affections. sterility, functional bleeding of the uterus, dysmenorrhoea, asthma and diseases of the brain[176, 243]. The leaves have an antibacterial action, inhibiting the growth of Staphylococcus aureus, Bacillus typhi, B. dysenteriae, streptococci, E. coli, B. subtilis, Pseudomonas etc[176]. The leaves are harvested in August and can be dried for later use[4]. The stem is also said to be antirheumatic, antispasmodic, and stomachic[218]. The roots are tonic and antispasmodic[243]. They are said to be one of the best stomachics[4]. They are harvested in the autumn and dried for later use[4]. The leaves, placed inside the shoes, are said to be soothing for sore feet[238]. The compressed dried leaves and stems are used in moxibustion[176, 178, 218, 222, 238]. Another renort says that the down from the leaves is used[4]

nrakta Throughout most temperate regions of the northern hemisphere, including Britain. ksacta Common on hedgebanks and waysides, uncultivated and waste land[4,7,17]

propta Seed - surface sow from late winter to early summer in a greenhouse and do not allow the compost to dry out. When large enough to handle, prick out the seedlings into individual pots. If growth is sufficient, they can be planted out into their permanent positions in the summer, otherwise grow them on in a cold frame for their first winter and then plant them out in the spring. Division in spring or autumn. Basal cuttings in late spring. Harvest the young shoots when about 10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Landscape Uses:Border. Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a sunny position and a moist soil[1, 14, 200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Tolerates a pH in the range 4.8 to 8.2. Established plants are drought tolerant[200]. Mugwort is an aggressive and invasive plant[14], it inhibits the growth of nearby plants by means of root secretions[20, 201]. The sub-species A. vulgaris parviflora. Maxim. is the form that is eaten in China[179]. There are some named varieties[200]. White' is a taller plant than the type species,

It is used in the treatment of heart complaints, amenorrhoea, menopausal problems and flatulence[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Leonurus cardiaca Motherwort for nervous heart complaints (see [302] for critics of commission E).

nrakta Europe. Naturalized in Britain. ksacta Hedge banks, waste places etc[9, 17], usually on gravelly or calcareous soils[4].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. If you have sufficient seed then it can be sown in an outdoor seedbed, or even in situ. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant that succeeds in most soils[4], preferring one on the poor side[108]. This plant was at one time cultivated for its medicinal uses[4]. The whole plant is deliciously pungent when handled[245]. The plant often self-sows when well-sited[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

#### 4.2.200 Aster cordifolius

Common Blue Wood Aster

3 tlin 7 cyuc 2 kcak 2 tcan 1 dwat 1.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aster cordifolius is a PERENNIAL growing to  $1.5\,\mathrm{m}$  (5ft) by  $1\,\mathrm{m}$  (3ft 3in). See above for USDA hardiness. It is hardy to UK zone  $3.\,\mathrm{lt}$  is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked and used as greens[207].

dwatta Antirheumatic Aromatic NervineAn infusion of the plant is used as an aromatic nervine and also in the treatment of rheumatism[207].

nrakta Eastern N. America - Nova Scotia and New Brunswick to Ontario, Minnesota, Georgia and Missouri. ksacta Woods and thickets[235].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. The seed usually germinates in 2 weeks at  $20^{\circ}\text{c}[134]$ . When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the shoots when they are about 10- 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. Prefers a rich soil[1]. Plants can be naturalized in a woodland or other wild garden[200]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

# 4.2.201 Equisetum hyemale

Dutch Rush, Scouringrush horsetail, Horsetail, Scouring Rush, Rough Horsetail

3 tlin 11 cyuc 2 kcak 3 tcan 2 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Equisetum hyemale is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen from July to August. Suitable forlight (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Large quantities of the plant can be toxic. This is because it contains the enzyme thiaminase[172], a substance that can rob the body of the vitamin B complex[65]. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. The plant also contains equisetic acid see the notes on medicinal uses for more information[213].

kcakta Edible Parts: Root StemEdible Uses: Strobil (the fertile shoots in spring) - cooked[177]. An asparagus substitute. Caution is advised, see the notes above on toxicity. Roots - dried and then cooked[257]. A source of starch[177]. Caution is advised, see the notes above on toxicity. A further report says that the peeled stems, base of the plant, root and tubers were eaten raw by the N. American Indians, the report went on to say that this may be inadvisable[85].

tcanta Dye Fungicide Liquid feed Musical Paper Parasiticide Polish Sandpaper ScourerThe stems are very rich in silica[4]. They are used for scouring and polishing metal[1, 4, 46, 61, 99] and as a fine sandpaper[54, 99]. The stems are first bleached by repeated wetting and drying in the sun[74]. They can also be used as a polish for wooden floors and furniture[46, 178]. The infused stem is an effective fungicide against mildew, mint rust and blackspot on roses[14]. It also makes a good liquid feed[54]. Used as a hair rinse it can eliminate fleas, lice and mites[213, 257]. A light pink dye is obtained from the stem[99]. The hollow stems have been used as whistles[257]. Another report says that the stem joints are pulled apart and used by children to produce a whistling sound[257].

dwatta Antibacterial Antiinflammatory Antispasmodic Appetizer Cancer Diaphoretic Diuretic Expectorant Febrifuge Hypotensive Parasiticide StypticHorsetails have an unusual chemistry compared to most other plants[238]. They are rich in silica, contain several alkaloids (including nicotine) and various minerals[238, 279]. The plant is anticancer, anti-inflammatory, antispasmodic, diaphoretic, diuretic, expectorant, febrifuge, haemostatic, hypotensive and styptic[147, 176. 218, 279]. It also has an appetitestimulating effect[279]]. The barren stems are used, they are most active when fresh but can also be dried and sometimes the ashes of the pant are used[4]. The plant is a useful diuretic when taken internally and is used in the treatment of kidney and bladder problems[4]. A decoction applied externally will stop the bleeding of wounds and promote healing[4]. The plant contains polyphenolic flavonoids with bactericidal activity[218].

nrakta Temperate regions of Europe, including Britain, N. America and Asia. ksacta Shady streambanks etc, to 500 metres[17]

propta Spores - best collected as soon as they are ripe in the spring and surface-sown immediately on a sterile compost. Keep moist and pot up as soon as the plants are large enough to handle. Very difficult[200]. Division. The plants usually spread very freely when well sited and should not really need any assistance.

nwatta Landscape Uses:Container, Ground cover, Woodland garden. Prefers a moist soil with a pH between 6.5 and 7.5[200]. Plants are hardy to about -30°c[200]. The stems of this species were once exported to Britain in quantity from Holland so that they could be used as an abrasive for cleaning pots and pans[238]. Plants have a deep and penetrating root system and can be invasive. If grown in the garden they are best kept in bounds by planting them in a large container which can be sunk into the ground[200]. Special Features:North American native, Invasive, Naturalizing, Wetlands plant. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root rattern is fleshy, Thick or swollen - fibrous or tap root [2-1].

plant, capable of spreading widely when in suitable conditions by means of both underground roots and long stems above ground [188, 271]. It makes a good ground cover but can become a nuisance if it is not sited with care[200]. It is, however, fairly easy to control by simply pulling up any parts of the plant that wander too far[271]. There are several named forms selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

#### 4.2.135 Galium verum

Lady's Bedstraw, Yellow Spring bedstraw, Wirtgen's bedstraw

3 tlin 7 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Galium verum is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: Coffee Colouring Curdling agent DrinkLeaves - raw or cooked[62, 179]. A yellow dye from the flowering stems is used as a food colouring[105, 183]. The roasted seed is a coffee substitute[7]. The seed is also said to be edible[179]. The chopped up plant can be used as a rennet to coagulate plant milks[7, 67, 115, 183, 244]. The flowering tops are distilled in water to make a refreshing acid beverage[2, 183].

tcanta Dye Repellent Strewing StuffingA red dye is obtained from the root[4, 6, 7, 67, 115]. It is rather fiddly to utilize[169]. A yellow dye is obtained from the flowering tops[4, 7, 115]. The dye is obtained from the foliage when it is boiled with alum[207]. The dried plant has the scent of newly mown hay, it was formerly used as a strewing herb[24] and for stuffing mattresses etc[61, 67, 115]. It is said to keep fleas away[207]. A sprig in a shoe is said to prevent blisters[67].

dwatta Antispasmodic Astringent Diuretic Epilepsy Foot care Lithontripic Urinary VulneraryLady's bedstraw has a long history of use as a herbal medicine, though it is little used in modern medicine. Its main application is as a diuretic and as a treatment for skin complaints[254]. The leaves, stems and flowering shoots are antispasmodic, astringent, diuretic, foot care, lithontripic and vulnerary[4, 7, 9]. The plant is used as a remedy in gravel, stone or urinary disorders[4, 9, 53, 238] and is believed to be a remedy for epilepsy[4, 21]. A powder made from the fresh plant is used to soothe reddened skin and reduce inflammation[7] whilst the plant is also used as a poultice on cuts, skin infections, slow-healing wounds etc[9]. The plant is harvested as it comes into flower and is dried for later use[9]. Both Asperuloside (a terpenoid) and Coumarin (a benzopyrone) occur in some species of Galium. Asperuloside can be converted into prostaglandins (hormone-like compounds that stimulate the uterus and affect blood vessels), making the genus of great interest to the pharmaceutical industry [238].

nrakta Most of Europe, including Britain, to W. Asia. ksacta Waste ground, roadsides etc[7], mainly near the sea[4], on all but the most acid soils[17].

propta Seed - best sown in situ as soon as it is ripe in late smert 2001. The seed can also be sown in situ in the spring though it may be very slow to germinate[2001. Division in spring. The plant can be successfully divided throughout the growing season if the divisions are kept moist until they are established[2001. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a loose moist leafy soil in some shade, but it tolerates a position in full sun[14]. Plants are tolerant of dry soils[1], but do not thrive in a hot climate. They dislike very acid soils[17, 53]. A very invasive plant[1], though it is low-growing and mixes without harm with any plants at least 60cm tall[K]. It grows well in the summer meadow[24] and is a food plant for the larvae of several species of butterflies[30].

#### 4.2.136 Asarum canadense

Snake Root, Canadian wildginger, Canada Wild Ginger, Wild Ginger

3 tlin 9 cvuc 3 kcak 3 tcan 3 dwat 0.1 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asarum canadense is a deciduous Perennial growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The leaves are poisonous[19]. Handling the leaves is said to cause dermatitis in some people[269].

kcakta Edible Parts: Edible Uses: CondimentThe underground stem and the flowers are used as a ginger substitute[2, 55, 106, 177, 183]. The root, especially when quite dry, has a pungent, aromatic smell like mild pepper and ginger mixed, but more strongly aromatic[245]. The root is best harvested in autumn but is available all year round[159]. It can be dried for later use[159].

tcanta IncenseThe slightly roasted root can be ground into a powder and then sprinkled onto clothing for perfume [257]. A useful ground cover for a shady position so long as it is not dry[197], spreading by its roots[208].

dwatta Anthelmintic Antiasthmatic Antibiotic Antitumor Carminative Contraceptive Diaphoretic Diuretic Expectorant Irritant Poultice Salve Stimulant Stomachic Tonic Snake root was widely employed as a medicinal herb by a number of native North American tribes who used it to treat a wide range of ailments[257]. It is still occasionally used in modern herbalism. The root is anthelmintic, carminative, diaphoretic, diuretic, expectorant, irritant, powerfully stimulant, stomachic and tonic[4, 21, 46, 200, 238, 257]. It is harvested in the autumn and dried for later use[4]. It is used in the treatment of chronic chest complaints, asthma, coughs, colds, dropsy, painful spasms of the bowels and stomach, scant or painful menstruation, infantile convulsions[4, 257]. The fresh leaves are applied as a poultice to wounds and inflammations, whilst a decoction or salve is applied to sores[257]. The root contains antibiotic substances effective against broad-spectrum bacteria and fungi[207]. It also contains aristolochic acid, which has antitumor activity[222]. The root and rhizome were slowly boiled in a small quantity of water for a long time and the resulting liquid drunk as a contraceptive by the women of one N. American Indian tribe[213].

nrakta Eastern N. America - Manitoba to New Brunswick, south to N. Carolina and Kansas. ksacta Moist rich soils in woodlands, usually on calcareous soils[43, 159]. Understorey of deciduous (rarely coniferous) forests from sea level to 1300 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at  $18^{\circ}$ c[134]. When large enough to handle, prick the

seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Landscape Uses:Ground cover, Massing, Rock garden, Woodland garden. Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Plants are found on alkaline soils in the wild[43]. Plants are hardy to at least -25°c[200]. The flowers are malodorous and are pollinated by flies[200]. Plants often selfsow when growing in a suitable position[200]. Special Features:Attractive foliage, North American native, Naturalizing, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.137 Rubus flagellaris

Northern Dewberry

3 tlin 7 cyuc 3 kcak 1 tcan 1 dwat 0.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

drutta Rubus flagellaris is a deciduous Shrub growing to  $0.2~\mathrm{m}$  (0ft 8in) by  $2~\mathrm{m}$  (6ft). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Fruit StemEdible Uses: TeaFruit raw or cooked in pies, preserves etc[46, 61, 105, 161, 171, 183, 257]. A rich flavour[43]. The fruit is about 15mm in diameter[200]. Young shoots - peeled and eaten raw[183]. They are harvested as they come through the ground in spring and whilst they are still young and tender. The dried leaves make a fine tea[183].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]. A black dye is obtained from the green twigs[207].

dwatta Antihaemorrhoidal Antirheumatic Astringent Stimulant Tonic VDThe root is astringent, stimulant and tonic[257]. An infusion has been used in the treatment of diarrhoea, venereal disease and rheumatism[257]. An infusion has been used as a wash in the treatment of piles[257]. The root has been chewed as a treatment for a coated tongue[257]. The leaves are astringent[257]. An infusion has been used in the treatment of diarrhoea[257].

nrakta Eastern N. America. ksacta Dry fields, openings and borders of thickets[43] in slightly acid soils[159].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. A very polymorphic species[43], it is sometimes cultivated for its edible fruit and there are some named varieties[1, 171, 183]. This species

is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. The plant produces apomictic flowers, these produce fruit and viable seed without fertilization, each seedling is a genetic copy of the parent[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 4.2.138 Vaccinium vitis

Cowberry, Lingonberry, Northern mountain cranberry, Cran-

3 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli fyifxre7t hjonli

drutta Vaccinium vitis-idaea is an evergreen Shrub growing to 0.3 m (1ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Tea should not be drunk on a regular basis because it contains the toxin 'arbutin'

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[2, 3, 5, 9, 21, 257]. Quite pleasant to eat[7]. An acid flavour, they are used like cranberries in preserves and are considered by many people to be superior to cranberries[183]. The taste is better after a frost[62, 115, 172]. Occasionally the plants bear 2 crops in a year[13]. The fruit is about 6mm in diameter[200]. A tea is made from the leaves[177, 183]. This should not be drunk on a regular basis because it contains the toxin 'arbutin'[9].

tcanta DyeA yellow dye is obtained from the leaves and stems[172]. A purple dye is obtained from the fruit[207]. Can be grown as a ground cover plant[11], spreading by underground runners[188]. It needs weeding for the first year or so[197]. Plants are best spaced about 30cm apart each way[208].

dwatta Antirheumatic Antiseptic Astringent Diuretic Refrigerant VDThe leaves are antiseptic, astringent, diuretic, refrigerant[7, 21]. They are used in the treatment of gonorrhoea[218], arthritis, rheumatism, diabetes and diarrhoea[9]. The leaves are gathered in early summer and dried rol later use[7]. The mature fruits are eaten fresh or dried as a remedy for diarrhoea[9] and as a treatment for sore throats, coughs and colds[257]. The juice has been gargled as a treatment for sore throats[257].

nrakta Europe, including Britain, from Iceland south and east to the Pyrenees, Macedonia, N. Asia to Japan ksacta Sunny mountain meadows, peat moors and pine woods[7, 17], on acid soils[9].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Landscape Uses:Border, Massing, Seashore. Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leafnould[11, 200]. Prefers a very acid soil with a pH in the

critical[238]. Pregnant women and people with heart complaints should not be prescribed this plant[7]. See also notes above on toxicity. Externally, the root is used as a poultice in the treatment of abscesses, boils, carbuncles and sores[238, 268]

nrakta Throughout Europe, including Britain, and temperate Asia. ksacta Damp undergrowth, woodlands and other shady positions[7, 9, 31].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at 20°c. Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Specimen, Woodland garden. Prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position[175, 200]. Succeeds in poor soils[208]. Succeeds in full sun but grows best in a shady position with only 2 - 3 hours sun per day[200]. Tolerates a pH range from 4.5 to 7[200]. Dislikes heavy clay[1]. Prefers a good supply of water at its roots[1] but succeeds in dry shade[28] and tolerates drought when it is established[200]. A very hardy plant, tolerating temperatures down to about -30°c[200], the plant remains evergreen in the milder areas of Britain[233]. Members of this genus are rarely if ever troubled by browsing deer[233]. An aggregate species[17]. There are many named forms, selected for their ornamental value[187]. Special Features: Attractive foliage. North American native, Wetlands plant, Attracts butterflies, There are no flowers or blooms

# 4.2.198 Quercus mongolica grosseserrata

3 tlin 7 cyuc 2 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Quercus mongolica grosseserrata is a deciduous Tree growing to 20 m (65th) by 15 m (49th). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, easily worked. Used for furniture, panelling, furniture etc[46].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - Japan. ksacta Mountains all over Japan[58].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 4.2.199 Leonurus cardiaca

Motherwort, Common motherwort 3 tlin 7 cyuc 2 kcak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Leonurus cardiaca is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: midly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with this plant can cause dermatitis in susceptible people[21]. The fragrant essential oil can cause photosensitization[274]. Grazing animals can have their mouths injured by the sharp teeth of the calyces[274]. Avoid during pregnancy as it is a uterine stimulant although it has been used during labour [301].

kcakta Edible Parts: Edible Uses: Condiment TeaThe fresh or dried flowers can be used as a flavouring in soups, particularly lentil or split pea[183]. They are also used as a flavouring in beer[183]. Fresh or dried flowers can be used to make a tea[183].

tcanta DyeA dark olive-green dye is obtained from the leaves [46, 61, 145].

dwatta Antiarrhythmic Antiflatulent Antispasmodic Astringent Birthing aid Cardiac Diaphoretic Emmenagogue Homeopathy Nervine Sedative Stomachic Tonic Women's complaints Motherwort is especially valuable in the treatment of female weaknesses and disorders, allaying nervous irritability, inducing guiet and passivity of the whole nervous system[4]. It is also seen as a remedy for heart palpitations, it has a strengthening effect, especially on a weak heart[254]. The antispasmodic and sedative effects promote relaxation rather than drowsiness[254]. The leaves are antispasmodic, astringent, cardiac, diaphoretic, emmenagogue, nervine, sedative, stomachic, tonic and uterine stimulant[4, 9, 21, 46, 165, 222]. They are taken internally in the treatment of heart complaints (notably palpitations) and problems associated with menstruation, childbirth and menopause, especially of nervous origin[238]. Although an infusion can be used, the taste is so bitter that the plant is usually made into a conserve or syrup[244]. An alcoholic extract is said to possess superior action to valerian (Valeriana officinalis)[240]. The plant has been found effective in the treatment of functional heart complaints due to autonomic imbalance, and also as an anti-thyroid treatment, though it needs to be taken for several months for these effects to be noticed[244]. The whole herb is harvested in August when in flower and can be dried for later use[4]. It should not be prescribed in the earlier stages of pregnancy or where periods are heavy [238] 254]. A homeopathic remedy is made from the plant[9]

female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers dry or moist soil.

pcista The plant might be slightly toxic[76]

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw[4, 115, 177]. The leaves have been used in salads, being acrid and pungent like cress[4]. We find them rather bitter and not very pleasant, though they are available all year round and so might be useful in the winter[K]. Some caution is advised, see the notes above on toxicity.

tcanta DyeA clear yellow dye is obtained from the flowers, though it is not very permanent[4, 115].

dwatta Antiscorbutic VulneraryThe herb is antiscorbutic and vulnerary[4, 7]. It is used externally as a poultice on fresh wounds to stop the bleeding[7]. There are reports that it has been used with success in India for the treatment of diabetes[4, 240].

nrakta S. Europe. Naturalized in Britain. ksacta Walls and other well-drained sites, shady rocks and woods, usually on calcareous soils[17, 50].

propta Seed - surface sow March to June in a cold frame and do not exclude light. The seed usually germinates in 2 - 4 weeks at  $18\,^\circ\text{C}[164]$ . When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in late spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a moderately good soil and some shade[1]. Plants usually self-sow freely[188] and can be invasive, especially when grown on old walls[200]. They succeed both on dry-stone walls and on old mortared walls[219].

# 4.2.196 Aralia hispida

Bristly Sarsaparilla

3 tlin 7 cvuc 2 kcak 2 tcan 1 dwat 1 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aralia hispida is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Drink TeaA tea is made from the roots[183]. The roots are also used for making 'root beer' [183].

tcanta Wildlife shelter. Nectary shelter [1-2].

dwatta Alterative Cardiac Diaphoretic Diuretic TonicA tea made from the leaves is diaphoretic[222]. The root is alterative and tonic[257]. An infusion of the root has been used in the treatment of heart diseases[257]. The bark, and especially the root bark, is diuretic and tonic[4, 222]. A homeopathic remedy is made from the fresh root[4]. It has alterative, diaphoretic and diuretic properties and is considered to be a good treatment for dropsy[4].

nrakta Eastern and Central N. America - E. Canada to Virginia, west to Illinois and Minnesota. ksacta Rocky or sandy sterile soils, Alberta to Saskatchewan, Manitoba and Ouebec (2041.

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a moderately fertile deep moistureretentive well-drained loam and a position in semi-shade but also succeeds in a sunny position[200]. Requires a sheltered position[200]. Plants are hardier when grown on poorer soils[200]. This species is especially tolerant of poor dry soils[200]. Prefers an acid soil[184]. Dormant plants are hardy to at least -15°c[184, 200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. The whole plant has an unpleasant smell[4]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 4.2.197 Dryopteris filix

Molo Form

3 tlin 8 cyuc 2 kcak 0 tcan 4 dwat 1.2 m hkuc

hmim cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Dryopteris filix-mas is an evergreen Fern growing to 1.2 m (4ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, and the seeds ripen from July to September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caution is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised

kcakta Edible Parts: Leaves RootEdible Uses: Young fronds - cooked[105, 177]. A flavour resembling asparagus, broccoli and artichokes[142]. Some caution is advised, see the notes above on toxicity. The rhizomes can be eaten raw or cooked[257]. They were eaten raw as part of a regime for losing weight[257].

tcanta Compost Potash TanninA compost of fern leaves is very beneficial on tree seed beds, aiding germination[20]. The ashes of the plant are rich in potash and has been used in making soap and glass[4]. An effective ground cover plant. Although it is usually deciduous, its decaying fronds make a good weed-suppressing mulch in the winter[200]. Space the plants about 60cm apart each way[208]. The roots contain about 10% tannin[223].

dwatta Anodyne Antibacterial Antiinflammatory Antirheumatic Antiviral Astringent Febrifuge Vermifuge VulneraryThe male fern is one of the most popular and effective treatments for tape worms. The root stalks are anodyne, antibacterial, anti-inflammatory, antiviral, astringent, febrifuge, vermifuge and vulnerary[7, 9, 13, 19, 21, 171, 178, 218, 238]. The root contains an oleoresin that paralyses tapeworms and other internal parasites and has been used as a worm expellent[222, 238]. The active ingredient in this oleoresin is 'filicin', roots of this species contain about 1.5 - 2.5% filicin[240]. It is one of the most effective treatments known for tapeworms - its use should be immediately followed by a non-oily purgative such as magnesium sulphate. Convolvulus scammonia or Helleborus niger in order to expel the worms from the body[7, 238, 254]. An oily purge, such as caster oil, increases the absorption of the fern root and can be dangerous[238]. The root is also taken internally in the treatment of internal haemorrhage, uterine bleeding, mumps and feverish illnesses[238]. The root is harvested in the autumn and can be dried for later use[7]. This remedy should be used with caution and only under the supervision of a qualified practitioner[21, 238]. The root is toxic and the dosage is

range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Sometimes cultivated for its edible fruit, there are some named varieties[183]. 'Koralle' has large and conspicuous berries[182]. The fruit hangs on the plant all winter if it is not picked[183]. The flowers produce a great deal of nectar and are very attractive to bees[7]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Edible, Wetlands plant, Attractive flowers or blooms. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 4.2.139 Geum rivale

Water Avens, Purple avens

3tlin7cyuc3kcak1tcan2dwat0.3m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Geum rivale is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to September, and the seeds ripen from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Edible Uses: Chocolate Condiment DrinkThe dried or fresh root can be boiled in water to make a delicious chocolate-like drink[85, 95, 106, 183, 213]. It can also be used as a seasoning[102, 183]. It is best harvested in the spring or autumn but can be used all year round[213]. Fragrant[161], it was once used to flavour ales[2, 183].

tcanta RepellentThe dried root repels moths. Plants are suitable for ground cover when spaced about 30cm apart each way[208]. The cultivar 'Leonard's Variety' is the best for this purpose[208].

dwatta Antidiarrhoeal Antiinflammatory Antiseptic Aromatic Astringent Diaphoretic Febrifuge Stomachic Styptic TonicThe root is anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, febrifuge, stomachic, styptic and tonic[4, 21]. An infusion is taken internally in the treatment. of diarrhoea (and is suitable for children to use), intestinal and stomach complaints, liver disorders etc, it is also applied externally as a wash to various skin afflictions - it is said to remove spots, freckles and eruptions from the face[4, 9]. This plant has similar properties but is less active than the related G. urbanum and so is seldom used medicinally[9, 238]. The root is best harvested in the spring, since at this time it is most fragrant[4]. Much of the fragrance can be lost on drying, so the root should be dried with great care then stored in a cool dry place in an airtight container, being sliced and powdered only when required for use[4]. The root is rich in tannin and is a powerful astringent[213, 222].

nrakta Europe, including Britain, from Iceland south and east to Spain, Siberia and W. Asia. N. America. ksacta Damp places, such as moist ditches and streamsides, most frequently in the shade[9, 17].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer' Division in spring or autumn. This should be done every 3 - 4

years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Easily grown in a moist or shady border[28, 187]. Prefers a soil rich in organic matter[200]. Prefers a base rich soil[17]. Hybridizes freely with other members of this genus, especially with G. urbanum[187]. There are some named varieties selected for their ornamental value[208, 233]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.140 Campanula latiloba

3 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula latiloba is an evergreen Perennial growing to 0.9 m (3ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pfr. neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[K]. Pleasantly sweet, though individual leaves are quite small. The leaves are available all year round. Flowers - a pleasant taste and texture with a slight sweetness[K].

tcanta Plants can be grown for ground cover when planted about 45cm apart each way, they form spreading clumps[208].

nrakta Europe - Siberia. ksacta Not known

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c[138]. Easy[221]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[200]. Very easy[221], larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta An easily grown plant that succeeds in almost any soil[221], it prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in full sun though it also tolerates partial shade[1, 200, 208]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Plants are hardy to at least -15°c[200]. If the plants are cut back by half after the first flush of flowering, they will usually produce a second flush[271]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Plants often self-sow in British gardens[221].

There are some named forms selected for their ornamental value[208]. This species is very closely related to C. persicifolia, differing from that species in having stalkless flowers and stiff rather thick angular stems[271]. The main difference from a gardener's viewpoint is that this species is coarser and more robust with stems that rarely blow over[271]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 4.2.141 Campanula carpatica

Tussock Bellflower, Carpathian Bellflower, Carpathian Harebell

3 tlin 8 cyuc 3 kcak 2 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Campanula carpatica is a PERENNIAL growing to 0.3~m (1ft) by 0.3~m (1ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked. A pleasant flavour, they are slightly sweet but a little bit chewy when eaten raw[K]. Flowers - raw or cooked. Slightly sweet, they make a pleasant and decorative addition to salads[K].

tcanta Plants make a good ground cover when planted about 30cm apart each way, forming a spreading clump[208]. nrakts S. E. Europe - Carpathian Mountains. ksacta Not

propta Seed - surface sow spring in a cold frame. Seed usually germinates in 2 - 4 weeks at 18°c. Very easy from seed[221]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy[221], larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Landscape Uses:Border, Container, Ground cover. Rock garden. Prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in a sunny position though it also tolerates partial shade[1, 200, 208]. A very easy species to grow, it will tolerate almost any soil or situation though it prefers the fullest amount of sun[221]. Plants grow well on a sunny wall so long as the roots have soil to grow into[219]. Plants are hardy to at least -15°c[200]. A very free-flowering plant, indeed it has one of the longest flowering periods of any species in this genus[271]. If the plant is cut back as the flowers fade, it will usually produce a second flush of flowers later in the season[271]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. This species, however, especially under garden conditions, is more likely to produce hybrids than most other members of the genus [271]. The plants are self-fertile[221]. A very variable species in the wild[271]. There are many named varieties selected for their ornamental value[200]. 'Chewton Joy' has pleasantly flavoured leaves[K]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage. Not North American native. Suitable for cut flowers. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F

(30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

#### 4.2.142 Asclepias speciosa

Showy Milkweed

3 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Asclepias speciosa is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from June to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. One report says that the plant is considered poisonous in large quantities by some native North American Indian tribes[257].

kcakta Edible Parts: Flowers Leaves Oil Root Seed SeedpodEdible Uses: Gum Oil SweetenerFlower buds - raw or cooked[61. 92]. They taste somewhat like peas[85]. They can be used to thicken soups[257]. Young shoots and leaves cooked[46, 61, 62, 92, 95]. An asparagus substitute[85, 183]. One report says that they should not be eaten raw[85], whilst another says that the young spring shoots were eaten raw by some native American tribes[257]. Tips of older shoots are cooked like spinach[85, 183]. Young seed pods, 3 - 4 cm long - raw or cooked[85, 257]. Very appetizing[85]. The immature pods are peeled before being eaten[257]. Flower clusters can be boiled down to make a sugary syrup[85] or they can be eaten raw[161, 183]. Seed - raw[161, 257]. A chewing gum can be made from the latex contained in the stem and leaves[46, 61, 92, 183]. Root[183]. No further details are given, but another report says that the root can be poisonous in large quantities [257].

tcanta Dye Fibre Gum Latex Oil Paper Pollution StuffingA good quality tough fibre is obtained from the bark[92, 99]. It is used in twine, coarse cloth, paper etc[92, 99]. The fibre is 10 - 45mm long[189]. It is easily harvested in late autumn, after the plants have died down, by simply pulling it off the dead stems[168, 169]. When making paper, the stems can be retted by leaving them in the ground until they are dry in the winter or they can be harvested in late summer, the leaves removed and the stems steamed to remove the fibre[189]. The stems are then cooked for two hours with lye and pounded with mallets[189]. The paper colour varies from white to creamy green depending on how the paper is made[189]. If the stems are used in the summer the latex will often find its way onto the fibres and is hard to remove[189]. The seed floss is used to stuff pillows etc, or is mixed with other fibres to make cloth[168, 169]. It has also been used as a baby's nappy[257]. The seed floss is a Kapok substitute, used in Life Jackets or as a stuffing material[169]. It is very water repellent. The floss has also been used to mop up oil spills at sea. Rubber can be made from latex contained in the leaves and the stems[57, 92, 112]. The yield is up to 3%[112]. Pods contain an oil and a wax which are of potential importance. A green due is obtained from the flowers and leaves combined[168]. Asclepias speciosa is a specific Monarch butterfly food and habitat plant. The dogbanemilkweed family Asclepias, Apocynum, Calotropis, and Trachomitum spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres

nrakta Europe to E. Asia. ksacta Mountainous regions in Europe[50]. Alpine valleys, meadows on mountain slopes, sandy riverbanks, ravines and forest edges at elevations of 700 - 5000 metres in northern China[266].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 4.2.193 Calochortus macrocarpus

Sagebrush Mariposa Lily, Nez Perce mariposa lily 3 tlin 7 cyuc 2 kcak 0 tcan 1 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calochortus macrocarpus is a BULB growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers RootEdible Uses: Bulb - raw or cooked[105, 161, 177, 257]. The bulb can be harvested in early spring, peeled and eaten raw[257]. It can also be boiled or baked and used like potatoes[257]. Flower buds - raw[257]. A sweet flavour[257].

dwatta SkinA poultice of the mashed bulbs has been used to treat poison ivy rash[257].

nrakta Western N. America - British Columbia to Nevada. ksacta Dry hills, usually in loose soil[60]. In sagebrush scrub and open coniferous forests to 2000 metres[90].

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 - 6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. One report says that the bulbs must be planted into their permanent positions immediately[1], whilst another says that they can be stored overwinter and replanted in the spring[138]. Stem bulbils, harvested from the stems after flowering[200]. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a sunny position and must be kept dry over winter[1, 200]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter. It is easiest to grow in a bulb frame but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in spring[138]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. Hand pollination is necessary if seed is required[1].

#### 4.2.194 Acer mono

Maple

3 tlin 8 cyuc 2 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Acer mono is a deciduous Tree growing to 15 m (49ff 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SapEdible Uses: The sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (A. saccharum). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Leaves - cooked. A famine food, they are only used when all else fails[179].

tcanta Fuel Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - hard, close grained[46]. Used as a fuel[46].

dwatta Astringent IrritantThe leaves are an irritant[240]. The bark is astringent[240].

nrakta E. Asia - China, Japan, Korea, Mongolia and eastern Russia ksacta Mountains all over Japan[58]. Hillsides, mountain valleys and forests from sea level to 1800 metres in China[266].

propta Seed of this species is rarely available. If obtained, it is best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 -8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting. rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Grafting onto the roots of A. platanoides is usually successful, but the graft should be made as low as possible to reduce the incident of suckers from the rootstock.

nwatta Landscape Uses:Specimen. Of easy cultivation, it prefers a good moist well-drained soil[11] and a position that is at least moderately sunny[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. A polymorphic species[58], it is closely related to A. truncatum[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features:Not North American native, Inconspicuous flowers or blooms.

#### 4.2.195 Cymbalaria muralis

Kenilworth Ivv

a tlin 7 cyuc 2 kcak 0 tcan 1 dwat m hkuc hmim cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifsre7t hionli

drutta Cymbalaria muralis is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and

# 4.2.190 Solidago canadensis scabra

Canadian Goldenrod

3 tlin 7 cvuc 2 kcak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

wis hpa7tmwatli xre7t hjonli

drutta Solidago canadensis scabra is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: TeaYoung leaves and flowering stems - cooked[172]. Seed[22, 46, 61, 105, 161, 183]. It can be used as a thickener in soups[172]. The seed is very small and fiddly to harvest or utilize[K]. A tea can be made from the flowers and/or the leaves[172, 183].

tcanta Dve LatexA source of latex, contained in the leaves. A potentially good source of rubber[61]. Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Haemostatic Salve Skin StypticThe whole plant is antiseptic, haemostatic, salve and styptic[168, 172, 257]. An infusion of the dried powdered herb can be used as an antiseptic[168]. A poultice of the flowers has been used in the treatment of ulcers and burns[257]. A poultice of the moistened, crushed root has been used in the treatment

nrakta Eastern N. America - Maine to Ontario, Nebraska, Georgia and Texas. ksacta Dry to damp thickets, roadsides and clearings[43].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the sum-

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. Hybridizes freely with S. canadensis[43]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

#### 4.2.191 Lythrum salicaria

Purple Loosestrife

3 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 1 m hkuc

hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli drutta Lythrum salicaria is a PERENNIAL growing to 1

m (3ft 3in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Leaves RootEdible Uses: ColouringLeaves - cooked[13, 46, 61, 105]. Rich in calcium[179]. Root - cooked[13]. An edible dye is obtained from the flowers[13]

tcanta Cosmetic Dye Preservative Tannin TeethA decoction of the plant is impregnated into wood, rope etc to prevent it rotting in water[74]. The leaves contain about 12% tannin, the stems 10.5%, the flowers 13.7% and the roots 8.5%[218]. It is probably these tanning that preserve the wood etc[218]. The powdered plant is used cosmetically in face-packs to counteract reddened skin[7].

dwatta Antibiotic Antidiarrhoeal Astringent Dysentery Eczema Hypoglycaemic Styptic VulneraryPurple loosestrife is an astringent herb that is mainly employed as a treatment for diarrhoea and dysentery. It can be safely taken by people of all ages and has been used to help arrest diarrhoea in breast-feeding babies[254]. It can also be used to treat heavy periods and inter-menstrual bleeding[254]. Modern research has shown the whole plant to be antibiotic and to be particularly effective against the micro-organism that causes typhus[254]. The flowering plant is antibiotic, highly astringent, hypoglycaemic, styptic and vulnerary [4, 7, 9, 21, 152, 218, 238]. It is valued as an intestinal disinfectant, especially in cases of enteritis[7], an infusion is used internally in the treatment of diarrhoea, internal bleeding, excessive menstruation etc[9, 222, 238]. The flowering plant is harvested in the summer and can be used fresh or dried[9]. Externally, the plant is used as a cleansing and healing wash for wounds. sores, impetigo, eczema, excess vaginal discharge, vaginal itching etc[7, 222, 238, 254]. The powdered plant is used as a haemostatic in cases of severe nosebleeds[7]. The stems are regarded as gum stimulators and are given to children to chew in order to strengthen weak or bleeding gums[7].

nrakta Europe, including Britain, south to N. Africa east to western and northern Asia. N. America.. ksacta Reed swamps at the margins of lakes and slow-flowing rivers, fens and marshes, avoiding acid soils[17].

propta Seed - sow in the autumn or the spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it could be worthwhile trying a sowing in situ in the autumn or the spring. Division in March or October[188]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in the spring[238]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Container, Massing, Rock garden, Seashore, Specimen. Succeeds in ordinary garden soil, especially if it is damp[1]. Prefers a neutral to alkaline soil[238]. Grows well in heavy clay soils. Grows well in marshy soils[24] and succeeds in shallow water at the edges of ponds[56]. Succeeds in full sun or partial shade[188]. A very hardy plant, tolerating temperatures down to at least -25°c[187]. This species can be very invasive and has been declared a noxious weed in some countries. Since being introduced in N. America it has invaded native marshlands. florming large areas of dense stands and crowding out many native species[274]. A very ornamental plant[1]. A good bee and butterfly plant[24]. Plants usually self-sow when well sited[200]. Special Features:Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

#### 4.2.192 Potentilla multifida

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla multifida is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: cooked[61]. Starchy[105, 177].

from the stem and seed finer or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Antirheumatic Antiseptic Ophthalmic Skin Stomachic VD WartsThe latex is used as a cure for warts[168, 257]. The latex needs to be applied at least once a day of a period of some weeks for it to be effective[K]. The latex has antiseptic properties and has been used to treat skin sores, cuts and ringworm[257]. A decoction of the plant tops can be strained and used to treat blindness and snow-blindness[257]. The root is either chewed when fresh, or dried, ground into a powder then boiled, and used in the treatment of stomach ache[257]. A decoction of the roots has been used in small doses to treat venereal diseases and also to treat coughs. especially from TB[257]. A poultice of the mashed roots has been applied to rheumatic joints[257]. Some caution should be employed when using the root since there is a report that it can be poisonous in large quantities[257].

nrakta Western N. America - Minnesota to British Columbia, south to Kansas, Utah and California. ksacta Prairies, in sandy and loamy, usually moist soils[60].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: HavPrefers a well-drained light rich or peaty soil and a sunny position[1, 134, 200]. A very ornamental plant[1], it is closely related to A. purpurascens[200]. The roots can spread quite freely when the plant is in a suitable position[233]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207].

#### 4.2.143 Viola labradorica

Labrador Violet, Alpine violet, Johnny Jump-Up, Alpine Violet 3 tlin 8 cyuc 3 kcak 2 tcan 0 dwat 0.1 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Viola labradorica is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[105]. A mild flavour, though the leaves soon become guite tough[K]. The

leaves make a very acceptable addition to salads[K]. When added to soup they thicken it in much the same way as okra[85, 159]. A tea can be made from the leaves[85].

tcanta A good ground cover plant, fast spreading but slow to thicken up and may need weeding for the first year or so[197]. Plants should be spaced about 30cm apart each way[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

nrakta North-eastern N. America - Labrador, south to the mountains of Maine, New Hampshire and New York. ksacta Woods and grassy places[187].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Landscape Uses: Border, Ground cover, Rock garden, Woodland garden. Cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Succeeds in dense shade [197]. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5. Hardy to about -25°c[187]. There are some named varieties selected for their ornamental value[200]. All members of this genus have more or less edible leaves and flower buds, though those species with vellow flowers can cause diarrhoea if eaten in large quantities [62, 85, 159]. Special Features: Attractive foliage, North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

# 4.2.144 Parthenocissus guinguefolia

Virginia Creeper, Woodbine 3 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Parthenocissus guinguefolia is a deciduous Climber growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista Skin contact with the leaves in autumn can cause dermatitis in some people[222]. The tissues of the plant contain microscopic, irritating needle-like crystals called raphides[274]. Some evidence suggests the berries are poisonous [301].

kcakta Edible Parts: Fruit Root StemEdible Uses: Fruit raw[105, 161]. The fruit is not very well flavoured, nor is it produced very freely[K]. The fruit is about 6mm in diameter[200] and is carried in small bunches like grapes[K], Stalks - cooked. They should be peeled and then boiled[105, 161]. The stalks are cut, boiled and peeled, and the sweetish substance between the bark and the wood is used for food[257]. Root - cooked[257]

tcanta DveA pink dve is obtained from the fruit[46, 61, 257]. The plant can be allowed to fall down banks and make a spreading ground cover[202]. They are best spaced about 3 metres apart each way[208]. They are very vigorous, however, and would soon swamp smaller plants[K].

dwatta Alterative Astringent Diuretic Expectorant TonicThe bark and fresh young shoots are aperient, alterative, emetic, expectorant and tonic[46, 61]. A hot decoction can be used as a poultice to help reduce swellings[257]. A tea made from the leaves is aperient, astringent and diuretic[222]. It is used as a wash on swellings and poison ivy rash[222, 257]. A tea made from the plant is used in the treatment of jaundice[222, 257]. A tea made from the roots is used in the treatment of gonorrhoea and diarrhoea[222, 257]. The fruit is useful in treating fevers[4]. Some evidence suggests the berries (due to oxalic acid content) are poisonous [301].

nrakta Eastern N. America - Quebec to Florida and Mexico. A garden escape in Britain. ksacta Woods and rocky banks[43].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires stratifying for 6 weeks at  $5^{\circ}c$  and should be sown as early in the year as possible[200]. Germination is variable. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood,  $7-10 {\rm cm}$  taken at a node (ensure that it has at least 2 true buds), July/August in a frame[78]. Easy to root but they do not always survive the first winter[182]. Basal hardwood cuttings of current seasons growth,  $10-12 {\rm cm} \log n$ , autumn in a frame[200]. Layering[200]. Plants often self-layer[202].

nwatta Landscape Uses:Arbor, Woodland garden. Requires a well-drained moisture retentive fertile soil[200]. Succeeds in most soils, preferring full sun but tolerating semi-shade[202]. Best if grown in semi-shade on an east or west facing wall[200]. Tolerates atmospheric pollution[4]. Dormant plants are hardy to about -25°c[200], though the young growth in spring can be damaged by late frosts. A very ornamental plant[1], it is self-supporting on walls by means of adhesive tendrils[11, 182]. Very fast growing, though it often does not grow very much in its first year or two after planting out[202]. When established, it can send out new growth 6 metres long in a year[4]. The plant can, however, become a nuisance by climbing into gutters[182]. Plants are very tolerant of trimming and can be cut right back to the base if required to rejuvenate the plant[202]. Any pruning is best carried out in the spring[219]. The fruit is normally only produced after a long hot summer[219]. There are several named varieties[182]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

#### 4.2.145 Populus deltoides

Eastern Cottonwood, Plains cottonwood, Rio Grande cottonwood, Necklace Poplar

3 tlin 9 cyuc 2 kcak 4 tcan 2 dwat 30 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Populus deltoides is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from March to April, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Inner bark Leaves SeedEdible Uses: Inner bark[105, 161, 177, 257]. A mucilaginous texture, it is usually harvested in the spring[257]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. Seeds[105, 161, 177]. No more details are given but they are very small and would be exceedingly fiddly to collect and use. Sap - used for food[257]. Buds[105, 161, 177]. No more details are given. The leaves are rich in protein and have a greater amino-acid content than wheat, corn, rice and barley[226]. A concentrate made from them is as nourishing as meat, but can be produced faster and more cheaply[226]. Some people believe that this will become a major food source for humans[226].

tcanta Biomass Dye Pioneer Rooting hormone Shelterbelt Soil stabilization WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. Various dyes can be obtained from the leaf buds in the spring - green, white, vellow, purple and red have been mentioned[257]. Trees are planted for dune fixing in erosion control programmes[149, 227]. They are also good pioneer species, growing quickly to provide a good habitat for other woodland trees and eventually being out-competed by those trees[229]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200, 269]. Another report says that it is easily storm-damaged[227]. The wood has been used as a bio-mass for producing methanol, which can be used to power internal combustion engines[226]. Annual yields of 7 tonnes of oven-dry material per year have been achieved[269]. Wood - weak, soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion but warps and shrinks badly[11]. 149, 171, 227]. It weighs 24lb per cubic foot[235]. The wood takes paint well, is easy to glue and nail[227]. It is used principally for lumber, pulp, crates, veneer etc[11, 149, 171].

dwatta Anodyne Anthelmintic Antiinflammatory Antiscorbutic Blood purifier Febrifuge Poultice TonicThe bark contains salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[222, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238]. An infusion of the bark has been used in the treatment of whooping cough and tuberculosis[257]. A decoction of the bark has been used to rid the body of intestinal worms[257]. The bark has been eaten as a treatment for colds[257]. A tea made from the inner bark is used in the treatment of scurvy[222]. The inner bark, combined with black haw bark (Crataegus douglasii) and wild plum bark (Prunus spp) has been used as a female tonic[222, 257]. A poultice of the leaves has been used as a treatment for rheumatism, bruises, sores and boils[257].

nrakta N. America - Quebec to Florida, west to Minnesota and Texas. ksacta Rich moist soils, mainly along riverbanks, bottoms and rich woods[43, 227].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Other Systems: Irreg. Intercrop Other Systems: Strip intercropLandscape Uses:Erosion control, Aggressive surface roots possible. An easily grown plant, it does well in a heavy cold damp soil[1, 269] but thrives best on moist well-drained, fine sandy loams or silts close to streams[269]. Prefers a deep rich welldrained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. Tolerates both hot and cool summers[200]. Fairly wind-tolerant[200]. The tree is reported to tolerate an annual precipitation in the range of 60 to 150cm, an annual temperature in the range of 8 to 14°C, and a pH of 4.5 to 8[269]. A fast-growing but shortlived tree[227, 229, 274]. It can make new shoots up to 1.5 metres long each year[274] and is often planted for timber in Europe[50]. It does have drawbacks, though, since it is easily storm-damaged, is easily damaged by fire when young and is much attacked by fungi[227]. Like the quaking aspen (Populus tremuloides) the leaves of this species rustle even in light breezes[274]. The trees can be coppiced[149], sprouting freely from the base of the trunk and the roots if they are cut down[227]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the

needs of the genus. Succeeds in most soils but prefers a well-drained light soil in a sunny position.

# 4.2.187 Polygonatum pubescens

Hairy Solomon's Seal

3 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum pubescens is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some members of this genus have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[102]. They can be used as an asparagus substitute. Root - cooked[102]. The root is up to 18mm thick[270]. It is rich in starch.

dwatta Haemostatic OphthalmicA decoction of the plant has been used in the treatment of spitting up of blood[257]. An infusion of the roots has been used as an eye wash in the treatment of snow blindness[257].

nrakta Eastern to Central N. America - Nova Scotia, Manitoba and southwards. ksacta Rich shady woods[43]. Rich moist wooded slopes and coves from sea level to 1100 metres[270].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture-retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but they tolerate most other conditions[200]. This species is closely related to P. odora-tum[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

#### 4.2.188 Aster macrophyllus

Bigleaf Aster

3 tlin 7 cyuc 2 kcak 2 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aster macrophyllus is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Very young leaves - cooked and used as a vegetable[46, 61, 105, 161, 177]. The leaves are said to act as a medicine as well as a food, though no details are given[257]. Only young leaves are eaten as old leaves quickly become tough[213]. Roots - cooked. They have been used in soups[257].

tcanta Plants can be used as a ground cover in light shade, forming a spreading clump[208, 233].

dwatta Blood purifier Laxative VDThe roots have been used as a blood medicine[257]. An infusion of the root has been used to bathe the head to treat headaches[257]. A compound decoction of the roots has been used as a laxative in the treatment of venereal disease[257].

nrakta Eastern N. America. Occasionally naturalized in Britain[17]. ksacta Dry to moist open woods, thickets and clearings[43]. By rivers and streams in Britain[17].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. Succeeds in dry soils in the shade[200]. Grows well in light woodland shade[88], succeeding amongst the roots of other plants[233]. Plants are hardy to about -25°c[187]. The plant has an invasive root system and can spread freely when well sited[233]. Slugs are fond of this plant and have destroyed even quite large clumps by eating out all the new growth in spring[K]. Most species in this genus seem to be immune to the predations of rabbits[233]. A very variable plant with many different forms[187], it hybridizes freely with other members of this genus [200].

# 4.2.189 Oenothera glazioviana

Large-Flower Evening Primrose, Redsepal evening primrose  $3 \, \text{tlin} \, 7 \, \text{cyuc} \, 2 \, \text{kcak} \, 0 \, \text{tcan} \, 2 \, \text{dwat} \, 1.5 \, \text{m} \, \text{hkuc}$ 

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Oenothera glazioviana is a BIENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies), bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves Oil RootEdible Uses: Oil-Root - cooked. Boiled and eaten like salsify[144]. Fleshy and succulent. Young shoots - raw or cooked[144]. Mild and in-offensive[144] Seed contains 28% of a drying oil[114]. It is edible and a very good source of gammalinolenic acid[141], an essential fatty acid that is not found in many plant sources and has numerous vital functions in the body. Difficult to harvest, it has to be done by hand[160].

dwatta Anticholesterolemic Astringent Hypotensive Miscellany SedativeThe oil in the seeds is anticholesterolemic, astringent, hypotensive, sedative[4, 21]. Reduces cholesterol levels[66]. Research suggests that the oil is potentially very valuable in the treatment of multiple sclerosis, pre-menstrual tension, hyperactivity etc[66].

nrakta A hybrid of garden origin, probably O. grandiflora x O. elata. ksacta Not known in the wild[200].

propta Seed - sow in situ from late spring to early summer

nwatta Prefers a dryish well-drained sandy loam and full sun[1, 200]. Heavy clay soils may induce winter rots[200]. Succeeds on poor soils[200]. The flowers open in the evening, they are richly scented and are very attractive to moths[4]. The seeds are a good food source for birds, especially finches[200]. The plants of this species are of hybrid origin and usually mutate freely[1]. Usually self-sows freely if in a suitable position[K].

propta Seed - sow March or October in situ and only just cover the seed. Germination should take place within 2 weeks.

nwatta We have very little information on this species but it should succeed as an annual crop in Britain. It might be possible to sow it as an over-wintering annual. Succeeds in most soils but prefers a well-drained light soil in a sunny position[1].

#### 4.2.184 Cleome lutea

Yellow Spiderflower, Jones spiderflower

3 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 1.2 m hkuc

htut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cleome lutea is a ANNUAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4 and is frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Young shoots - cooked[85]. Seed - ground into a meal and used as a flour[85]

tcanta DyeYields a black dye[85]. No further details are given, but it is probably obtained by boiling down the whole plant[K].

dwatta StingsThe plant has been used to treat ant bites[257].

nrakta Western N. America - Nebraska to Washington and Arizona. ksacta Sandy soils on desert plains to lower montane valleys, it is also found on sandy flatland[60].

propta Seed - surface sow or only lightly cover the seed in spring in a greenhouse[164]. The seed usually germinates in 5 - 14 days at 25°c[164]. When large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. Day time temperatures below 20°c depress germination but a night time fall to 20° is necessary[164].

nwatta Prefers a light fertile soil in a warm dry sunny position with plenty of room to spread[1, 200]. A frost tender plant, it can be grown as a summer annual in Britain[200].

#### 4.2.185 Heliopsis helianthoides

False sunflower, Oxeve sunflower 3 tlin 9 cvuc 2 kcak 2 tcan 0 dwat 1.5 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Heliopsis helianthoides is a PERENNIAL growing to 1.5 m (5ft) by 1.2 m (4ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects, Birds. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known

kcakta Edible Parts: FlowersEdible Uses: The flowers have a mild taste and can be used as a garnish or in a salad [318-1].

tcanta Soil stabilizationPossibly used for erosion control due to the fibrous deep roots. Insectory: The nectar and pollen of the flowers attract their fair share of insects, including long-tongued bees. Halictine bees, bee flies, butterflies, Chauliognathus pennsylvanicus (Goldenrod Soldier Beetle), and other insects. Among the long-tongued bees, is the oligolege Holcopasites heliopsis (False Sunflower Bee). The caterpillars of Papaipoma rigida (Rigid Sunflower Borer Moth) sometimes bore through the stems[318-1]. Attracts birds and painted lady butterflies. Plant communities-Thickets Selected cultivars are shorter and attractive in a more formal garden. Smooth oxeve is considered one of the best hardy plants for a wildflower garden border [318-1].

dwatta Febrifuge MalariaOx-eye has been used in medicinal drinks, for treatment of lung troubles. The leaves

have been used in a strong tea to reduce fevers and loosen phlegm. Stems have been used to treat malaria [318-1].

nrakta Native to eastern and central North America from Saskatchewan east to Newfoundland and south as far as Texas, New Mexico, and Georgia. ksacta Open woods, woodland borders and clearings, thickets, grassy meadows, savannas, limestone glades, tallgrass prairies, blackland prairies, stream banks and disturbed roadsides or railroad rights of

propta Seed, Cuttings, Division. Heliopsis helianthoides establishes readily from seed when planted in the winter/fall or early in spring (March to April). Germination generally starts four weeks after sowing if soil temperatures remain in the 60 - 70 degree Fahrenheit range. Seeds ripen approximately one month after flowering, however as with many Asters, plants are self sterile. It may be necessary to crack open a few seeds to make sure they are viable. Cuttings and Divisions: Five to seven node cuttings taken from the top 12 inches of growth in late spring root easily. Cuttings are sometimes reluctant to overwinter. Divide plants in the fall for best results [318-1].

nwatta An upright clumping perennial wildflower with sunflower-like heads. It performs well in dry (xeric) locations, in poor to average soils, and in full sun to partial shade. Flowering can be extended by removing spent flowers. Staking may be necessary in shady locations[318-1]. USDA Hardiness Zones: 3 - 9. Soil pH: 6.0 - 8.0. Growth Rate: Moderate. Life Span: Short-Lived Perennial. Stand Persistence: Long. Form: Upright. Texture: Coarse. Sun: Full Sun, Partial Shade. Soil Type: Loamy, Silty, Clay. Soil Moisture: Moderate, Dry. Minimum Root Depth: 12 inches. Root Type: Tap, Stolon. Fungal Types: Endomycorrhizal. Seasonal Interest: Summer. Fruit Type: Achene. Flower Color: Yellow. Drought: Tolerant. Flood: Moderate. Salt: Moderate. Soil Compaction: Moderate. Mowing: Tolerant. Fire Damage: Tolerant. Cold Injury: Infrequent. Wind Storm Damage: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Animal Damage: Deer, Gophers, Mice, Rabbits. Growing Season: Warm. Bloom Time: Early Summer - Late Summer. Fruit Time: Summer - Fall [318-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Several cultivars are available with flowers of varying colors and shades. These include 'Summer Sun', 'Golden Plume', and 'Prairie Sunset'. The following cultivars of H. helianthoides var. scabra ("rough") have gained the Royal Horticultural Society's Award of Garden Merit: Benzinggold', Light of Loddon', 'Spitzentänzerin', 'Waterperry Gold'.

#### 4.2.186 Secale cereale ancestrale

3 tlin 7 cvuc 2 kcak 0 tcan 0 dwat m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Secale cereale ancestrale is a ANNUAL. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade.

It prefers moist soil and can tolerate drought. kcakta Edible Parts: SeedEdible Uses: Seed cooked[105, 177]. It can be ground into a flour and used as a cereal in making bread, biscuits etc.

nrakta W. Asia. ksacta Sandy places in vineyards, field edges etc. 100 - 1370 metres in Turkev[93].

propta Seed - sow March or October in situ and only just cover the seed. Germination should take place within 2

nwatta We have very little information on this species and do not know if it will succeed in Britain, though it should succeed as a spring-sown annual and possibly as an autumn sown plant. It is a primitive form of the cultivated cereal rye, Secale cereale[177] and as such could be of value in breeding programmes. The following notes are based on the general

if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: North American native, Naturalizing, Wetlands plant, Inconspicuous flowers or

# 4.2.146 Pinus sylvestris

Scot's Pine, Scotch Pine

3 tlin 7 cyuc 2 kcak 5 tcan 3 dwat 25 m hkuc

hmimhtut cyutli hgatkyuctcuphia7n hwicli hyishrasilut hpa7tli frusflatpriklwisslip hpa7tmwatli dvat hionli

drutta Pinus sylvestris is an evergreen Tree growing to 25 m (82ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, in flower in May, and the seeds ripen from March to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Inner barkEdible Uses: CondimentInner bark - dried and ground into a powder and used in making bread[2, 66, 105, 177]. It is often mixed with oatmeal[115]. A famine food, it is only used when all else fails[115]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Essential Fibre Fuel Herbicide Lighting Packing Resin Shelterbelt WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. A reddish yellow dye is obtained from the cones[6]. This tree yields resin and turpentine[64, 66, 100, 171]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk. or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher vields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. An essential oil obtained from the leaves is used in perfumery and medicinally[46, 61]. A fibre from the inner bark is used to make ropes[115]. The roots are very resinous and burn well. They can be used as a candle substitute[115]. The leaves are used as a packing material[46]. The fibrous material is stripped out of the leaves and is used to fill pillows, cushions and as a packing material[7]. Trees are very wind resistant and quite fast growing. They can be planted as a shelterbelt, succeeding in maritime exposure[75, 200]. Wood - light, soft, not strong, elastic, durable, rich in resin. Used in construction, furniture, paper manufacture etc.[13, 46, 100], A good fuel but it is somewhat smokey[6, 66, 115].

dwatta Antirheumatic Antiseptic Aromatherapy Bach Balsamic Diuretic ExpectorantScot's pine has quite a wide range of medicinal uses, being valued especially for its antiseptic action and beneficial effect upon the respiratory system. It should not be used by people who are prone to allergic skin reactions whilst the essential oil should not be used internally unless under professional supervision[254]. The turpentine obtained from the resin is antirheumatic, antiseptic, balsamic, diuretic, expectorant, rubefacient and vermifuge[4, 13, 46]. It is a valuable remedy in the treatment of kidney, bladder and rheumatic affections, and also in diseases of the mucous membranes and the treatment of respiratory complaints[4]. Externally it is used in the form of lini-

soil[11]. Dioecious. Male and female plants must be grown ment plasters and inhalers[4]. The leaves and young shoots are antiseptic, diuretic and expectorant[9]. They are harvested in the spring and dried for later use[9]. They are used internally for their mildly antiseptic effect within the chest and are also used to treat rheumatism and arthritis[254]. They can be added to the bath water for treating fatigue, nervous exhaustion, sleeplessness, skin irritations[9]. They can also be used as an inhalant in the treatment of various chest complaints[9]. The essential oil from the leaves is used in the treatment of asthma, bronchitis and other respiratory infections, and also for digestive disorders such as wind[254]. An essential oil obtained from the seed has diuretic and respiratory-stimulant properties[254]. The seeds are used in the treatment of bronchitis, tuberculosis and bladder infections[254]. A decoction of the seeds can be applied externally to help suppress excessive vaginal discharge[254]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Self-reproach', 'Guilt feelings' and 'Despondency'[209]. The essential oil is used in aromatherapy. Its keyword is 'Invigorating'[210].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Albania and temperate Asia. ksacta Forming woods in the mountains of Scotland[7, 9].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Industrial Crop: Hydrocarbon Management: Standard Regional TimberLandscape Uses: Christmas tree, Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Trees grow well on poor dry sandy soils[11, 81]. Fairly shade tolerant[186]. Prefers a light acid soil, becoming chlorotic at a pH higher than 6.5[186]. Trees can succeed for many years on shallow soils over chalk[185]. Tolerates chalk for a while, but trees are then short-lived[81]. Tolerates some water-logging[186]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[186]. Very wind resistant[49, 75], tolerating maritime exposure[166], Tolerates atmospheric pollution[226]. Fairly long-lived, to 200 years or more and quite fast growing[185], but trees are very slow growing in wet soils[81]. Young trees can make new growth of 1 metre a year though growth slows down rapidly by the time the tree is 18 metres tall[185]. This species is extensively used in cool temperate forestry as a timber tree[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Cones take two seasons to ripen[7]. Plants are easily killed by fire and cannot regenerate from the roots[186]. A good food plant for the caterpillars of several species of butterflies[30]. This tree has over 50 species of associated insects[81]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. There are several named forms selected for their ornamental value[188]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Naturalizing, Inconspicuous flowers or blooms.

#### 4.2.147 Ulmus americana

American Elm. Grav Elm. Water Elm 3 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulmus americana is a deciduous Tree growing to 25 m (82ft) by 25 m (82ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: CoffeeLeaves raw or cooked. The red inner bark has been used to make a coffee-like drink[257].

tcanta Containers Paper String WoodA fibre obtained from the stems is used in making paper[189]. The stems are harvested in spring, the leaves are removed and the stems steamed until the fibres can be stripped. The outer bark is removed from the inner bark by scraping or peeling. The fibres are cooked for 2 hours with lye and then beaten with mallets. The paper is beige in colour[189]. The inner bark is very fibrous and is used in making string and strong ropes[149]. 226]. The bark has been used to make various containers, including those used for gathering maple syrup[226]. Wood - hard, strong, heavy, durable, coarse grained, shrinks moderately though it tends to warp and twist, it bends well and is difficult to split. The wood is very durable in water. It weighs 40lb per cubic foot and is harvested commercially for flooring, wheel hubs, cooperage, agricultural implements and many other uses[46, 61, 82, 149, 171, 226, 227].

dwatta Antispasmodic Astringent Birthing aid Dysentery Haemostatic SalveAn infusion made from the bark has been used in the treatment of bleeding from the lungs, ruptures, coughs, colds, influenza, dysentery, eye infections, cramps and diarrhoea[226, 257]. An infusion of the bark has been taken by pregnant women to secure stability of children[257]. A decoction of the bark has been used as a wash on wounds[257]. A decoction of the inner bark has been taken in the treatment of severe coughs, colds, menstrual cramps[257]. An infusion of the inner bark has been drunk, and used as a bath, in the treatment of appendicitis[257]. An infusion of the root bark has been used in the treatment of coughs, colds and excessive menstruation[257]. A decoction has been used as an eve wash in the treatment of sore eves[257]. The inner bark has been used as an emollient on tumours[257]

nrakta Eastern N. America - Newfoundland to Manitoba, Florida and Texas. ksacta Rich soils, especially by streams and in lowlands[43, 82]. Found on a range of soil types, from acidic to mildly alkaline[229].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Landscape Uses:Firewood, Aggressive surface roots possible, Specimen, Street tree. Prefers a fertile soil in full sun[188], but it can be grown in any soil of at least moderate quality so long as it is well drained[1]. Trees are moderately fast-growing and live for at least 300 years in the wild[227, 229], but they do not thrive in Britain[1]. This species is particularly susceptible to 'Dutch elm disease'[274], a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. Mature trees killed back by the disease will often regrow from suckers, but these too will succumb when they get larger. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant. hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering

times can be hybridized[200]. Special Features: North American native, Inconspicuous flowers or blooms.

#### 4.2.148 Acer platanoides

Norway Maple, Harlequin Maple

3 tlin 7 cyuc 2 kcak 3 tcan 0 dwat 21 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Acer platanoides is a deciduous Tree growing to 21 m (69ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[4, 105, 177]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (A. saccharum)[2]. The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta Dye Preservative Shelterbelt WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. The trees are fairly wind tolerant and are often used in to give protection from the wind in mixed shelterbelts[200]. They are fast-growing and rapidly produce a screen[200]. A rose coloured dye is obtained from the bark[57]. Wood - hard, heavy, fine grained. Used for small domestic items[4, 13, 46, 61].

nrakta Europe, from Scandanavia to the Urals and the Mediterranean, east to W.Asia. Naturalized in Britain. ksacta Grows on all but very poor soils in Britain[17].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cultivars can be budded onto rootstocks of the species. Any grafting is best carried out in September rather than February.

nwatta Landscape Uses:Firewood, Aggressive surface roots possible, Pollard, Screen. Of easy cultivation, it prefers a good moist well-drained soil but thrives in any soil[11, 17]. Grows well in heavy clay soils. Prefers a sunny position but tolerates some shade[11, 200]. One report says that plants tolerate chalky soils[200], but another says that plants can develop chlorosis as a result of iron deficiency when they are grown in alkaline soils. Trees are very tolerant of atmospheric pollution[226]. The Norway maple is a guick-growing tree that has been widely planted in Britain and is more or less naturalized. There are many named forms that have been selected for their ornamental value[11]. Norway maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. The leaves are seldom eaten or defaced by insects because the tree contains a sharp milky juice that they dislike[4]. Trees take 30 years to produce seed[98]. Special Features: Not North American native, Invasive, Naturalizing, Attractive flowers or blooms.

ers are fragrant[245]. The form in cultivation in Britain is and it is not the oxalic acid that makes them poisonous. It very invasive, forming thickets with its suckers, whilst the wild form does not produce suckers[11]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

# 4.2.181 Chrysothamnus viscidiflorus

Green Rabbitbrush, Yellow rabbitbrush

3 tlin 7 cvuc 2 kcak 2 tcan 1 dwat 1 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Chrysothamnus viscidiflorus is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: Condiment GumA latex obtained from the root is used as a chewing gum[46, 61, 105, 2571. The plant has been used as a spice[257].

tcanta Dve Gum LatexThe latex obtained from the roots could be used in making rubber[46, 61, 161, 177]. Unfortunately it is not produced in sufficient quantity to make commercial extraction worthwhile[K]. A green dye is obtained from the bark[168]. A yellow-gold dye is obtained from the flowers[168, 257]. It is orange when alum is used as a mordant[257]. It rapidly establishes in disturbed habitat, including burns, flooded washes, and rockslides, so it is a valuable shrub for revegetating damaged land such as overgrazed rangeland and abandoned mining areas.

dwatta Antirheumatic Odontalgic PoulticeA poultice made from the chewed plant tips has been applied to boils and rheumatic joints[257]. An infusion of the leaves has been used to treat colds[257]. The finely mashed leaves have been inserted in tooth cavities to treat toothache[257].

nrakta Western N. America - southern British Columbia to California. ksacta Dry open places in lowlands and up to moderate elevations[60].

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse and only just covering the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in sand in a frame[200].

nwatta Requires a sunny position and prefers a welldrained sandy soil[1, 11]. Plants do not require a rich soil[11]. They tolerate alkaline soils[200]. A very hardy plant but it prefers a drier climate than it finds in Britain though it succeeds in this country if given the protection of a dry sunny wall[200]. A very variable and ornamental species[60]. The leaves and stems are pleasantly aromatic[219].

#### 4.2.182 Rheum rhaponticum

Rhubarb, Garden rhubarb 3 tlin 7 cyuc 2 kcak 0 tcan 3 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum rhaponticum is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain high concentrations of oxalic acid[34, 76]. Oxalic acid can lock up certain minerals (especially calcium) in the body, leading to nutritional deficiency. Cooking the plant will reduce the concentration of oxalic acid. Another report says that the leaves have the same concentration of oxalic acid in the stems as they do in the leaves says that any toxic properties of the leaves is more likely to be due to the presence of glycosides[142]. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers StemEdible Uses: Leaf stem - raw or cooked[1, 2, 103]. An acid flavour, they are used as a fruit substitute in tarts etc[2]. The young flower pouch, harvested before the flowers open, is said to form a dish of great delicacy[2].

tcanta Plants can be grown for ground cover when spaced about 1.8 metres apart each way[208].

dwatta Astringent Purgative StomachicRhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The main species used is R. palmatum. Though the chemistry varies slightly, this species is used interchangeably[238]. Another report says that this species contains only small quantities of the medicinally active compounds and so it is only used as a mild laxative [244]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 37, 57, 61, 171, 238]. Small doses act as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints. haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta Europe to E. Asia - Siberia. ksacta Wet mountain rocks in Europe[50].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semishade[200]. Shade tolerant[15], but plants prefer a sunny position[37]. Grows well in heavy clay soils. Hardy to at least -20°c[200]. This species is probably a parent of the cultivated rhubarb, R. x cultorum[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

#### 4.2.183 Secale vavilovii

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc

htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Secale vavilovii is a ANNUAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed cooked[105]. Used as a cereal for making bread, cakes, thickening soups and so on[K].

nrakta Europe - Armenia. ksacta Eroded volcanic slopes, dry gorges, irrigation ditches and as a weed of cultivated land in Turkey[93].

ter. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

### 4.2.179 Solidago odora

Sweet Goldenrod, Anisescented goldenrod, Chapman's goldenrod

3 tlin 7 cyuc 2 kcak 2 tcan 2 dwat 1.2 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Solidago odora is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Condiment TeaLeaves - cooked[177]. Seed[177]. No more details are given but the seed is very small and fiddly to harvest[K]. An aromatic, anise-flavoured tea is made from the dried leaves and dried fully expanded flowers[21, 55, 95, 183]. The blossoms are used as a flavouring[102].

tcanta Dye EssentialAn anise-scented essential oil is obtained from the plant[61]. It is used medicinally[207] and in perfumery - especially for scenting soaps[245]. Mustard, orange and brown dyes can be obtained from the whole plant1681.

dwatta Antiseptic Aperient Astringent Carminative Diaphoretic Diuretic Dysentery Febrifuge Stimulant Tonic Uriaphoretic Diuretic Dysentery Febrifuge Stimulant Tonic UriaryAn infusion of the dried powdered herb is antiseptic[168]. The leaves make a very pleasant-tasting tea that is mildly astringent, carminative, diaphoretic, diuretic, febrifuge and stimulant[21, 95, 207, 222, 257]. It is useful in the treatment of coughs and colds, dysentery and ulceration of the intestines[4, 257]. The essential oil has been used as a diuretic for infants, as a local application for headaches and for the treatment of flatulence and vomiting[4]. The flowers are aperient, astringent and tonic[4]. An infusion is beneficial in the treatment of gravel, urinary obstruction and simple dropsy[4]. The root can be chewed as a treatment for sore mouths[257].

nrakta Eastern N. America - New Hampshire to Florida, west to Texas and Oklahoma. ksacta Dry sterile soil or thin woodlands[43]. Woods and roadsides in Texas[274].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Tolerant of very poor sandy soils[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The bruised leaves have a smell like a mixture of sassafras and aniseed[245]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

### 4.2.180 Rosa virginiana

Virginia Rose 3 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

148

drutta Rosa virginiana is a deciduous Shrub growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[177]. The fruit is up to 15mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The buds are eaten by native Indians in N. America[161, 177, 183]. No further details are given, does this refer to the leaf or flower buds? The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Hedge Hedge Soil stabilizationCan be grown as a hedge, succeeding in windy positions[1, 11]. The suckering form of this species can be used to fix sand dunes[11]. It also makes a good ground cover[245].

dwatta Anthelmintic Cancer Haemostatic OphthalmicA decoction of the roots has been used as a bath and to treat worms in children[257]. An infusion of the roots has been drunk and used as a wash in treating bleeding cuts on the feet[257]. An infusion of the roots has been used as a wash to treat sore eyes[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Eastern N. America - Newfoundland to Ontario, south to Louisiana. A garden escape in Britain[17]. ksacta Damp to dry thickets, clearings, swamps and shores[43].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel. July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12

nwatta Succeeds in most soils, preferring one on the dryish side[11]. Grows well in heavy clay soils. Prefers a circumneutral soil and a sunny position[200]. Dislikes water-logged soils. Does well in a windy position[11]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. The flow-

#### **4.2.149** Ulmus rubra

Slippery Elm

3 tlin 7 cyuc 2 kcak 3 tcan 5 dwat 20 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulmus rubra is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from March to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Outer bark constituents known to cause abortions - avoid during pregnancy [301].

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: TeaLeaves - raw or cooked. Inner bark - raw or cooked. It can be dried, ground into a powder and then used as a thickener in soups or added to cereal flours when making bread etc[2, 14, 46, 55, 171]. It can also be chewed as a thirst quencher[227]. The inner bark has been cooked with fats in order to prevent them becoming rancid[257]. Immature fruit - raw or cooked[177]. The fruit is about 20mm in diameter[200]. A tea-like beverage can be brewed from the inner bark[257].

tcanta Fibre Kindling Roofing Tinder WoodA fibre obtained from the inner bark is used to make a twine[189, 257]. The boiled bark has been used for making matting, nets etc[257]. The inner bark has been used in making baskets[257]. The bark has been used as a roofing material[257]. The weathered bark has been used as kindling for starting a fire[257]. Wood - very close-grained, tough, heavy, hard, strong, durable, easy to split. It weighs 43lb per cubic foot and is used for fence posts, window sills, agricultural implements etc[46, 61, 82, 227].

dwatta Demulcent Diuretic Emollient Expectorant Nutritive UrinarySlippery elm bark is a widely used herbal remedy and is considered to be one of the most valuable of remedies in herbal practice[4]. In particular, it is a gentle and effective remedy for irritated states of the mucous membranes of the chest, urinary tubules, stomach and intestines[254]. The inner bark contains large quantities of a sticky slime that can be dried to a powder or made into a liquid[229]. The inner bark is harvested in the spring from the main trunk and from larger branches, it is then dried and powdered for use as required[4]. Ten year old bark is said to be best[4]. Fine grades of the powder are best for internal use, coarse grades are better suited to poultices[238]. The plant is also part of a North American formula called essiac which is a popular treatment for cancer. Its effectiveness has never been reliably proven or disproven since controlled studies have not been carried out. The other herbs included in the formula are Arctium lappa, Rumex acetosella and Rheum palmatum[254]. The inner bark is demulcent, diuretic, emollient, expectorant, nutritive[4, 21, 165, 213]. It has a soothing and healing effect on all parts of the body that it comes into contact with[4] and is used in the treatment of sore throats, indigestion, digestive irritation, stomach ulcers etc[222]. It used to be frequently used as a food that was a nutritive tonic for the old, young and convalescents[222]. It was also applied externally to fresh wounds, burns and scalds[222]. The bark has been used as an antioxidant to prevent fats going rancid[222]. The whole bark, including the outer bark, has been used as a mechanical irritant to abort foetuses[238]. Its use became so widespread that it is now banned in several countries[238].

nrakta Central and Southern N. America - Maine to Florida, west to Texas and North Dakota. ksacta Rich deep soils, often calcareous, on the banks of streams and low rocky hillsides [43, 82].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200], it requires 2 - 3 months stratification according to another report[113]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to

handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Industrial Crop: Medicinal Management: Coppice Management: Standard Minor Global CropPrefers a fertile soil in full sun[188], but can be grown in any soil of at least moderate quality so long as it is well drained[1]. Plants are hardy to about -10°c[238]. A moderately fastgrowing tree, living about 200 years in the wild[229], but although perfectly hardy, this species does not usually thrive in Britain[11]. Trees are often harvested in the wild for their edible inner bark, the 'slippery elm' that can be obtained from chemists and health food shops[K]. Trees have been overexploited in the wild, plus they have also suffered from Dutch elm disease. As a result they are becoming much less common[238]. The slippery elm is very susceptible to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit. and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

### 4.2.150 Picea pungens

Blue Spruce, Colorado Spruce 3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 20 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Picea pungens is an evergreen Tree growing to 20 m (65ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. The cones are about 7cm long[82]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food, it is only used when all else fails. Seed - raw[172]. The seed is about 2 - 4mm long[229]. It is rich in fats and has a pleasant slightly resinous flavour but is too small and fiddly to be worthwhile unless you are desperate[172, K]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172].

tcanta Shelterbelt WoodA fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - light, soft, close grained, weak, brittle and often full of knots[82, 171, 229]. The wood has little commercial value[226], but is used for construction[82] and is also valued for its use in the pulp industry to make paper[171].

nrakta South-western N. America - Rocky Mountains. ksacta Banks of streams or on first benches above them, singly or in small groves, 2000 - 3300 metres[82].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame[78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should

be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5-8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5-10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Christmas tree, Firewood, Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Prefers a cold dry high mountain site[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Resists wind exposure to some degree[200]. This species has a deeply penetrating root system that firmly anchors the tree against winds[229]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. A longlived but slow-growing tree in the wild, with specimens 800 years old recorded[229]. It is planted as a timber tree in N. and C. Europe[50]. Most trees in Britain are grafted and these are slow growing[185]. The few trees of seedling origin tend to be fairly fast growing after a slow start[185]. Annual increases of 30 - 40cm are not uncommon in some of the larger trees. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Seed production is usually good, with heavy crops every 2 - 3 years[229]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. There are several named forms, selected for their ornamental value[188]. Trees are very subject to severe damage by aphids in mild winter areas where temperatures do not regularly fall below -8°c[200]. All parts of the plant emit a powerful pungent smell when bruised[245]. Special Features: Attracts birds, Attractive foliage, North American native, Inconspicuous flowers or blooms.

#### 4.2.151 Pinus strobus

White Pine, Eastern white pine 3 tlin 7 cyuc 2 kcak 0 tcan 3 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dvat hionli

drutta Pinus strobus is an evergreen Tree growing to 20 m (65ft) by 5 m (16ft) at a fast rate.1t is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It cannot tolerate atmospheric pollution.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222]. Avoid if allergies. Avoid internally if suffering from asthma or bronchitis. The astringent taste may cause stomach discomfort [301].

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: Condiment Drink Gum TeaSeed - raw or cooked[102, 159]. Rather small and fiddly, it is only about 6mm long[200]. The seed is mainly used as a flavouring in cooking[213]. The fresh needles are brewed into an aromatic tea that is rich in vitamins A and C[183]. A refreshing drink is made from the leaves[159]. An acceptable candy is made by boiling the tender new shoots in syrup[183]. The sticky amber sap can be used for chewing[102, 159]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200]. The firm unexpanded male cones can be boiled and used as a flavouring[177, 183]. A pleasant

sweet flavour[257]. Inner bark - raw or cooked. A sweet flavour[105, 159, 161, 213]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread.

tcanta Dye Gum Herbicide Miscellany Pitch Waterproofing WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher vields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing canoes, containers etc, as a wood preservative etc[257]. Wood - straight and close-grained, light, soft, not strong, works easily and takes an excellent natural or painted finish[46, 61, 82, 171, 226, 229]. It weighs 24lb per cubic foot[235]. A very valuable timber[235], the wood is especially suited for making the masts of ships[4] and is also used for lumber, cheap furniture, house interiors, construction etc[46, 61, 82, 171, 226, 229]. dwatta Antiscorbutic Demulcent Diuretic Expectorant

Miscellany Pectoral Poultice Salve Vitamin CWhite pine was employed medicinally by several native North American Indian tribes who valued it especially for its antiseptic and vulnerary qualities, using it extensively in the treatment of skin complaints, wounds, burns, boils etc[257]. It is also very beneficial to the respiratory system and so was used in treating coughs, colds, influenza and so on[257]. The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4]. A poultice of pitch has been used to draw out toxins from boils and reduce the pain[257]. The dried inner bark is demulcent, diuretic and expectorant[4]. An infusion was used as a treatment for colds[213] and it is still used as an ingredient in commercial cough syrups, where it serves to promote the expulsion of phlegm[213]. A poultice made from the pounded inner bark is used to treat cuts, sores and wounds[213]. The wetted inner bark can be used as a poultice on the chest in treating strong colds[257]. The dried inner bark contains 10% tannin, some mucilage, an oleoresin, a glycoside and a volatile oil[213]. A tea made from the young needles is used to treat sore throats[213]. It is a good source of vitamin C and so is effective against scurvy[213]. An infusion of the young twigs has been used in the treatment of kidney disorders and pulmonary complaints[257]. The powdered wood has been used as a dressing on babies chaffed skin, sores and improperly healed navels[257].

nrakta Eastern N. America - Newfoundland to Manitoba, south to Georgia. ksacta Woods, especially on sandy drift soils or fertile well-drained soils, sometimes on river banks and rarely in swamps [82]. Often forming dense forests [235].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long

sun[200]. Does well on dry sandy banks and in poor soils[200]. Prefers a peaty loam soil[1]. This is one of the first species to invade disturbed or denuded ground and often becomes a serious weed of grazing land[212]. A very polymorphic plant[43].

### 4.2.177 Malus x adstringens

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus x adstringens is a deciduous Tree. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A rather acid flavour. The fruit is about 4 - 5cm in diameter (2001)

nrakta A hybrid species of garden origin, M. baccata x M. pumila. ksacta Not known in the wild.

propta Seed - this is a hybrid species and will not breed true. The seed is best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. A very ornamental plant, there are a great many named varieties[200]. 'Robin', 'Hopa' and 'Tradescant' have all been mentioned for their edible fruit[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 4.2.178 Tanacetum vulgare

Tansy, Common tansy, Golden Buttons, Curly Leaf Tansy 3 tlin 9 cyuc 2 kcak 4 tcan 2 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Tanacetum vulgare is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The plant is poisonous if large quantities are ingested[20, 21, 76]. There have been cases of death in N. America from drinking strong brews of the tea, presumably as an abortifacient[207].

kcakta Edible Parts: Flowers LeavesEdible Uses: Condiment TeaYoung leaflets - raw or cooked[5, 7, 13, 52, 53]. They can be added in small quantities to salads[183]. The plant is also used as a flavouring, it is a substitute for nutmeg and cinnamon[12, 27, 37, 55, 115]. This plant is not recommended for internal use[200]. The flowers have a unique flavour and are eaten or used as a garnish[183]. A bitter, somewhat lemon-flavoured tea is made from the leaves and flowering stems[183].

tcanta Compost Dye Essential Insecticide Repellent StrewingA green dye is obtained from the young shoots[4, 115]. The leaves and flowers can also be used and a yellow can also be obtained[169]. The plant is used as a strewing herb in cellars, churches etc in order to repel insects[4, 14, 20, 61, 201, 238]. Both the growing and the dried plant are said to repel flies, ants and fleas, especially if they are mixed with elder leaves (Sambucus spp.)[4, 12, 14, 18, 200, 201]. The leaves and the flowering shoots contain 0.15% of an essential oil that contains camphor, borneol and thujone[7, 213]. Both the leaves and the oil and they have been used to kill fleas and lice[213]. Thujone is an effective insecticide, but it is highly toxic to mammals when taken in excess[238] The plant is a good addition to the compost heap, being valued for its mineral content[200]. Attractive flowers. Attracts wildlife. Landscape Uses: Container. Dynamic accumulator.

dwatta Anthelmintic Antirheumatic Antispasmodic Appetizer Bitter Carminative Emmenagogue Poultice Stimulant TonicTansv is a commonly grown domestic remedy, useful in treating a wide range of complaints, though it is little used in modern herbalism[4, 254]. Its main value is as a vermifuge to expel intestinal worms and, to a lesser degree, to help stimulate menstrual bleeding[254]. Tansy should be used with caution, however, it is possibly unsafe for internal use, especially if you are pregnant[238]. The essential oil in the leaves is toxic and as little as 1/2 oz can kill an adult[21, 222]. The leaves and flowering tops are anthelmintic, antispasmodic, bitter, carminative, emmenagogue, stimulant and tonic[4, 7, 9, 21, 46, 165]. An infusion of the leaves or whole plant is used to treat menstrual irregularities and as an anthelmintic, especially for children[4, 213]. It is also valuable in treating hysteria, kidney weaknesses, stomach problems, fevers and also as an emmenagoque[4]. In larger doses the plant can procure an abortion, though these doses can be poisonous[213]. Externally, tansy is used as a poultice on swellings and some eruptive skin diseases[4]. It is also used externally to kill lice, fleas and scabies, though even external use of the plant carries the risk of toxicity[254]. The plant is harvested as it is coming into flower and is dried for later use[4] The seeds are used as an anthelmintic[207]

nrakta Most of Europe, including Britain, to the Caucasus, Armenia and Siberia. ksacta A common plant of waste ground, hedgerows etc[17].

propta Seed - sow spring in a greenhouse. Only just cover the seed and do not allow the pot to dry out. Prick out the seedlings into individual pots once they are large enough to handle and plant out in the summer. Division is very simple at almost any time in the growing season, though spring is probably best. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Succeeds in an ordinary garden soil[1]. Plants thrive in almost any soil[4]. Tansy is occasionally grown in the herb garden, though a site for growing this plant should be selected with care since it usually spreads very aggressively at the roots[4, 14]. There are some named varieties[238]. 'Fernleaf' is a more decorative compact form to about 75cm, it does not spread so guickly. A good plant to grow in the orchard, when grown under fruit trees, raspberries, roses etc it repels insects from them[201]. The flowering plant attracts hoverflies and butterflies. Special Features: Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. Fragrant flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and wakcakta Edible Parts: Leaves RootEdible Uses: Rutin-Leaves and young shoots - cooked[2, 105, 177].The new growth in spring and autumn is used[178, 179]. It is a good source of rutin[179]. Root - cooked. A famine food, used when all else fails[177, 179].

tcanta FuelThe old plant is used as a fuel[178, 179].

dwatta Alterative Analgesic Antibacterial Antiinflammatory Antiperiodic Antipyretic Antiviral Carminative Diaphoretic Emmenagogue Haemolytic Malaria Pectoral SedativeBei chai hu root has been used in traditional Chinese medicine for at least 2,000 years[238]. It is a bitter herb that is used to harmonize the body, balancing the different organs and energies within the body[254]. It strengthens the digestive tract, acts as a tonic for the liver and circulatory system, lowers fevers and has anti-viral effects[238]. The root is alterative, analgesic, antibacterial, anti-inflammatory, antiperiodic, antipyretic, antiviral, carminative, diaphoretic, emmenagogue, haemolytic, hepatic, pectoral, sedative[116, 147, 174. 176, 178, 218, 238, 254]. It is taken internally in the treatment of malaria, blackwater fever, uterine and rectal prolapse, haemorrhoids, sluggish liver, menstrual disorders, abdominal bloating etc[238]. The roots are harvested in the autumn and can be used fresh or dried[238]. The root contains saikosides[254]. These saponin-like substances have been shown to protect the liver from toxicity whilst also strengthening its function, even in people with immune system disorders[254]. These saikosides also stimulate the body's production of corticosteroids and increase their anti-inflammatory affect[254]. The plant is often used in preparations with other herbs to treat the side effects of steroids[218].

nrakta E. Asia - China, Korea. ksacta Grassy areas on hills and mountain slopes in Korea[279]. Grasslands, stream banks, sunny slopes and roadsides at elevations of 100 - 2700 metres in China[266].

propta Seed - sow spring in a cold frame. The seed usually germinates in 2 - 8 weeks at  $15^{\circ}c[138]$ . Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer or following spring. Division in spring. Very easy, larger clumps can be planted direct into their permanent positions. It is best to pot up smaller clumps and grow them on in a cold frame until they are well rooted before planting them out in the summer.

nwatta An easily cultivated plant[1], it succeeds in a sunny position in most fertile well-drained soils[138, 233, 238]. This species is closely related to B. falcatum, and is included in that species by some botanists.

### 4.2.175 Anchusa azurea

Anchusa, Italian bugloss

3 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Anchusa azurea is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw. An excellent and decorative addition to the salad bowl, or used as a garnish[183]. The tender young leaves and young flowering shoots can be cooked and eaten as a venetable[7].

tcanta DyeA red dye is obtained from the root[7]. This was at one time used as a basis for some cosmetics[7].

dwatta Antitussive Depurative Diaphoretic Diuretic PoulticeThe whole plant is antitussive, depurative, diaphoretic and diuretic[7]. It is harvested when in flower and dried for later use. The dried and powdered herb is used as a poultice to treat inflammations[7]. Use internally with caution, the plant contains the alkaloid cynoglossine which can have a paralyzing effect[7].

nrakta Europe - Caucasus. An occasional garden escape in Britain[17]. ksacta Sides of arable fields, waste places,

roadsides and steppes on stony hills[45, 187].

propta Seed - sow spring in pots of sandy soil[200]. An overnight drop in temperature helps germination[133]. The seed usually germinates in 1 - 4 weeks at 21°c[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in early spring[200]. Root cuttings in autumn or early winter. Late winter is best[200].

nwatta Succeeds in most soils, preferring a sunny position[1, 111]. Prefers a fertile well-drained soil[111]. Tolerates heavy clay[200]. Requires a deep well-drained soil[187]. Established plants tolerate drought[187]. Plants are hardy to about -15°c[187]. The flowers are a good source of food for bees[1]. Many named forms have been selected for their ornamental value[187]. The plants tend to be short-lived perennials but they can be propagated by means of root cuttinus[187].

#### 4.2.176 Grindelia squarrosa

Rosin Weed, Curlycup gumweed

3 tlin 7 cyuc 2 kcak 0 tcan 3 dwat 1 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Grindelia squarrosa is a BIENNIAL/PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant contains the carcinogen safrole[274]. kcakta Edible Parts: Edible Uses: Gum TeaThe fresh or dried leaves can be used to make an aromatic, slightly bitter but pleasing tea[183]. A sticky resinous sap that covers the leaves can be used as a chewing rum substitute[183].

tcanta Dye GumYellow and green dyes are obtained from the flowering heads and pods[168]. Aromatic.

dwatta Antispasmodic Eczema Expectorant Homeopathy Poultice SedativeRosin weed was used by the native North American Indians to treat bronchial problems and also skin afflictions such as reactions to poison ivy[254]. It is still used in modern herbalism where it is valued especially as a treatment for bronchial asthma and for states where phleam in the airways impedes respiration[254]. In addition, it is believed to desensitize the nerve endings in the bronchial tree and slow the heart rate, thus leading to easier breathing[254]. The plant merits investigation as a treatment for asthma[222]. The herb is contraindicated for patients with kidney or heart complaints[254]. The dried leaves and flowering tops are antiasthmatic, anti-inflammatory, antispasmodic, expectorant and sedative [4, 46, 207, 212, 238, 254]. The principal use of this herb is in the treatment of bronchial catarrh, especially when there is an asthmatic tendency, it is also used to treat whooping cough and cystitis[4]. 2541. The active principle is excreted from the kidneys, and this sometimes produces signs of renal irritation[4, 238]. Externally, the plant is used as a poultice to treat burns, poison ivv rash, dermatitis, eczema and skin eruptions[212, 213, 222, 238]. The plant is harvested when in full bloom and can be used fresh as a poultice or dried for infusions etc[254]. A fluid extract is prepared by placing the freshly gathered leaves and flowers in a small quantity of simmering water for about 15 minutes[213]. A homeopathic remedy is prepared from the leaves and flowering stems[4].

nrakta N. America - Minnesota to British Columbia, south to California and Texas. ksacta Prairies, plains and dry banks[4, 43].

propta Seed - sow autumn or spring in a cool greenhouse and only just cover the seed. Prick out the plants into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. Division as new growth commences in the spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings.

nwatta Industrial Crop: Hydrocarbon Management: Hay Wild CropSucceeds in any well-drained soil in full as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses: Christmas tree, Aggressive surface roots possible, Screen, Superior hedge, Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Intolerant of atmospheric pollution[188]. The white pine is a very important timber crop in its native range, the huge stands that existed before the Europeans went to N. America have been largely cut down[229]. It is a fast-growing and fairly long-lived tree[229] that is often cultivated as a timber tree, especially in central Europe[50]. Young trees grow very vigorously with new shoots of up to 1 metre common. Growth slows and almost ceases by the time the tree is 20 metres tall[185]. Trees can produce cones when 5 - 10 years old, but reliable seed production takes another 10 years[229]. Good crops are produced every 3 - 5 years in the wild, with little seed in the intervening years[229]. The cones are 10 - 20cm long and take 2 years to mature[82, 229], they open and shed their seed in late summer whilst still attached to the tree[82, 226]. Plants often self-sow in Britain[185]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Trees have a very thin bark, which makes them particularly susceptible to forest fires[226]. This species is very susceptible to white pine blister rust, it should not be grown near any gooseberries or currants (Ribes species) since these plants can act as vectors for the disease[1, 120]. Plants are also subject to aphid damage[1]. Plants in this genus are notably susceptible to honey fungus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Special Features: Attracts birds, Attractive foliage, North American native, Fragrant foliage, Naturalizing, Inconspicuous flowers or blooms.

### 4.2.152 Picea engelmannii

Mountain Spruce, Engelmann spruce 3 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 20 m hkuc htut cyulli tcuphja7n hwicil hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Picea engelmannii is an evergreen Tree growing to 20 m (65ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. The cones are about 5cm long[82]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food when all else fails. Seed - raw[172]. The seed is about 2 - 4mm long[229] and is too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172].

tcanta Basketry Charcoal Fibre Fuel Tannin WoodThe bark is a source of tannin[46, 61, 82]. The branches and the roots have been shredded, pounded and used to make cord and rope[257]. (It is probably the bark that was used[K].) The bark has been used to make baskets and various small utensils[257]. Wood - close-grained, light, soft, not strong. It is used for lumber, construction, fuel and charcoal[46, 61,

82, 171]. It is also valued for its use in the pulp industry to make paper[171].

dwatta Caneer Eczema Pectoral Salve Skin TB Vitamin CAn infusion of the bark has been used in the treatment of respiratory complaints, TB etc[257]. A decoction of the leaves and gum has been used in the treatment of cancer[257]. It was said that if this treatment did not work then nothing would work[257]. The decoction was also used in the treatment of coughs[257]. The ashes of the twigs, mixed with oil, have been used as an ointment or salve on damaged skin[257]. The pitch obtained from the trunk has been used in the treatment of eczema[257].

nrakta Western N. America - Alberta and British Columbia to Arizona and New Mexico. ksacta Montane regions to the tree-line, especially by swamps[60]. Often found on poor thin rocky soils, though the best specimens are growing in deep well-drained clay-loam soils[229].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame[78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. Plants have a shallow root system and are easily wind-blown[155]. Often planted for its timber in N. Europe[50]. Trees are of moderate growth after a slow start, older trees often averaging over 40cm a year[185]. Trees grow better and faster in the north of Britain than in the south. This is not an easy tree to grow in Britain[1], it prefers a continental climate and, although the dormant tree is very cold hardy, the new growth in spring is very susceptible to damage by late frosts in this country[11]. Quite long-lived in its native range, with specimens 500 - 600 years old[229]. Seed production commences around the age of 20 - 25 years, with excellent crops every 2 - 6 years[229]. Closely related to P. glauca, this species also hybridizes with P sitchensis in the south of its range[226]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. The crushed foliage is often said to be foetid but after the first sniff the scent is sweet and like menthol or camphor[185]. Plants are susceptible to damage by the green spruce aphid[1].

### 4.2.153 Juniperus virginiana

Pencil Cedar, Eastern redcedar, Southern redcedar, Silver Cedar, Burk Eastern Red Cedar, Silver East

3 tlin 9 cyuc 2 kcak 4 tcan 2 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhien hionli

drutta Juniperus virginiana is an evergreen Tree growing to 20 m (65ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from April to May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any

one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista All parts of the plant might be toxic[4, 222].

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[106]. A sweetish resinous flesh[82]. They can be crushed and used as a flavouring in soups and stews[257]. The cones are about 5mm in diameter[200]. About 10mm according to another report[226]. A tea is made from the fruit[159]. It is not very nice[159]. It is made from the young branchlets and the fruit according to one report[183].

tcanta Essential Incense Insecticide Repellent Shelterbelt Tinder WoodAn essential oil is obtained from the wood[1, 46, 57, 61]. Composed of cedar camphor or cedrol[213], it is used in soaps, as an insecticide and moth repellent[61, 213], a deodorant, in polishes, perfumery etc[4, 21]. Chips of the wood have been used as moth repellents[269]. The leaves are used as an incense[46, 213] and are also either burnt or crushed and then scattered around as an insect repellent[169, 257]. The crushed bark can be used as a soft base in cradles[257]. The bark has also been cut into strips and used to make mats[257, 269]. The red inner bark is a source of a red dye[269]. The bark of the tree is useful as tinder in starting fires Boy Scout style[269]. Some cultivars of this tree are suitable for ground cover when spaced about 90cm apart each way[208]. 'Tripartita' and 'Chamberlaynii' have been recommended[208]. A fairly wind resistant tree. it can be grown as part of a shelterbelt planting[200]. Wood very durable, light, brittle, soft, easily worked, very fragrant, insect-resistant[1, 46, 82, 171, 227]. The wood does not shrink much on drying and weighs 30lb per cubic foot[227]. The reddish wood is highly prized for cabinet making[226], it is also used for fencing, the casing of lead pencils etc[1, 46, 82. 1711.

dwatta Abortifacient Anthelmintic Antiseptic Aromatherapy Cancer Diaphoretic Diuretic Emmenagogue Rubefacient StimulantPencil cedar leaves were much used medicinally by the native N. American Indians, and also in folk medicine by the white settlers, especially to treat chest complaints and skin problems such as venereal warts and other excrescences[269]. The leaves are anthelmintic, diuretic, rubefacient and stimulant[4, 257]. A decoction has been used in the treatment of coughs and colds, general weakness and as a medicine for convalescents[257]. The berries are anthelmintic, diaphoretic, emmenagogue and mildly antiseptic[4, 213, 222, 257]. They have been chewed as a treatment for mouth ulcers[213, 257] or made into a tea to treat colds, rheumatism, worms etc[222, 257]. The fresh young twigs are used as a diuretic[213]. An infusion has been used both internally and as a steam bath in the treatment of rheumatism[257]. The essential oil from the wood is an abortifacient, in some cases it has caused vomiting, convulsions, coma and death[4, 213]. The plant is said to contain the anticancer compound podophyllotoxin[222]. The essential oil from the berries is used in aromatherapy. Its keyword is 'Composing'[210].

nrakta Central and Eastern N. America from Canada south to Georgia and Texas. ksacta Dry, rarely wet, open woods and rock slopes, often on limestone[43]. Infertile soils and old pastures[222].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Christmas tree, Firewood, Screen, Seashore, Specimen, Street tree. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11] and succeeding on chalk[200]. Established plants are drought tolerant, succeeding in hot dry positions[200]. They are also fairly wind-resistant[200]. A very ornamental and hardy plant[1]. It is very slow growing[4] and apparently short-lived in Britain[185], though it is very long-lived in its native environment[226]. Another report says that plants live to a moderate age of 200 - 350 years in the wild[229]. Cultivated as a timber tree in some parts of C. and S. Europe[50] and used as a Christmas tree in parts of N. America[269], there are some named forms, selected for their ornamental value[200]. Closely related to J. scopulorum, it hybridizes with that species where their ranges overlap[226]. The main difference between the two species is that the fruits of this plant mature in one year whilst those of J. scopulorum take two years[226]. This species often hybridizes with other members of the genus. The crushed foliage has an aroma like soap or paint[185]. Plants are resistant to honey fungus[88]. In America this tree is a host of a gall-like rust that at certain stages in its life-cycle also attacks the leaves of apple trees[149]. Plants are usually dioecious, though trees with both male and female flowers are occasionally found[229]. Male and female plants must usually be grown if seed is required. Special Features: Attracts birds, North American native, Fragrant foliage, Attracts butterflies, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

### 4.2.154 Thuja occidentalis

American Arbor-Vitae, Arborvitae, Eastern Arborvitae, Siberian Arborvitae, Northern White Cedar, Wh 3 tlin 7 cyuc 2 koak 0 tcan 3 dwat 15 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Thuja occidentalis is an evergreen Tree growing to 15 m (49ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista An essential oil from the leaves is poisonous if taken in large doses[7, 65]. Nausea, vomiting, flatulence, indigestion reported. Possible asthma and seizures [301]. This plant should not be used by pregnant women[165]. Use oil internally in small quantities and under medical supervision. Death and convulsions reported with improper internal use [301].

kcakta Edible Parts: StemEdible Uses: TeaPith of young shorts - cooked[105]. It can be added to soups[177]. Pleas-antly sweet, the pith was used as the basis of the soup according to one report[183]. Inner bark - cooked. It is only used in times of emergency or scarcity[213]. The inner bark can be dried and ground into a powder, then used with wheat or other cereals in making bread, biscuits etc. The leafy branchlets are used as a tea substitute[159, 177, 257] but are probably best avoided by pregnant women[165]. An aromatic flavour[183]. Another report says that the foliage and bark are used, the resulting tea is a good source of vitamin Cf226]

tranta Broom Essential Fibre Incense Repellent Tannin WoodTolerant of regular trimming, though not into the old wood, it can be grown as a hedge[226]. The fresh branches are used as besoms[4]. Their aromatic smell serves to deodorize the house whilst sweeping[226]. The leaves have been kept in the clothes cupboard as a perfume, incense and insect repellent[257]. The leaves and stems have been used as an incense[257]. An essential oil is obtained from the leaves and branches, it is used in perfumery and in

#### 4.2.172 Sambucus mexicana

Mexican Elder

3 tlin 9 cyuc 2 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sambucus mexicana is a deciduous Shrub growing to 1 m (3ft 3in). It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: Flowers -raw or cooked[183]. Fruit -raw or cooked[257]. It is usually dried before being used since this reduces a somewhat rank taste[177, 181, 183]. The fruit can be used in making pies, preserves, winemaking etc[183]. The fruit is about 6mm in diameter and is borne in large clusters[227]. Some caution is advised, see the notes above on toxicity.

tcanta Dye WoodA purple to black dye is obtained from the fruits[257]. An orange to yellow dye is obtained from the stems[257]. Wood - soft and coarse-grained[227].

dwatta Febrifuge Laxative StomachicAn infusion of the blossoms has been used in the treatment of upset stomachs, fevers, sore throats, colds and flu[257]. A decoction of the roots has been used in the treatment of constipation[257].

nrakta South-western N. America - California to New Mexico, south to Mexico. ksacta Open flats and cismontane valleys and canyons below 1850 metres in California[71]. Oak forests along streams and ditches, 1800 - 3000 metres in Mexico[181].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. It is closely related to S. caerulea[71]. The following notes are based on the general needs of the genus. Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

### 4.2.173 Plantago major

Common Plantain, Cart Track Plant, White Man's Foot , Plantain

3 tlin 12 cyuc 2 kcak 3 tcan 3 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Plantago major is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female orqans) and is pollinated by Wind.

The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista High doses may cause a fall in blood pressure and diarrhoea. Possible allergic contact dermatitis. Avoid in patients with intestinal obstruction or abdominal discomfort [2011]

kcakta Edible Parts: Leaves Root SeedEdible Uses: TeaYoung leaves - raw or cooked[2, 5, 12, 56, 62, 183]. They are rather bitter and tedious to prepare because the fibrous strands need to be removed before use[9]. It is best not to use the leaf-stalk since this is even more fibrous than the leaf[183]. Many people blanch the leaves in boiling water before using them in salads in order to make them more tender[183]. A Chinese form has more palatable leaves - it contains about 2.7% protein, 0.4% fat, 2.2% ash[179]. Seed - raw or cooked[62, 172]. Very tedious to harvest[172]. The seed can be ground into a meal and mixed with flour[183]. It is very rich in vitamin B1[179]. The whole seeds can be boiled and used like sago[193]. The dried leaves make an acceptable tea[183]. Root[183]. No further details.

tcanta Some named forms have been selected for their ornamental value[233]. An important food plant for the caterpillars of many species of butterflies[30]. Special Features: Edible, Naturalizing, Suitable for dried flowers. Dynamic accumulator.

dwatta Antidote Astringent Demulcent Deobstruent Depurative Diuretic Expectorant Haemostatic Laxative Ophthalmic Poultice Refrigerant VermifugeCommon plantain is a safe and effective treatment for bleeding, it quickly staunches blood flow and encourages the repair of damaged tissue[254]. The leaves are astringent, demulcent, deobstruent, depurative, diuretic, expectorant, haemostatic and refrigerant[4, 7, 9, 21, 147, 165, 172, 238]. Internally, they are used in the treatment of a wide range of complaints including diarrhoea, gastritis, peptic ulcers, irritable bowel syndrome, haemorrhage, haemorrhoids, cystitis, bronchitis, catarrh, sinusitis, asthma and hay fever[238, 254]. They are used externally in treating skin inflammations, malignant ulcers, cuts, stings etc[4]. The heated leaves are used as a wet dressing for wounds, swellings etc[213, 222]. The root is a remedy for the bite of rattlesnakes, it is used in equal portions with Marrubium vulgare[207]. The seeds are used in the treatment of parasitic worms[213]. Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238]. A distilled water made from the plant makes an excellent eve lotion[7].

nrakta Most of Europe, including Britain, to northern and central Asia. ksacta A common garden weed, particularly in lawns[1, 4, 13]. Rarely in grassy places[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200]. Although this species is a common garden weed, some named forms have been selected for their ornamental value[233].

#### 4.2.174 Bupleurum chinense

Bei Chai Hu

3 tlin 7 cyuc 2 kcak 0 tcan 3 dwat 1 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Bupleurum chinense is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at  $15^\circ c$  and then 3 months cold stratification at  $4^\circ c[164]$ . The seed usually germinates within 1- 18 months at  $15^\circ c$  but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10 cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Cuttings of mature wood of the current year's growth, preferably with a heel, November in a frame.

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. Å very hardy plant, tolerating temperatures down to about -25°c[200]. Hybridizes freely with other members of this genus[200]. There are several sub-species[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil reguirements including nutrients and water. The root pattern is branching; a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 4.2.170 Amelasorbus jackii

Jack's amelasorbus

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Amelasorbus jackii is a deciduous Shrub growing to 2 m (6ft 7ln). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Not very palatable[183].

nrakta Western N. America - Idaho and Oregon. ksacta Not known

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. This is a bi-generic hybrid and, if seed is produced, it is unlikely to breed true. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring - takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a sunny position in a well-drained moisture-reterive hums-rich lime-free soil[200]. This species probably tolerates some lime in the soil[200]. Succeeds in semi-shade though it fruits less well in such a position[200]. Hardy to about -20°c[200]. Plants are surprisingly vigorous in British gardens[11]. A naturally occurring bi-generic hybrid, Amelanchier alnifolia semiintegrifolia x Sorbus scopulina, it is very variable in the wild[182, 2001]

#### 4.2.171 Eleutherococcus senticosus

Siberian Ginseng

3 tlin 7 cyuc 2 kcak 0 tcan 5 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eleutherococcus senticosus is a deciduous Shrub growing to 2 m (6ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista Caution if high blood pressure. Avoid coffee. 6 weeks maximum use. Avoid during pregnancy. Unsuitable for children. High doses may cause drowsiness, anxiety, irritability, mastalgia and uterine bleeding. Possible blood pressure increases and irregular heart beats. Effects of antidiabetic drugs, sedatives and anticoagulants may be potentiated [301]

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves and buds - cooked[105, 177]. The dried leaves are used as a tea substitute[105, 177].

dwatta Adaptogen Antiinflammatory Hypoglycaemic Tonic VasodilatorSiberian ginseng is a powerful tonic herb with an impressive range of health benefits. Unlike many herbs with a medicinal use, it is more useful for maintaining good health rather than treating ill health. Research has shown that it stimulates resistance to stress and so it is now widely used as a tonic in times of stress and pressure[254]. This plant is a very commonly used folk treatment in China and Russia where it is used as a ginseng substitute[218]. It is a pungent bitter-sweet warming herb that is said to be stronger in its action than ginseng[238]. Regular use is said to restore vigour, improve the memory and increase longevity[218]. The root and the root bark are adaptogen, anti-inflammatory, hypoglycaemic, tonic and vasodilator. It is taken internally during convalescence and in the treatment of menopausal problems, geriatric debility, physical and mental stress etc[238]. It works by strengthening the hodies natural immune system[140, 165, 176, 238]. It has also been used to combat radiation sickness and exposure to toxic chemicals[200, 218, 238]. This herb is not prescribed for children, and should not be used for more than 3 weeks at one time[238]. Caffeine should not be taken when using this herb[238]. The roots are harvested in the autumn and dried for later use[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Eleutherococcus senticosus for tendency to infection, lack of stamina (see [302] for critics of commission E).

nrakta E. Asia - China, Japan, Siberia. ksacta Mixed and coniferous mountain forests, forming small undergrowth or groups in thickets and edges. Sometimes found in oak groves at the foot of cliffs, very rarely in high forest riparian woodland[74].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Prefers a light warm open loamy humus-rich soil and a position sheltered from north and east winds[11, 200]. Prefers a well-drained soil and full sun[200]. (A surprising report, this species is a woodland plant and we would expect it to prefer shade[K]) Tolerates urban pollution and poor soils[200]. Plants are hardy to at least -15°c if they are sheltered from cold winds[200]. A highly polymorphic species[74]. Siberian ginseng is cultivated as a medicinal plant in Russia and China[140].

medicines[46, 57, 61, 226]. It is poisonous if taken internally[65]. This essential oil also has insect repellent properties[106]. The tough and stringy bark has been used to weave fibre bags[257]. The bark is a source of tannin[257]. Wood - light, soft, not strong, brittle, coarse grained, very durable, easily worked, does not warp[61, 82, 171, 226, 235]. It weighs 20lb per cubic foot[235]. Used especially where contact with water cannot be avoided, for canoes, garden buildings, shingles, posts etc[11, 61, 82, 171, 226].

dwatta Alterative Anthelmintic Antiinflammatory Antirheumatic Antiseptic Antiviral Aromatic Astringent Diaphoretic Diuretic Emmenagogue Homeopathy Rubefacient Vitamin CAmerican arbor-vitae was much used by many native North American Indian tribes as a medicine to treat fevers, coughs, headaches, swollen hands and rheumatic problems[254, 257]. The plant has an established antiviral activity and is most commonly used in modern herbalism to treat warts and polyps, being prescribed both internally and externally for these conditions[254]. The plant can be used to induce menstruation and so should not be prescribed for pregnant women[238]. The recently dried leafy young twigs are alterative, anthelmintic, anti-inflammatory, antiseptic, aromatic, astringent, diaphoretic, diuretic and emmenagogue[4, 7, 21, 165]. The plant is being used internally in the treatment of cancer[238], especially cancer of the uterus[254]. A tea made from the leaves is used in the treatment for bronchitis and other respiratory problems, colds, headaches and as a cough syrup[222, 254]. The plants diuretic properties make it useful in treating acute cystitis and bed-wetting in children[254]. The leaves are used in steam baths in the treatment of rheumatism, arthritis, colds etc[222]. Externally, the leaves are used as a wash for swollen feet and burns[222]. Extracts of the leaves can be painted on painful joints or muscles as a counter0irritant, improving local blood supply and thus facilitating the removal of toxins, easing pain and stiffness[254]. A tincture of the leaves has been used in the treatment of warts, piles, bed sores and fungal infections[222]. The leaves and young twigs can be harvested as required and used fresh or dried[238]. 'Oil of white cedar', obtained from the leaves, is an essential oil that is antiseptic, expectorant and rubefacient[213, 222]. It is used internally to promote menstruation and relieve rheumatism[213]. This volatile oil is toxic and poisoning from overdoses has occurred[213], it should only be used under the supervision of a qualified practitioner and should not be prescribed for pregnant women[238]. The oil also stimulates the heart and causes convulsions in high doses[213]. A tea of the inner bark is used to promote menstruation[213] and in the treatment of consumption and coughs[222]. A homeopathic remedy is made from the leaves and twigs, gathered when the tree is flowering[232]. It is used in the household as a treatment against warts, but also has a range of other applications that should only be prescribed by a competent homeopath[7, 232].

nrakta Eastern N. America - Nova Scotia to Georgia, west to Illinois and Minnesota. ksacta Swamps and cool rocky banks of streams[43], forming dense almost impenetrable forests[82, 165]. Also found on rocky soils[226]. Plants are usually found on neutral to alkaline limestone soils[226].

propta Seed - best sown when ripe in the autumn in a cold frame[113]. Stored seed germinates best if given a short cold stratification[113]. It can be sown in a cold frame in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If growing large quantities of plants, the seed can be sown in an outdoor seed bed in mid spring[78]. Grow the plants on for two years and then plant them out into their permanent positions in late autumn or early spring. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a shaded frame. Forms roots by the end of September but it should be overwintered in a frame[78]. Cuttings of almost ripe wood, 5 - 10cm with a heel, September in a cold frame. Forms roots in the following summer. Plant out in autumn or spring[78].

nwatta Landscape Uses:Firewood, Hedge, Screen, Superior hedge, Specimen. Prefers a permanently moist soil[1], it is intolerant of dry soils[11]. A useful plant for very poorly-drained soils[185, 200]. The best stands in America are on well-drained soils[11]. Grows well in heavy clay soils. Suc-

ceeds in sandy soils[188] and on chalk[200]. A very hardy tree, tolerating very cold winters with temperatures down to -46°c[200, 238]. In cold weather the leaves turn brown, becoming green again in the spring[226]. It is usually slow growing and short-lived in cultivation in Britain and rarely looks thrifty[81, 185]. However, there are some good specimens in western Britain[4, 14]. Some cultivars are more healthy, 'Lutea' is growing very well in several places and 'Spiralis' is also growing well[185]. Trees live 200 - 300 years in the wild[226]. Sometimes planted as a timber tree in C. Europe[50]. Plants cannot regenerate from old wood. Pruning is not normally necessary for this species, any pruning that is carried out should be done with care[238]. The wood and the foliage are strongly aromatic[226]. The crushed leaves have a scent of apples [185]. Special Features: Attracts birds, North American native, Wetlands plant, Inconspicuous flow-

### 4.2.155 Hemiptelea davidii

3tlin 7 cyuc 2 kcak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemiptelea davidii is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Leaves OilEdible Uses: Oil Teayoung leaves - cooked. Mixed with rice dumplings[177]. The tender leaves make a good beverage[266].

as a hedge in China[109]. The fibre from the bark is used for manufacturing staple rayon and sacks[266]. An oil is extracted from the seeds[266]. The report does not say if the oil is edible, nor does it give any uses. Wood - hard. It is used for making utensils[266].

dwatta Demulcent Diuretic Febrifuge LenitiveDemulcent, diuretic, febrifuge, lenitive[178].

nrakta E. Asia - China, Korea. ksacta Hedges, loess banks, banks of soil and debris[109]. Hill slopes and trailsides, often planted when found around houses, at elevations below 2000 metres[266].

propta Seed - best harvested as soon as it is ripe but before it has fully dried on the plant and sown immediately in a cold frame. Stored seed requires stratification and should be sown as soon as possible[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Seed can be stored cold and dry[200].

nwatta Prefers a deep moist loamy soil, succeeding in acid and alkaline conditions[200]. Relatively shade tolerant[200]. Plants are probably resistant to Dutch Elm disease[200]. Plants can be hermaphrodite or monoecious.

### 4.2.156 Pinus aristata

Bristle-Cone Pine

3 tlin 10 cyuc 2 kcak 2 tcan 2 dwat 12 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus aristata is an evergreen Tree growing to 12 m (39ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: SeedEdible Uses: CondimentSeedraw or cooked[160]. Up to 6mm long[200]. The oil-rich seed has a slightly resinous flavour. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide Preservative WoodLandscape Uses: Screen, Specimen, A tan or green dye is obtained from the needles[168]. The tree could be the source of antioxidants that contribute to long life[160]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4. 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - light, soft, not strong. Used for fuel and mining timber[46]. Special Features: Attractive foliage. North American native, Inconspicuous flowers or blooms. Can be grown in pots.

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4, 257].

nrakta South-western N. America - Colorado to New Mexico. ksacta Dry rocky slopes, often in pure stands, 2250 - 3450 metres in California[71]. Trees grow right up to the tree line, where they are no more than gnarled shrubs[229].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Thrives in a light well-drained sandy or gravelly loam[1]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. A wind tolerant tree, it often grows on very exposed ridges in the wild[229]. Trees grow best in areas with cold dry summers, the largest cultivated specimen is in dry sub-continental north-east Iceland[200]. A very slow growing[81] (to 6 metres in 60 years at Kew) and short-lived tree in Britain, though it lives for 2000 years or more in its native range[11, 185]. This is the oldest known living plant with specimens over 4000 years old[188]. This species is closely related to P balfouriana[11]. The cones open and shed their seed whilst still attached to the tree[226]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the

germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Plants in this genus are notably susceptible to honey fungus[200]. Heat zone: 9-1.

#### 4.2.157 Malus x robusta

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hoa7tmwatli xre7t hionli

drutta Malus x robusta is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit is rather variable in size and is usually about 1 - 3cm in diameter[200]. A firm and juicy flesh with rather an acid flavour, we found it pleasant in small quantities when fully ripe[K].

tcanta RootstockUsed as a vigorous winter-hardy rootstock for the cultivated apple, M. sylvestris domestica, it is somewhat resistant to fireblight but susceptible to crown root1831

nrakta A hybrid of garden origin, M. baccata x M. prunifolia. ksacta Not known in the wild.

propta Seed - this is a hybrid species and will not breed true. The seed is best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at  $1\,^\circ c$  and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. There are some named varieties, selected for their ornamental value[183]. 'Fairy' and 'Joan' both have larger fruits than the type, up to 4cm in diameter[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 4.2.158 Malus yunnanensis

rabapple

3 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus yunnanensis is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium

pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Landscape Uses:Border, Massing. Prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. A relatively fast-growing plant in the wild, it often forms thickets by means of root suckers[229]. All parts of the plant are fragrant. The bruised foliage has a delicious resinous orange-like perfume[245]. Dioecious. Male and female plants must be grown if seed is required. Flowers are formed on the old wood[206]. Special Features: North American native, Attracts butterflies, Inconspicuous flowers or blooms, Blooms appear periodically throughout the year. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

### 4.2.167 Filipendula kamtschatica

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Filipendula kamtschatica is a PERENNIAL growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Édible Parts: Leaves RootEdible Uses: Young shoots - raw[74]. Leaves - cooked[74]. Root - raw or cooked[74].

nrakta E. Asia - Japan, Siberia. ksacta High grass meadows[74] along streams in the mountains[187].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[188, 200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a humus-rich moist soil in semishade[1, 200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils. Does well in marshy soils. Grows well in heavy clay soils. Plants are hardy to about -25°c[187], when growing in shallow water they even survive if the water is frozen[245]. A good bee plant, the flowers also attract flies. The flowers have a powerful, sweet scent when inhaled from a distance, though there are fishy undertones when inhaled near to[245]. Members of this genus are rarely if ever troubled by browsing deer[233]

#### 4.2.168 Aruncus dioicus

Goat's Beard, Bride's feathers 3 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 2 m hkuc

hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Aruncus dioicus is a PĒRĒNNIAL growing to 2 m (6ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very

alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista Cyanogenic glycosides are found in the leaves[74].

kcakta Edible Parts: LeavesEdible Uses: Budlings, stems and young leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

tcanta Plants form a dense growth that is very effective at holding invasive plants at bay[208]. They can be used as a tall ground cover for large areas[208].

dwatta Antipyretic Astringent Birthing aid Salve Stings Stomachic VDThe poulticed root is applied to bee stings[222, 257]. A tea made from the roots is used to allay bleeding after child birth, to reduce profuse urination and to treat stomach pains, diarrhoea, gonorrhoea, fevers and internal bleeding[222, 257]. The tea is used externally to bathe swollen feet and rheumatic joints[222, 257]. A salve made from the root ashes is rubbed onto sores[257].

nrakta Europe, N. America and Asia. ksacta Damp woods, shady places and by streams, usually in mountainous areas[50, 187].

propta Seed - best sown in a cold frame as soon as it is ripe. Sow stored seed in late winter or early spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 15cm tall. They can be planted out into their permanent positions at any time of the year. Division in early spring or autumn[200]. Very easy, the clumps can be planted out direct into their permanent positions.

nwatta Landscape Uses:Border, Massing, Seashore, Specimen, Woodland garden. Succeeds in most moist soils in sun or partial shade[187, 200, 233]. Plants do well in moist to wet soils but will also tolerate fairly dry sites[208]. Succeeds in acid or limey soils[208]. Grows well on the woodland edge[200]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Plants are hardy to at least -20°c[187]. This is a polymorphic species, especially the form that grows in Japan[187]. There are some named forms selected for their ornamental value, 'Kneiffii' is only half the size of the type species[208]. Plants are fast-growing[208] and form very large clumps[187]. The flowers are sweetly perfumed[245]. Dioecious, male and female plants must be grown if seed is required[208]. Special Features:Attractive foliage, Naturalizing, Wetlands plant.

### 4.2.169 Cotoneaster racemiflorus

Black-Wood, Cotoneaster

143

3 tlin 7 cyuc 2 kcak 2 tcan 1 dwat 2.4 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cotoneaster racemiflorus is a deciduous Shrub growing to 2.4 m (7ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: MannaEdible Uses: Yields a manna-like substance called shir-khist, it is rich in sugars[46, 61, 183]. It contains about 13% sacchrose, 37.5% dextrose[105, 183]. No details of which part of the plant yields the manna, it is most likely to be the stem.

tcanta Basketry Dye WoodA rose-tan dye is obtained from the fruit[168]. The wood is used in basket making.

dwatta Aperient Expectorant Stomachic The plant is aperient, expectorant and stomachic [240].

nrakta N. Africa to W. and C. Asia. ksacta Shrubby thickets on stony slopes[74]. To elevations of 2400 metres in Kashmir[145].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe

It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta Landscape Uses: Border, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Dislikes chalky soils, this is especially true for the cultivar 'Plena' [200]. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. A slow-growing and shortlived species in the wild[229], it produces suckers from the roots and often forms thickets[228]. This species is closely related to M. coronaria[1]. It hybridizes freely with other members of the genus[200]. There are many named forms, selected for their ornamental value[200]. The fruit is a good wildlife food source, especially for birds[200]. The plant fruits very heavily in southern Britain[K]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:North American native, Fragrant flowers, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

#### 4.2.165 Malus x astracanica

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus x astracanica is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105].

nrakta A garden hybrid, M. prunifolia x M. pumila<br/>[177]. ksacta Not known in the wild.

propta Seed - this is a hybrid species and will not breed true. The seed is best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less

well in such a situation[1, 200]. This hybrid species is possibly a primitive form of the cultivated apple[11]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 4.2.166 Zanthoxylum americanum

Prickly Ash - Northern, Common pricklyash, Northern Prickly

3 tlin 7 cyuc 2 kcak 2 tcan 3 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Zanthoxylum americanum is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Tannins may reduce gut iron absorption. Possble nervous system stimulation. Excessive ingestion may interfere with anticoagulant therapy [301].

kcakta Edible Parts: Edible Uses: CondimentSeed -cooked. It is used as a condiment. A pepper substitute[106]. The fruit is rather small, about 4 - 5m in diameter[229], but is produced in dense clusters which makes harvesting easy[K]. Each fruit contains a single seed[229].

tcanta EssentialAgroforestry Uses: The plant's prickly nature and suckering habit can produce an effective barrier[277]. Other Uses: The fruits have been used by young men as a perfume[257]. Wood-soft. It weighs 35lb per cubic foot[235]. Of little use[229].

dwatta Anodyne Antirheumatic Antispasmodic Carminative Diaphoretic Diuretic Dysentery Irritant Odontalgic Sialagogue Skin StimulantPrickly ash is a warming, stimulating herb that is beneficial for the circulation. It was highly regarded by the native North American Indians who used it especially to alleviate rheumatism and toothache[254]. All parts of the plant, but especially the bark and roots, contain the aromatic bitter oil xanthoxylin[229]. This has a number of applications in medicine, especially in the treatment of arthritic and rheumatic conditions, digestive problems and leg ulcers[229, 254]. The fruit has a similar medicinal action to the bark[4]. The bark and roots are irritant, odontalgic and antirheumatic[213]. Along with the fruit they are diaphoretic, stimulant and a useful tonic in debilitated conditions of the stomach and digestive organs[4]. They produce arterial excitement and are of use in the treatment of fevers, ague, poor circulation etc[4]. The fruits are considered more active than the bark, they are also antispasmodic, carminative, diuretic and antirheumatic[4, 213, 222]. The pulverized root and bark are used to ease the pain of toothache[213, 222]. One report says that it is very efficacious, but the sensation of the acrid bark is fully as unpleasant as the toothache[213]. Chewing the bark induces copious salivation[222]. Rubbing the fruit against the skin, especially on the lips or in the mouth, produces a numbing effect[K]. A tea or tincture of the bark has been used in the treatment of rheumatism, dyspepsia, dysentery, heart and kidney troubles etc[222]. A tea made from the inner bark has been used to treat itchy skin[213, 257].

nrakta Eastern N. America - Quebec to Florida, west to Minnesota and Oklahoma. ksacta Found on upland rocky hillsides and on moist low-lying sites, in open woods, on bluffs or in thickets[229].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in

(loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A gritty texture[1]. The fruit is harsh and acid[11], though it improves somewhat when it has been frosted[K]. Quite small, it is  $10 \cdot 15 mm$  in diameter[200].

tcanta RootstockThe plant is very adaptable to poor environmental conditions and can be used as stock for grafting apple trees in W China[266].

nrakta E. Asia - China. ksacta Mixed forests on slopes or by streams in valleys at elevations of 1600 - 3800 metres in Guizhou. Hubei. Sichuan and Yunnan Provinces[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta Landscape Uses:Border, Standard, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

#### 4.2.159 Acer glabrum

Rock Maple, Rocky Mountain maple, Douglas maple, Greene's maple, New Mexico maple, Torrey maple 3 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Acer glabrum is a deciduous Tree growing to 9 m (29ft 6in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy clay soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Inner bark Leaves SeedEdible Uses: CondimentEdible young shoots - cooked. They are used like asparagus[85]. The seedlings, gathered in early spring, are eaten fresh or can be dried for later use[213]. The dried crushed leaves have been used as a spice[257]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. The seeds are about 6mm long[82]. Inner bark[85]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread. An emergency food, it is usually only used when all else fails[85].

tcanta Containers Fibre Fuel Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fibre obtained from the inner bark is used for making mats, rope etc[99, 257]. The bark has been used to make spoons, paint containers etc[257]. Wood tough, hard, heavy, close grained, pliable[82, 99]. It weighs 37lb per cubic foot[235]. The wood can also be used as friction sticks[99]. The green wood can be moulded.[99] The wood is too small for commercial exploitation, though it makes a good fuel[99, 229]. It was often used by native North American Indian tribes for making small items such as snowshoes, drum hoops, bows and pegs[257].

dwatta Antiemetic Birthing aid Cathartic GalactogogueA decoction of the wood and bark is said to cure nausea[213]. Another report says that this is specifically the nausea caused by smelling a corpse[257]. An infusion of the bark has been used as a cathartic[257]. A decoction of the branches, together with the branches of Amelanchier sp., was used to heal a woman's insides after childbirth and also to promote lactation[257].

nrakta Western N. America - Alaska to California, west to New Mexico. ksacta Edges of mountain streams, on rocks and in coniferous woods, 1500 - 2000 metres[82, 184].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. The seed has a hard coat and can be slow to germinate, often taking 2 years. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. It is very difficult to find suitable wood for cuttings.

nwatta Landscape Uses:Erosion control, Massing. Of easy cultivation, it succeeds in any soil, preferring a good moist well-drained soil[11]. Prefers a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Hardy to about -25°c[184]. This species grows well at Kew, a specimen was 12 metres tall in 1967[11]. The tree is almost fastigiate[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Trees are usually dioecious. Male and female trees must be grown if seed is required[226]. Special Features:North American native, Inconspicuous flowers or blooms.

#### 4.2.160 Acer tataricum

Tatarian Maple

3 tlin 7 cyuc<sup>2</sup> kcak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Acer tataricum is a deciduous Tree growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Sap SeedEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[74]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably

lower than in the sugar maples (A. saccharum). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Seed - cooked[105, 177]. The wings are removed and the seeds are then boiled[2].

tcanta Companion PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta S.E. Europe, W. Asia. ksacta Found in deciduous oak scrub, rocky slopes and river valleys at altitudes between 500 - 1700 metres in Turkey[93].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the

nwatta Landscape Uses:Container, Pollard, Standard, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil on the acid side and a sunny position[11, 182]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Trees usually fruit abundantly in Britain[11]. A bad companion plant, inhibiting the growth of nearby plants[18, 20]. Special Features:Not North American native, Fragrant flowers, Inconspicuous flowers or blooms.

#### 4.2.161 Celastrus scandens

Climbing Bittersweet, American bittersweet 3 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 8 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Celastrus scandens is a deciduous Climber growing to 8 m (26ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from July to August, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The fruit is poisonous[222]. All parts of the plant are potentially toxic[222].

kcakta Edible Parts: StemEdible Uses: Bark and twigs - they must be cooked[105]. The thickish bark is sweet and palatable after boiling[2, 161, 177]. Another report says that it is the inner bark that is used, and that it is a starvation food, only used when other foods are in short supply[257]. Some caution is advised in the use of this plant since there are suggestions of toxicity.

dwatta Analgesic Antirheumatic Cancer Cardiac Dinoretic Diverteix Dysentery Emetic SkinClimbing bittersweet was employed medicinally by a number of native North American Indian tribes, though it is scarcely used in modern herbalism[257]. The root is diaphoretic, diuretic and emetic[222]. It is a folk remedy for chronic liver and skin ailments (including skin cancer), rheumatism, leucorrhoea, dysentery and suppressed menses[222]. A strong compound infusion, usually combined with raspberry leaf tea, has been used to reduce the pain of childbirth[257]. A poultice of the boiled root has been used to treat obstinate sores, skin eruptions etc] 2571. Externally, the bark is used as an ointment

on burns, scrapes and skin eruptions[222]. Extracts of the bark are thought to be cardioactive[222]. Many plants in this genus contain compounds of interest for their antitumour activity[218].

nrakta Eastern N. America - Quebec, south to North Carolina and New Mexico.. ksacta Rich soils[235] in dense moist thickets, woods and along river banks[43, 268].

propta Seed - gather when ripe, store in dry sand and sow February in a warm greenhouse[78]. Three months cold stratification leads to a higher germination rate[113]. Remove the flesh of the fruit since this inhibits germination[113]. Germination rates are usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in August of the current seasons growth. Takes 12 months[78]. Root cuttings, 6mm thick 25mm long in December. Plant horizontally in pots in a frame[78].

nwatta Landscape Uses: Arbor. Prefers a deep loamy soil[11]. Dislikes chalky soils[108]. Succeeds in full or partial shade[188]. Requires a humus-rich soil if it is to be at its best[219]. A rampant climber, it requires ample space and is best grown into an old tree. It climbs by means of twining and also by prickles on the young stems[182]. Plants do not normally require pruning[219]. The foliage of some wild plants is variegated[235]. There are some named forms, selected for their ornamental value[200]. A good bee plant[108]. Plants in this genus are notably resistant to honey fungus[200]. Plants are usually dioecious, in which case male and female plants must be grown if seed is required[182]. This species seldom fruits freely in Britain[182]. Special Features: Attracts birds, North American native, Invasive. Attracts butterflies. Suitable for dried flowers. Inconspicuous flowers or blooms

### 4.2.162 Viburnum prunifolium

Stagberry, Black Haw, Hybrid blackhaw, Smooth Blackhaw, Blackhaw Viburnum

3 tlin 9 cvuc 2 kcak 0 tcan 3 dwat 7.5 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum prunifolium is a deciduous Tree growing to 7.5 m (24ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

pcista Overdose symptoms include: nausea, dizziness, fits (seizures), visual disturbances, increased perspiration, reduced pulse rate. Rare allergic reactions. Avoid during pregnancy due to effects on the uterus [301].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 5, 55, 62, 200, 257]. A thin dry flesh with a sweet taste[11, 159, 227]. The fruit is somewhat variable in size and quality, the best forms are nice raw whilst others are used for making preserves etc[183]. The taste is best after a frost[22, 46, 61]. The ovoid fruit is about 17mm long and contains a single large seed[200].

tcanta Hedge Hedge WoodPlants can be grown as a hedge, they can be sheared to make a formal screen[200]. Wood - heavy, hard, strong, brittle, close grained[82]. It weighs 52lb per cubic foot, but is of no commercial importance due to the small size of the trees[227, 229].

dwatta Abortifacient Anodyne Antispasmodic Astringent Birthing aid Dysentery Nervine SedativeStagberry was used by the North American Indians to treat dysentery and to arrest haemorrhage of the uterus[254, 257]. It is now considered to be a specific treatment for the relief of menstrual pain - the bark contains 'scopoletin', a coumarin that has a sedative affect on the uterus and salicin, a painkiller that is used in making aspirin[238, 254]. The bark of the root and stems is abortifacient, anodyne, antispasmodic, astringent, nervine and sedative[9, 46, 165, 222]. A tea is used internally in the treatment of painful or heavy menstruation, prolapse of the

uterus, morning sickness, to prevent miscarriage and to relieve spasms after childbirth[222, 238, 254]. It is also used to treat convulsive disorders, colic and other cramping pains that affect the bile ducts, hysteria, asthma and palpitations of a nervous origin[238, 254]. The stem bark is harvested in the autumn before the leaves change colour, or in the spring before the leaf buds open[238]. The root bark is only harvested in the autumn[254]. Both barks can be dried for later usef[238].

nrakta Eastern N. America - Connecticut to Florida, west to Texas and Kansas. ksacta Thickets, woodland borders, shores etc[43], and on dry rocky hillsides[3, 82].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Screen, Specimen. An easily grown plant, succeeding in most soils[1]. Unlike other members of the genus, this species grows well on poor soils and in dry situations[200]. Prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. A very hardy plant, tolerating temperatures down to about -40°c[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Special Features:Attracts birds, Attractive foliage, North American native, Attracts butterflies, Fragrant flowers, Attractive floowrs or blooms.

#### 4.2.163 Malus angustifolia

Southern Crab, Southern crab apple 3 tin 8 cyuc 2 koak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus angustifolia is a deciduous Tree growing to 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[61, 105]. A fragrant aroma, but the fruit is harsh

and acid[11]. The hard sour fruits are often used for making preserves, cider, jellies etc[46, 82, 183]. The fruit is about 25mm in diameter and is slightly pear-shaped[200].

tcanta WoodWood - hard, heavy, close grained[46, 61, 82, 229]. It weighs 43lb per cubic foot[235]. Of no commercial value, but it is used locally for making levers, tool handles and other small objects[46, 61, 82, 229].

nrakta Eastern N. America - Maryland to Florida, west to Texas and Louisiana. ksacta Woods and thickets, especially along river banks[229].

propta Seed - best sown as soon as it is ripe in the auturn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta Landscape Uses:Border, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The flowers have a perfume of violets[245]. A short-lived tree in the wild[229]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:North American native, Fragrant flowers, Attractive flowers or blooms.

#### 4.2.164 Malus ioensis

Prairie Crab, Prairie crab apple, Texas crab apple, Prairie Crabannie

3 tlin 8 cyuc 2 kcak 2 tcan 0 dwat 5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Malus ioensis is a deciduous Tree growing to 5 m (16ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from May to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 159, 183, 257]. Up to 4cm in diameter[229]. Harsh and astringent[1, 227, K], it is best baked or made into preserves. It makes excellent jellies and cider[229].

tcanta WoodWood - heavy. Of no commercial importance[229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

nrakta Central N. America - Indiana to Minnesota, south to Texas and Louisiana. ksacta Open woods, thickets, pastures, along streams etc, with a preference for calcareous soils[228].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200].

up smaller clumps and grow them on in a cold frame until early summer. Division in spring or autumn[200]. Basal cutthey are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 4.2.307 Lonicera canadensis

Fly Honeysuckle, American fly honeysuckle 3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lonicera canadensis is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[2, 177]. It is possibly edible[105]. The fruit is about 6mm in diameter[235].

dwatta Diuretic Sedative VDThe steeped branches are a very effective diuretic[207]. A decoction of the shoots is used in the treatment of chancres caused by syphilis[257]. The bark is sedative. An infusion has been given to children who cry all night[257].

nrakta N. America - Nova Scotia to Saskatchewan, Connecticut, Pennsylvania, Michigan and Minnesota. ksacta Cool moist woods[43, 235].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 -10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78], Lavering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200].

### 4.2.308 Artemisia sacrorum

Russian Wormwood

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flat-

priklwis hpa7tmwatli xre7t hionli

drutta Artemisia sacrorum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: LeavesEdible Uses: One report says that the plant is edible but gives no more details[177].

nrakta E. Asia - from Afghanistan to India, Tibet, China and Mongolia. ksacta Widespread throughout China on hills, waysides, shrublands, slopes (where it is often dominant on southern slopes), roadsides and forest steppe from low to middle elevations[266].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or

tings in late spring. Harvest the young shoots when about 10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. This species is closely related to Artemisia gmelinii and is often confused with that species[266]. We are not sure if this plant is annual, biennial or perennial, since various reports differ. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 4.2.309 Berula erecta

Cutleaf Waterparsnip

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Berula erecta is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist or wet

pcista The plant is toxic, and capable of causing death to grazing animals[274].

kcakta The leaves and flowers have been used for food[257]

dwatta The plant is used externally in the treatment of rheumatism[257]. An infusion of the whole plant can be used as a wash for swellings, rashes and athletes foot infec-

nrakta Most of Europe, including Britain, N. America, W. and C. Asia. ksacta Ditches, canals, ponds, fens and marshes throughout Britain[17].

propta Seed -

nwatta We have no information on the cultivation needs of this plant but, judging by its native habitats, it is likely to need a moist to wet soil in full sun or light shade[K]. The leaves of this plant are very similar to Apium nodiflorum, differing in colour and in the usually greater number of pairs of segments[17].

#### 4.2.310 Verbascum thapsus

Great Mullein, Common mullein, Aaron's Rod, Flannel Plant, Hag Taper, Mullein, Torches, Velvet Plant

3 tlin 8 cyuc 1 kcak 4 tcan 3 dwat 1.8 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Verbascum thapsus is a BIENNIAL growing to 1.8 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The leaves contain rotenone and coumarin, though the quantities are not given[222]. Rotenone is used as an insecticide and coumarin can prevent the blood from clotting[K]. Hairs on the leaves can act as an irritant[222].

kcakta Edible Parts: Edible Uses: TeaAn aromatic. slightly bitter tea can be made by infusing the dried leaves in boiling water for 5 - 10 minutes[183]. A sweeter tea can be made by infusing the fresh or dried flowers[183].

tcanta Dye Insecticide Insulation Lighting Tinder Wick-Landscape Uses: Border - a very ornamental plant. A yellow dye is obtained from the flowers by boiling them in water[4]. diploids[187]. L. galeobdolon argentatum is the more rampant form, its clone 'Variegatum' is a commonly used ground cover plant for shady places[187]. Plants seem to be immune to the predations of rabbits[233]. A very invasive plant, sending out long prostrate shoots that root at intervals along the stems[31, 200]. Special Features: Attractive foliage, Naturalizing. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

### 4.2.210 Camassia cusickii

Cussick's camas

3 tlin 11 cyuc 2 kcak 3 tcan 0 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Camassia cusickii is a BULB growing to 0.9 m (3ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no hazards are known Camassia spp. can be mistaken for Zigadenus spp. when not flowering which are very toxic.

kcakta Edible Parts: RootEdible Uses: Bulb. The cooked bulb has a sweet, anise-squash flavour. Pressure cook at 250°F or 120°C for nine hours. A larger bulb than other species in this genus but the flavour is considered poorer [1-2]. Considered pungent, slimy, and bitter tasting by some (summitpost.org). The bitter taste is due to saponins in the plant. Commonly confused with C. guamash where Native Americans would harvest the roots to eat raw as a vegetables, or boiled them to create a sweet, molasses-like treat.

tcanta Uses include food forests, informal gardens, cottage gardens, prairie and meadows. Locations include: garden banks and slopes, beds and borders and can be underplanted with roses and other shrubs. Showy, cut flowers. Thrives among perennials. C. cusickii can naturalize and serve as a good ground cover.

dwatta None Known

nrakta A Pacific Northwest U.S. native that's been cultivated commercially in the Netherlands. ksacta Damp meadows at subalpine and alpine elevations (4,000-6,000 feet (1,200-1,800 m) and tolerates pond edges, rich soils, and bloom well in either sun or shade.

propta Propagated by removing the offsets that have formed round the main bulbs. Plant 6 inches (150 mm) deep in late summer or early fall. In very cold areas, the soil should be mulched to protect the bulbs in late autumn.

nwatta Hardy Perennial Bulb found in temperate to subtropical locations. Prefers moist, fertile soil in full sun to partial sunlight. Soil chalk, loam or sand which is acid, alkaline or neutral. It tolerates clay and dry soil. Soil moisture moist but well-drained. Unlike most bulbs, it prefers soil that has a bit more moisture but is intolerant of waterlogging. Deerand rodent-resistant. Flowers spring to early summer. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1). For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

## 4.2.211 Mentha x piperita citrata

Eau De Cologne Mint, Eau de Cologne Mint, Peppermint 3 tlin 9 cyuc 2 kcak 3 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha x piperita citrata is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this sub-species, it should be noted that, in large quantities, the closely allied M. x piperita vulgaris can cause abortions, especially when used in the form of the extracted essential oil, so it should not be used by pregnant women.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods[5]. A very pungent flavour, the leaves of the true eau-de-cologne mint are too aromatic for most tastes. though the cultivar 'Basil' has an excellent flavour and makes a very good substitute for basil in pesto[K]. A herb tea is made from the fresh or dried leaves[21, 183].

tcanta Essential Repellent StrewingLandscape Uses: Container, Ground cover, Woodland garden. An essential oil obtained from the whole plant is a source of lavender oil which is used in perfumery[46, 105, 238]. It is also used in oral hygiene preparations, toiletries etc[238]. Formerly used as a strewing herb[14], the plant repels insects, rats etc[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. Dynamic accumulator.

dwatta Anodyne Antiseptic Antispasmodic Carminative Cholagogue Diaphoretic Refrigerant Stomachic Tonic VasodilatorEau de Cologne mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The leaves and flowering plant are anodyne, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, refrigerant, stomachic, tonic, vasodilator[4, 9, 21, 165]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The medicinal uses of this herb are more akin to lavender (Lavandula spp) than the mints. It is used to treat infertility, rapid heartbeat, nervous exhaustion etc[238]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Britain, ksacta A natural hybrid, M. aquatica x M. spicata found in moist soils on the sides of ditches, roadsides etc in S. England[5, 17]

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for the production of essential oils, but the plant also succeeds in

partial shade. Prefers a slightly acid soil[16]. Plants are very tolerant of neglect, succeeding in long grass[K]. Hybridizes freely with other members of this genus. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. The mint will need to be grown in containers to prevent it spreading too aggressively into the other plants. The whole plant has a strong minty aroma with a hint of ginger[245]. The plant produces a better quality essential oil if the plant is grown in dry ground[115]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

### 4.2.212 Zizia aurea

Golden Alexanders, Golden zizia 3 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 0.8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Zizia aurea is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There is a report that the root might be toxic[222]. kcakta Edible Parts: FlowersEdible Uses: The flowers, with the main stem removed, are a welcome addition to a tossed green salad. They are also a delicious cooked vegetable when used in a similar manner to broccoli[183].

dwatta Febrifuge Hypnotic VulneraryA tea made from the root is febrifuge[222, 257]. The root is also believed to be vulnerary and hypnotic[222].

nrakta Eastern N. America - Quebec to Saskatchewan and south to Texas and Florida.. ksacta Moist meadow-land[200]. Dry woods and rocky outcrops[222]. Low woods in Texas[274].

propta Seed - we have no information for this species but it is probably best sown in spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

watta Requires a moist soil and a position in full sun[200]. Suitable for the wild garden and other informal plantings as well as collections of native wild flowers[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2].

### 4.2.213 Calochortus nuttallii

Sego Lily

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calochortus nuttallii is a BULB growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Bulb - raw or cooked[207]. Remove the outer husk. Excellent raw, the flavour is greatly improved by slow cooking[183]. The bulbs are said to have a crisp nut-like texture and a pleasant flavour when cooked. The bulbs can also de dried and ground into a powder[207] which can be used with cereal flours when making bread[212]. Leaves - cooked as a potherb[183]. It is hard to obtain a sufficient quantity and this use of the leaves will weaken the plants so is not to be recommended[K]. Seed - ground into a powder[183]. Flowers and flower buds - raw. A tasty addition to the salad bowl[183].

nrakta South-western N. America - California to New Mexico. ksacta Dry soils with grass and scrub, 1500 - 2800 metres[90].

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 - 6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. One report says that the bulbs must be planted into their permanent positions immediately[1], whilst another says that they can be stored overwinter and replanted in the spring[138]. Stem bulbils, harvested from the stems after flowering[200]. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a warm sunny position and must be kept dry from mid summer to late autumn[1, 90, 200]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter[42, 90]. It is easiest to grow in a bulb frame[90] but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in spring[138]. Another report says that the bulbs should be replanted immediately[1]. Bulbs frequently divide after flowering, the bulblest taking 2 years to reach flowering size[200]. Hand pollination is necessary if seed is required[1]. A very ornamental plant[1], it is the state flower of Utah[85, 95].

#### 4.2.214 Alchemilla alpina

Alpine Lady's Mantle, Mountain Lady's Mantle 3 tlin 7 cyuc 2 koak 0 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Alchemilla alpina is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaThe following uses are for A. vulgaris. They quite probably also apply for this species[K]. Young leaves - raw or cooked[5, 7]. A dry, somewhat astringent flavour[K]. They can be mixed with the leaves of Polygonum bistorta and Polygonum persicaria then used in making a bitter herb pudding called 'Easter ledger' which is eaten during Lent[177, 183]. Root - cooked. An astringent taste[4]. The leaves are used commercially in the blending of teal[7].

dwatta Alterative Antirheumatic Astringent Diuretic Emmenagogue Febrifuge Sedative Styptic Tonic Vulnerary-Lady's mantle has a long history of herbal use, mainly as an for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Succeeds in any soil in full sun[187, 200], but prefers a fertile sandy loam[200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Does well on chalk. Dislikes winter wet[200]. Succeeds in acid as well as alkaline soils[200]. Plans are hardy to about -25°c[187]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. There are some named forms, selected for their ornamental value[233]. When planting out. in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

### 4.2.303 Erigeron annuus

Annual Fleabane, Eastern daisy fleabane 3 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Érigeron annuus is a ANNUAL/PERENNIAL growing to 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies), bees, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant-boiled[105, 177].

nrakta N. America. Naturalized in C. Europe. ksacta Fields and waste places[43]. Prairies and open ground in various soil types in Texas[274].

propta Seed - sow spring in situ. The seed usually germinates within four weeks.

nwatta Landscape Uses:Border, Container, Rock garden, Seashore, Specimen. Prefers a moderately fertile well-drained soil in a sunny position[200]. A polymorphic species[50]. A self-fertile plant, producing seed apomictically[50]. Very few members of this genus will hybridise with other members of the genus[274]. Special Features:North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers.

### 4.2.304 Saussurea pulchella

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Saussurea pulchella is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

nrakta E. Asia - Japan, Korea. ksacta Grassy places in mountains all over Japan [58].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame in the spring. Surface sow, or only just cover the seed, and make sure that the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first

winter. Plant them out in late spring after the last expected frosts. Division in spring might be possible.

nwatta Succeeds in most soils in a sunny well-drained position[1].

### 4.2.305 Solidago graminifolia

Flat-Topped Goldenrod

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Solidago graminifolia is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe fresh or dried leaves are a tea substitute[183].

tcanta Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Febrifuge PectoralAntiseptic. An infusion of the dried powdered herb can be used[168]. A decoction of the root has been used in the treatment of chest pains and lung problems[257]. An infusion of the blossoms has been used in the treatment of some types of fevers[257].

nrakta N. America - British Columbia to Alberta, south to Florida and New Mexico. ksacta Damp to dryish shores, thickets and meadows[204].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. This plant has become a weed in its natural range and can be invasive under cultivation[200]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

### 4.2.306 Carex aquatilis

Water sedge, Sitka sedge

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Carex aquatilis is an evergreen Perennial growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in July, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Stem bases - raw[257].

nrakta Northern Europe, including Britain, from Norway to Sweden, Finland, N. Russia and Siberia. ksacta Margins of lake and streams in mountainous districts in west and northern Britain[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot

of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Plants only thrive in a sunny position if the soil remains moist throughout the growing season[238]. Prefers a calcareous soil. Tolerates a pH in the range 4.5 to 7.5. Plants take 2 - 3 years to flower when grown from seed[244]. Grows well in open woodlands[1, 4]. The flowers are very attractive to bees[244]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. Although the plant is a perennial, individual roots only live for one year and die after flowering. Each root produces a number of 'daughter' roots before it dies and these can be used for propagating the plant[4]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. An aggregate species which is divided by some botanists into many species[17, 76]. Special Features:Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers.

### 4.2.300 Frasera speciosa

Green Gentian, Elkweed

3 tlin 7 cvuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Frasera speciosa is a BIENNIAL/PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista When used medicinally, large doses of the powdered root have proved fatal[155].

kcakta Edible Parts: RootEdible Uses: Root[105, 106, 155, 161]. It has been reported that the N. American Indians ate the fleshy root of this plant, but caution is advised since the roots of closely related plants are used medicinally as emetics and cathartics[212]. See the notes above on toxicity.

tcanta ParasiticideThe root, when ground into a powder and then mixed with oil, has been used as a parasiticide in order to kill lice[155].

dwatta Contraceptive Febrifuge Laxative Parasiticide stomachic TonicThe whole plant is febrifuge, pectoral, laxative and tonic[155, 257]. An infusion of the dried, powdered leaves, or the root, has been used in the treatment of diarrhoea[257]. A cooled decoction of the roots has been used in the treatment of asthma, colds, digestive complaints etc[257]. An infusion of the plant has been used as a contraceptive[213]. Caution is advised in the use of this plant, see the notes above on toxicity.

nrakta Western N. America - California to Washington. ksacta Dryish or dampish places[71]. Rich soils in open pine woods, aspen groves etc, 1500 - 3000 metres[155].

propta Seed - sow spring in a greenhouse[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in late winter[200].

nwatta Requires a moist but well-drained position and a stony peaty soil[1, 200]. Requires an acidic soil[200]. A very ornamental plant[1].

#### 4.2.301 Papaver orientale

Oriental Poppy

3 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Papaver orientale is a PERENNIAL growing to 1 m (3ft 3in) by 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH:

mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no specific mention has been found for this plant, many species in this genus are toxic to mammals, though the toxicity, at least when grown in Britain, is low.

kcakta Edible Parts: Edible Uses: CondimentThe young seed heads are used as a condiment, they are hot and acrid[2, 105, 183]. Some caution is advised, see the notes above on toxicity.

dwatta DiaphoreticThe petals are sudorific[240].

nrakta W. Asia - Armenia, N.E. Iran, Turkey. ksacta Meadows, usually in sub-alpine zones, but also on stony slopes in the lower mountain zone[74].

propta Seed - sow June in an outdoor seedbed. Plant into permanent positions in September. Seed can also be sown in spring and may then flower in late summer. Division in March or October with care[200]. Another report suggests that division is very simple[190]. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Root cuttings 10cm long, November/December in a cold frame[111].

nwatta Landscape Uses: Alpine garden, Container, Foundation, Rock garden, Specimen, Woodland garden. Prefers a well-drained sandy loam in a sunny position[1, 200]. Succeeds in an ordinary good soil[111, 200] and in dry soils, tolerating drought when established[190]. Plants prefer a deep soil that is poor and dry rather than rich, they dislike moist conditions[233]. Plants can be grown in guite coarse grass, which can be cut annually in the autumn[233]. A deeprooting and almost indestructible plant, every scrap of the running root system that is left in the ground can grow into a new plant[190, 233]. There are many named varieties selected for their ornamental value [187, 200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A good bee plant[108]. Special Features: Attractive foliage, All or parts of this plant are poisonous, Attracts butterflies, Suitable for cut flowers.

#### 4.2.302 Clematis recta

Ground virginsbower

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Clematis recta is a PERENNIAL CLIMBER growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying [65].

kcakta Edible Parts: LeavesEdible Uses: Young shoot tips - cooked or pickled[177]. Some caution is advised, see the notes above on toxicity.

dwatta Antirheumatic Diaphoretic Diuretic Homeopathy RubefacientThe flowers and leaves are diaphoretic, diuretic and rubefacient[4]. They are taken both internally and externally in the treatment of syphilitic, cancerous and other foul ulcers[4]. Caution is advised since this is a poisonous plant[4]. A homeopathic remedy is made from the plant. It is used in the treatment of rheumatism and skin eruptions[238].

nrakta S. and E. Europe. ksacta Scrub, forest, river valleys and sunny hills[74, 187].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at  $20^{\circ}$ c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame

external treatment for cuts and wounds, and internally in the treatment of diarrhoea and a number of women's ailments, especially menstrual problems[9, 244]. This plant, the alpine ladies mantle, has been shown to be more effective in its actions[238, 268]. The herb is alterative, antirheumatic, astringent, diuretic, emmenagogue, febrifuge, sedative, styptic, tonic and vulnerary[4, 7, 9, 21, 46, 165]. The leaves and flowering stems are best harvested as the plant comes into flower and can then be dried for later use[4]. The fresh root has similar and perhaps stronger properties to the leaves, but is less often used[4]. The plant is rich in tannin and so is an effective astringent and styptic, commonly used both internally and externally in the treatment of wounds[4]. It helps stop vaginal discharge and is also used as a treatment for excessive menstruation and to heal lesions after pregnancy[4, 244]. Prolonged use can ease the discomfort of the menopause and excessive menstruation[268]. The freshly pressed juice is used to help heal skin troubles such as acne and a weak decoction of the plant has been used in the treatment of conjunctivitis[244].

nrakta Western and Northern Europe. ksacta Meadows, pastureland and woodland clearings, mainly on acid

propta Seed - sow spring in a cold frame. The seed usually germinates in 3 - 4 weeks at 16°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on a cold frame for their first winter, planting out in late spring or early summer. Division in spring or autumn. The divisions can be planted out direct into their permanent positions, though we find it best to pot them up and keep them in a sheltered position until they are growing away well.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Rock garden. Easily grown in ordinary soil in sun or part shade[1, 233]. Prefers a well-drained acid soil[200, 238]. Grows well in heavy clay soils. Succeeds in dry shade[188]. Plants in this genus seem to be immune to the predations of rabbits[233]. Special Features:Attractive foliage, Not North American native, Suitable for cut flowers, Inconspicuous flowers or blooms.

### 4.2.215 Aguilegia formosa truncata

Columbine

3 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 0.9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aquilegia formosa truncata is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: Flowers Edible Uses: Flowers - raw. Rich in nectar, they are sweet and delightful[172, 213], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K]. Children enjoy sucking out the sweet nectar from the base of the flowers[257]. Early spring greens cooked and eaten as a vegetable[257]. Some caution is advised, see the notes above on toxicity. Root - cooked. Used by the N. American Indians as a famine food[213]. Some caution is advised, see the notes above on toxicity.

tcanta Parasiticide ParasiticideThe seed is used to rid the hair of lice[172, 257]. The whole plant is boiled up and used as a hair wash[213, 257]. The seeds are aromatic. They can be crushed and rubbed on the body as a perfume or placed in a sachet and stored with clothes to impart a nice small[257].

dwatta Antispasmodic Diaphoretic Parasiticide Parasiticide Resolvent SalveWestern columbine was quite frequently employed by a number of native North American Indian tribes who used it to treat a variety of complaints[257]. It is little used in modern herbalism. Antispasmodic, diaphoretic,

parasiticide, resolvent, salve[172]. A decoction of the root is used in the treatment of diarrhoea and stomach aches[257]. A decoction of the roots and leaves is used in the treatment of VD, dizziness and biliousness[257]. The mashed fresh roots can be rubbed briskly on aching rheumatic joints[257]. A poultice of chewed roots or leaves is applied to bee stings, sores etc[257]. A decoction of the leaves is used in the treatment of sore throats, coughs and colds[257]. The seeds can be chewed as a remedy for stomach aches[257].

nrakta South-western N. America - California, Nevada and Oregon. ksacta Mesic woods or shrublands from sea level to about 3500 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate [200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring [200].

nwatta Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sunny position[1]. Intolerant of heavy clay[200]. A very ornamental plant[1], it is hardy to about -15\*c[187]. Most species are short-lived, dying out after 2 - 3 years, though they usually produce seed prolifically[200]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

### 4.2.216 Osmunda claytoniana

Interrupted Ferr

3 tlin 7 cvuc 2 kcak 0 tcan 1 dwat 0.5 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Osmunda claytoniana is a FERN growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: Leaves StemEdible Uses: The young fronds are eaten[183]. Cooked as a vegetable[177, 272]. The centre of the clump, below ground level, is the source of a small edible pith called 'fern butter'[183].

dwatta VermifugeThe roots are used as an adulterant for Dryopteris felix-mas in the treatment of internal worms[240].

nrakta E. Asia - China, Japan, Himalayas. Eastern N. America. ksacta Wet places in C. Japan[58]. Open slopes, rarely in forests, 2800 - 3300 metres in Kashmir[145].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wirv roots[2001.

nwatta Likes a soil of swamp mud and loamy or fibrous peat, sand and loam[1]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Requires a shady position[188]. Plants are hardy to at least -20°c, they are evergreen in warm winter areas but decidu-

ous elsewhere[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1].

### 4.2.217 Aguilegia flabellata

Fan Columbine, Dwarf Columbine 3 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwi hpa7tmwatli xre7t hjonli

drutta Aquilegia flabellata is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaLeaves - cooked. They must be thoroughly boiled[177]. Caution is advised, see the notes above on toxicity. Flowers - raw. Sweet and delightful[172], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K]. The flowers are also used as a tea substitute.

tcanta ParasiticideThe seed is used as a parasiticide to rid the hair of lice[172].

nrakta E. Asia - Japan, Korea. ksacta Scrub in the alpine regions of C. and N. Japan.

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Landscape Uses:Alpine garden, Container, Rock garden, Seashore. Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sunny position[1]. Intolerant of heavy clay[200]. Hardy to about -20°c[187]. The name of this species is based on the cultivated form, the true wild form is A. flabellata pumila. Kudo. There are some named varieties selected for their ornamental value[200]. Most species are short-lived, dying out after 2 - 3 years, though they usually produce seed prolifically[200]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features: Attracts birds, Attractive foliage.

### 4.2.218 Epigaea repens

Mayflower, Trailing arbutus, Ground Laurel 3 tlin 8 cyuc 2 kcak 2 tcan 2 dwat 0.1 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Epigaea repens is an evergreen Shrub growing to  $0.1\ m$  (0ft 4in) by  $0.3\ m$  (1ft). See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers weit total

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw. Fragrant, with a spicy slightly acid flavour[105], they are eaten as a wayside nibble or are added to salads[183]. Thirst quenching[177]

tcanta Plants can be grown for ground cover, they should be spaced about 25cm apart each way and form a carpet of growth[208]. This species is probably not very worthwhile for ground cover in Britain because of its difficulty to cultivate[208].

dwatta Astringent Diuretic Tonic UrinaryMayflower is rarely used medicinally, even in folk medicine, though it is a strong urinary antiseptic and is one of the most effective remedies for cystitis, urethritis, prostatitis, bladder stones and particularly acute catarrhal cystitis[268]. The leaves are astringent, diuretic and tonic[46, 61]. An infusion is made from the dried leaves, or a tincture from the fresh leaves[4]. A tea made from the leaves is used in the treatment of kidney disorders, stomach aches, bladder disorders etc[222]. It is of special value when the urine contains abutin and, although this is an effective urinary disinfectant, it hydrolyzes to hydroquinone which is toxic[222]. The leaves can be used fresh or can be harvested in the summer and dried for later use[238, 268].

nrakta Eastern N. America - Newfoundland to Florida and west to Tennessee, Ohio and Michigan. ksacta Damp mossy banks in sandy and peaty woods and clearings[43, 268], usually under pine trees[4].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame[200]. Another report says that the seed requires no pre-treatment and can be sown in late winter in a cold frame[113]. Surface sow and place the pot in light shade, do not allow it to dry out[113]. The seed usually germinates in 3 - 5 weeks[113]. As soon as they are large enough to handle, pot up the seedlings into individual pots. Be very careful since they strongly resent root disturbance. Grow them on in light shade in the greenhouse and plant them out in their permanent positions in the late spring of their second years growth. Cuttings of half-ripe wood, July/August in a frame[200]. Take the cutting with a part of the previous year's growth[113]. (This report is unclear as to whether it means a heel of older wood or just a small section of older wood[K]) Plants self-layer and can be divided in the spring but this must be done with great care since they deeply resent root disturbance[200].

nwatta Landscape Uses:Rock garden, Woodland garden. Requires an open lime-free humus-rich soil and shade from direct sunlight[11, 182, 200]. Grows well in the shade of other calcifuge plants such as rhododendrons and also under pine trees[245]. A very cold-hardy plant but it is often excited into premature growth by mild winter weather and is then subject to damage by frost[11]. The flower buds require a period of chilling to about 2°c before they will open[200]. The flowers are deliciously and strongly scented[200] with a rich spicy perfume[245]. There are some named varieties. selected for their ornamental value[200]. A difficult plant to grow in cultivation[200] and very hard to transplant successfully[182]. Another report says that although the genus is generally difficult to cultivate, this species is relatively easy to grow[188]. Special Features: Attractive foliage, Fragrant flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

### 4.2.219 Ajuga reptans

Bugle, Common Bugelweed, Bugleweed, Carpet Bugleweed, Carpetweed, Carpet Bugle

3 tlin 10 cyuc 2 kcak 2 tcan 3 dwat 0.3 m hkuc pcimhmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyik hpa7tli flatoriklwis hpa7tmwatli fvifxre7t hjonli

drutta Ajuga reptans is an evergreen Perennial growing to 0.3 m (1ft) by 0.6 m (2ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not

in flower from July to August. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

kcakta There is a report that this root has been boiled and used for food in Lapland[2]. However, this is a very poisonous plant and such a use is very inadvisable[K].

dwatta Alterative Anaesthetic Antiarthritic Antitussive Deobstruent Diaphoretic Diuretic Sedative StimulantThe root is alterative, anaesthetic, antiarthritic, antitussive, deobstruent, diaphoretic, diuretic, sedative and stimulant[178]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta Europe to W. Asia. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. If the flower stems are removed after flowering the plant will normally flower again later in the season[200]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. A polymorphic species[1]. The nomenclature is very confused for this species, A. lycoctonum. L. is treated as A. septentrionale by many botanists whilst A. lycoctonum. Auct. is A. vulparia[50].

#### 4.2.298 Verbena hastata

American Blue Vervain, Swamp verbena 3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Verbena hastata is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: TeaSeed cooked[257]. The seed can be roasted and ground into a powder or used whole as a piñole[105, 161, 183, 257]. Pleasantly bitter, some of this bitterness can be removed by leeching the flour[183]. The leaves are used as a tea substitute[161, 183, 257].

dwatta Antiperiodic Diaphoretic Emetic Expectorant Tonic Vermifuge VulneraryThe leaves and roots are antiperiodic, diaphoretic, emetic, expectorant, tonic, vermifuge and vulnerary[4, 21, 46, 222]. The roots are more active than the leaves[222]. The plant is used in the treatment of stomach aches, gravel, worms and scrofula[4, 257]. An infusion of the roots, leaves or seeds has been used in the early stages of fevers[257]. A snuff made from the dried flowers has been used to treat nose bleeds[257].

nrakta N. America - Nova Scotia and New Brunswick to Florida, and from California to British Columbia. ksacta Swales, damp thickets and shores[43].

propta Seed - sow early spring in a greenhouse or cold frame and only just cover the seed[1]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger

divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in early summer. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any moderately fertile well-drained but moisture retentive soil in a sunny position[1, 200]. Plants are hardy to about -20°c[187].

### 4.2.299 Aconitum napellus

Aconite, Venus' chariot, Wolfsbane Garden, Monk's Hood Garden

3 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Aconitum napellus is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from February to October, in flower from July to August, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic, acting especially on the nerve centres. At first it stimulates the central and peripheral nervous system and then paralyzes it. Other symptoms of poisoning include a burning sensation on the tongue, vomiting, stomach pain and diarrhoea. Simple skin contact with the plant has caused numbness in some people[4, 7, 9, 10, 14, 19, 65, 76, 244]. The root contains 90% more poison than the leaves[232].

kcakta Some reports suggest the root is edible if cooked[2, 177], but these should be treated with extreme caution due to the highly toxic nature of the plant[K].

dwatta Analgesic Anodyne Antirheumatic Diaphoretic Diuretic Febrifuge Homeopathy Irritant SedativeAconite has been used since ancient times, especially as an antidote to poisoning[244]. Since the entire plant is itself very toxic, however, any use should be under the guidance of a skilled practitioner[4]. All parts of the plant are used medicinally. The root is the most important and this is harvested as soon as the plant dies down in the autumn and is dried before use[4]. The other parts of the plant are less important and are used fresh, being harvested when the plant is coming into flower[4]. The root is analgesic, anodyne, antirheumatic, diaphoretic, diuretic, irritant and sedative[4, 7, 9, 165, 200]. Due to its poisonous nature, it is not normally used internally though it has been used in the treatment of fevers[200]. Externally, it is applied to unbroken skin in the treatment of rheumatism, painful bruises, neuralgia etc[200, 254]. All parts of the plant, except the root, are harvested when the plant is in flower and used to make a homeopathic medicine[232]. This is analgesic and sedative and is used especially in the treatment of fevers, inflammation, bronchitis, neuralgia etc[9, 232].

nrakta Most of Europe, including Britain, east to N. W. Asia and the Himalayas. ksacta Damp shady places and moist rich meadows in southern Wales and south-western England[7, 13, 31, 165, 176]. It is usually found in calcareous soils[9].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Landscape Uses:Border, Container, Massing, Woodland garden. Thrives in most soils and in the light shade

up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Specimen, Woodland garden. An easily grown plant, succeeding in a moist loamy soil[1]. Grows well in heavy clay soils. Succeeds in sun or semi-shade[188]. Hardy to about -25°c[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. Succeeds in a woodland or semi-wild garden, it often spreads wildly[200]. Special Features:Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers.

### 4.2.294 Artemisia gmelinii

Russian Wormwood, Gmelin's wormwood 3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicil hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Artemisia gmelinii is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: LeavesEdible Uses: One report says that the plant is edible but gives no more details[177].

tcanta The plant yields 1% essential oil, which contains 19% essential oil, 6% camphor[240].

dwatta HepaticThe leaf and stem are used in Korea to treat hepatitis, hyperlipaemia and infected cholecystitis[279]. The plant contains flavonoids, sesquiterpenes and other bio-active constituents, though no bio-activites have been recorded scientifically[279].

nrakta Eastern Europe to Central Asia, China, Mongolia and Korea. ksacta Dry stony slopes, especially in Ladakh and Lahul, 2100 - 4200 metres[51]. Hills, steppe, semidesert steppe, meadows, rocky slopes, scrub, dry floodlands, wastelands. 1500-4900 m[266]

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. This species is closely related to A. sacrorum and often confused with that species[266]. We are not sure if this plant is annual, biennial or perennial, since various reports differ. Members of this genus are rarely if ever troubled by browsing deer[233].

### 4.2.295 Salvia pratensis

Meadow Clary, Introduced sage 3 tiin 7 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Salvia pratensis is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe pungent, bitter flavoured herb has been used as a flavouring in beers and wines[183]. It is also used as an adulterant of sage[177, 183].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Serbia, the Crimea, Bulgaria. ksacta A rare native in Britain, growing in old grasslands over chalk and limestone [200].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta An easily grown plant, it succeeds in a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[11]. Requires a good well-drained soil[187]. Hardy to about -25°c[187]. Plants can be killed by excessive winter wet[200]. Well suited to the wild garden, growing well in the summer meadow[200]. Plants have stout stems and require little if any staking[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. There are many named forms selected for their ornamental value[200].

#### 4.2.296 Juncus balticus

Baltic Rush

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcuphja7nhs6s hwicli jlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Juncus balticus is a PERENNIAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista Although no reports of toxicity have been seen for this species, there is a report that one member of this genus is possibly toxic to mammals[76]..

kcakta Edible Parts: SeedEdible Uses: Drink SweetenerA sugar forms along the top of the plant. This can be gathered and eaten as candy[257]. Seed[257]. No more details are given but the seed is very small[K]. The stems are used to make a fermented drink[257].

tcanta WeavingThe stems are used in making woven baskets, thatching, weaving mats etc[212, 257]. The basal portions of the stems have been used as a light yellow-brown decoration on baskets[257].

nrakta N. Europe, Northern N. America, N. Asia in boreal areas. ksacta Damp to wet soils, usually in saline conditions[212]

propta Seed - surface sow in pots in a cold frame in early spring and keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown sufficiently, otherwise in late spring of the following year. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in a moist soil, bog garden or shallow water[1, 200]. Prefers a heavy soil in sun or light shade[200]. Plants can form large clumps and spread aggressively at the roots[200, 212].

#### 4.2.297 Aconitum lycoctonum

Wolfshane

3tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Aconitum lycoctonum is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is

frost tender. It is in leaf all year, in flower from May to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drouoth.

pcista None Known

kcakta Edible Parts: LeavesEdible Uses: Young shoots raw[7].

tcanta A good ground-cover for a position in semi-shade[200], forming a carpet and rooting as it spreads[208]. Fairly fast growing but it does not always smother out weeds and can become bare at the centre if not growing in good conditions[197]. Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, theses are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level groundcovers provide little field.

dwatta Aromatic Astringent Bitter HomeopathyBugle has a long history of use as a wound herb and, although little used today, it is still considered very useful in arresting haemorrhages and is also used in the treatment of coughs and spitting of blood in incipient consumption[4, 254, 268]. The plant contains digitalis-like substances (these are commonly found in Digitalis species and are used in treating heart complaints) and is thought to possess heart tonic properties[268]. It has also been considered good for the treatment of excessive alcohol intake[4]. The whole plant is aromatic, astringent and bitter[4, 7, 9]. The plant is usually applied externally[7]. It is harvested as it comes into flower in late spring and dried for later use[4, 7]. It is also commonly used fresh in ointments and medicated oils[238]. A homeopathic remedy is made from the whole plant. It is widely used in various preparations against throat irritations and especially in the treatment of mouth ulcers[7].

nrakta Most of Europe, including Britain, to S.W. Asia and N. Africa. ksacta Damp grassy fields and damp woods[7, 13, 17].

propta Seed - sow spring or autumn in a cold frame. The seed usually germinates in 3 - 4 weeks at 10°c[133], though it can be erratic[238]. Prick out the seedlings when they are large enough to handle and plant them out in the summer[K]. Division of runners at almost any time of year. Very easy, the divisions can be planted straight out into their permanent positions if required.

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Rock garden, Specimen, Woodland garden. Prefers a humus-rich, moisture retentive soil and partial shade[28, 31, 200]. Does well in marshy soil and in the spring meadow[24]. Grows well in dry shade[187. 190] and is fairly drought tolerant once established, though it shows distress in severe drought[190]. Plants do not always ripen their seeds in Britain, they spread freely by runners, however, and soon form an extensive patch in suitable conditions[4]. A number of forms have been selected for their ornamental value, several of them are variegated and these are used especially as ground cover plants for dry shade[187]. A purple-leafed form, 'Atropurpurea' does well in full sun so long as the soil is not dry[208]. A good bee and butterfly plant[24]. Special Features: Attractive foliage, Not North American native, Naturalizing. Heat Zone: 9-1.

#### 4.2.220 Calochortus tolmiei

Tolmie Startulip

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calochortus tolmiei is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[105, 161, 177]. A sweet flavour, it can be baked or boiled like potatoes[257].

nrakta Western N. America - Washington to California. ksacta Dry, usually rocky, soils on brushy slopes[60]. Open stony places in montane coniferous forests, 1000 - 2200 metres[90].

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 - 6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. One report says that the bulbs must be planted into their permanent positions immediately[1], whilst another says that they can be stored overwinter and replanted in the spring[138]. Stem bulbils, harvested from the stems after flowering[200]. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a sunny position and must be kept dry over winter[1, 200]. Another report says that it is best grown in a good, very gritty soil in sun or semi-shade in a bulb frame[90]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter[1, 200]. It is easiest to grow in a bulb frame but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in spring[138]. Another report says that they should be replanted immediately[1]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. Hand pollination is necessary if seed is required[11].

#### 4.2.221 Vaccinium scoparium

Grouseberry, Grouse whortleberry  $3\ tlin\ 7\ cyuc\ 2\ kcak\ 0\ tcan\ 1\ dwat\ 0.2\ m\ hkuc$ 

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium scoparium is a deciduous Shrub growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (oamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked and used in pies, jellies, jams, breads, muffins etc[60, 85, 161, 183, 257]. The dried fruits can be used to flavour other foods or to thicken soups[183]. The fruit is about 4-6mm in diameter[200]. The fresh or dried leaves can be used to make a kind of tea.

tcanta BroomThe branches can be used as brooms[257]. dwatta Antiemetic Antiseptic Appetizer Astringent Carminative HypoglycaemicAntiseptic, astringent, carminative, hypoglycaemic[172]. An infusion of the dried, pulverized leaves has been used in the treatment of nausea and to increase the appetite[257]. The dried and powdered fruits have been given to children to improve their appetite[257].

nrakta Western N. America - British Columbia and Alberta, south to Colorado and S. Dakota. ksacta Usually found at high elevations[60]

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are

about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the green house for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

### 4.2.222 Dryopteris expansa

Spiny Wood Fern, Spreading woodfern 3 tlin 7 cyuc 2 kcak 0 tcan 3 dwat 0.4 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Dryopteris expansa is a FERN growing to 0.4 m (1ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. The seeds ripen from July to September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caution is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised.

kcakta Edible Parts: Leaves RootEdible Uses: Root raw or cooked[256]. Baked and then peeled before being eaten[257]. The raw root is rather bitter but they develop a sweet taste when cooked and are said by some people to develop a flavour rather like sweet potatoes[256]. The root is best harvested in early autumn. At this time the rhizomes are surrounded by scaly, finger-like projections - if the projections are flat and dark inside then the rhizomes are not good to eat but if they are round, fleshy and light-coloured then they can be eaten[256]. The young shoots, harvested in spring before they have fully unfurled, can be cooked and eaten[257]. They can be added to soups[257].

tcanta HairAn infusion of the leaves has been used as a hair wash[257].

dwatta Anthelmintic PoulticeA poultice of the pounded roots has been applied to cuts[257]. We have no other reports for this species, but the following uses apply to many members of this genus and quite probably also to this species[K]. The root contains 'filicin', a substance that paralyses tapeworms and other internal parasites and has been used as a worm expellent[4, 172, 238]. It is one of the most effective treatments known for tapeworms - its use should be immediately followed by a non-oily purgative such as magnesium sulphate in order to expel the worms from the body[238]. An oily purge, such as caster oil, increases the absorption of the fern root and can be dangerous[238]. The root is harvested in the autumn and can be dried for later use, it should not be stored for longer than 12 months[238]. This remedy should be used with caution and only under the supervision of a qualified practitioner[238]. The root is toxic and the dosage is critical[238]. See also the notes above on toxicity. The root is also used in the treatment of dandruff[4, 172].

nrakta Northern Temperate Zone, including Britain. ksacta Cool moist woods, often on rotting logs and tree stumps[256].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at 20°c. Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant[233], it prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position[175, 200]. Prefers a moist soil[188]. Closely related to D. dilatata and hybridising where their ranges meet to produce D. x ambroseae. Members of this genus are rarely if ever troubled by browsing deer[233].

### 4.2.223 Calochortus gunnisonii

Mariposa Lily, Gunnison's mariposa lily 3 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hoa7tmwatli xre7t hionli

drutta Calochortus gunnisonii is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Bulb - raw or cooked[46, 105, 161]. One report says that the raw bulb tastes like a raw new potato[183]. It has a crisp nut-like texture and a pleasant flavour when cooked[85, 183]. The bulb can be dried and ground into a powder for making a sweet porridge, mush etc[85, 183, 257]. Leaves - cooked. It is hard to obtain a sufficient quantity[85] and use of the leaves will weaken the bulbs. Seed - ground into a powder[85, 183]. Flower buds - raw. Added to salads[85, 183].

dwatta Antirheumatic MiscellanyAn infusion of the plant has been taken internally to treat rheumatic swellings and to ease the delivery of the placenta[257].

nrakta South-western N. America - Rocky Mountains. ksacta Grassy hillsides and open coniferous woods[60]. Found in a variety of habitats from moist meadows and open woods to sandy and rocky hillsides and dry gulches between 1,200 and 3,300 metres[214].

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 -6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. The bulbs can be planted straight out into their permanent positions but in areas with wet winters it might be best to store them overwinter and replant them in the spring. Stem bulbils, harvested from the stems after flowering. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a sunny position and must be kept dry from mid summer to late autumn[1, 60, 200]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter[1, 42]. It is easiest to grow in a bulb frame but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in the spring[138]. The bulbs must be replanted immediately according to another report[1]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. This species is closely related

at 10°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any reasonably good well-drained but moisture retentive soil[1]. Succeeds in sun or semi-shade but flowers better in a sunny position[200].

### 4.2.291 Aconitum lycoctonum vulparia

Wolfbane

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Aconitum lycoctonum vulparia is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 13, 65].

kcakta Some reports suggest the root is edible if cooked[2, 105], but these should be treated with extreme caution due to the highly toxic nature of the plant[K].

dwatta Analgesic Anodyne Diaphoretic Diuretic Irritant SedativeThe root is analgesic, anodyne, diaphoretic, diuretic, irritant, sedative[4, 7, 9, 165]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta Europe to Asia ksacta Woods and bushy places in damp shady places.

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. An aggregate species which is divided by some botanists into many species.

### 4.2.292 Berberis koreana

Korean Barberry, Barberry 3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis koreana is a deciduous Shrub growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked. The fruits are about 5mm long[200]. Young leaves - cooked[177].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Korea. ksacta Hedgerows, ledges and montibus[11, 67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it. can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Landscape Uses:Erosion control, Pest tolerant, Hedge, Massing, Screen, Superior hedge, Woodland garden. Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. A very hardy plant, tolerating temperatures down to about -30°c[200]. Plants can be pruned back quite severely, they resprout well from the base[200]. Very stoloniferous, plants produce suckers freely[67, 200]. A very ornamental plant[67], it is closely related to B. vulgaris[1]. Hybridizes freely with other members of this genus[1]. The flowers are produced late in spring, thereby escaping spring frosts[67]. Special Features: Not North American native, Inconspicuous flowers or blooms

### 4.2.293 Lysimachia clethroides

Gooseneck Loosestrife, Gooseneck yellow loosestrife, Japanese Loosestrife, Shepherd's Crook 3 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Lysimachia clethroides is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: CondimentLeaves and young shoots - cooked and used as a vegetable[183]. A famine food, they are only used when all else fails[179]. They can also be used as a condiment[46, 61, 183]. Fruits and flowers are said to be edible[177, 183] but no further details are given. The fruit is very small[200].

nrakta E. Asia - China, Japan. Naturalized in Holland. ksacta Sunny grassy hills and at low altitudes in mountains all over Japan[58, 187]. Damp woodland margins, wet ravines and grassy mountain slopes at elevations of 300 - 2100 metres in China[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot

-35°c[184]. A slow-growing tree in the wild[229]. A number of named forms have been selected for their ornamental value[182]. Flowers are produced on the current year's growth[229]. The plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Unlike most members of the genus, this species produces suckers[200]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Dioecious. Male and female plants must be grown if seed is required.

### 4.2.288 Stephanandra incisa

Laceshrub, Cutleaf Stephanandra

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stephanandra incisa is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves[105, 177]. No more details are given.

tcanta Hedge HedgeThe cultivars 'Crispa' (syn 'Prostrata') and 'Dart's Horizon' make dense arching ground cover plants[197, 200]. They should be spaced about 1.2 metres apart each way[208]. Plants are sometimes grown as an informal hedge

nrakta E. Asia - China, Japan, Korea. ksacta Thickets in low mountains all over Japan[58]. On mountain slopes, or by streams at elevations of 500 - 1000 metres in southern

propta Seed - we have no information for this species but it is likely to require a period of cold stratification and would probably be best sown in a cold frame as soon as it is ripe. Sow stored seed in a cold frame as soon as it is received. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring is a very effective means of increase[78]. Roots cuttings, March in a warm greenhouse[11]. Cuttings of half-ripe wood, 10 - 12cm long, July in a frame. High percentage[78].

nwatta Landscape Uses:Border, Cascades, Erosion control, Ground cover, Massing, Specimen. Thrives in a reasonably moist but well-drained soil in sun or part shade[1, 11, 182]. Hardy to at least -20°c[200]. There some named varieties[182]. Plants in this genus are notably resistant to honey fungus[200].

#### 4.2.289 Symphoricarpos occidentalis

Wolfberry, Western snowberry

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1.8 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip

hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Symphoricarpos occidentalis is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower

from June to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista No report of toxicity has been seen for this species but the fruit of many if not all members of this genus contains saponins. Although toxic, these substances are very poorly

absorbed by the body and so tend to pass through without causing harm. They are also destroyed by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins but it would take extremely large doses of many kilos of fruit from this plant in order to produce toxic symptoms[65]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[161]. Insipid. They are best if cooked. A famine food, they are only used when all else fails[177, 257]. The fruit is about 8mm in diameter[200]. See the notes at top of page regarding possible toxicity.

tcanta Broom Hedge Hedge Soil stabilizationPlants have extensive root systems and are used to stabilize soils on banks and slopes[200]. The branches can be made into brooms[257]. Very tolerant of trimming, it can be grown as a medium to tall hedge[200].

dwatta Birthing aid OphthalmicAn infusion of the leaves has been used as a wash for weak and inflamed eyes[257]. An infusion of the root has been used to cleanse the afterbirth and aid in convalescence[257].

nrakta Western N. America - Illinois, Michigan and Minnesota to British Columbia, Kansas and Colorado. ksacta Bluffs, dry prairies and plains[43], mainly in the Rockies[11].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 3 months warm then 5 months cold stratification[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, 15 - 25cm long preferably with a heel, in a sheltered bed outdoors in winter. High percentage[78, 200]. Division of suckers in winter. They can be planted out direct into their permanent positions.

nwatta Tolerates most soils and conditions, including poor soils and amongst the roots and under the drip of trees[11, 200]. Grows well in heavy clay soils. Prefers a welldrained soil[200]. Does well in sun or shade[1]. Tolerates urban pollution and maritime exposure[200]. A very hardy plant, tolerating temperatures down to about -40°c[200]. Plants in this genus are notably resistant to honey fungus[200].

### 4.2.290 Hypericum ascyron

Great Saint John's Wort

3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Hypericum ascyron is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves, shoot tips and flowering buds - cooked[105, 177]. The leaves are a tea substitute[177].

dwatta Depurative Emmenagogue Febrifuge Poultice Stings VD VulneraryThe fruit is emmenagogue and is also used to treat skin complaints and gonorrhoea[218]. The whole plant is depurative, febrifuge, poultice and vulnerary[147, 218]. A decoction is used in the treatment of boils and abscesses, headaches and stomach ache and vomiting[147]. The root is considered to be specific for use in treating the first stages of consumption[257]. A powder made from the boiled root has been applied as a poultice to draw the poison out of a snake hite[257]

nrakta N. America - Quebec to Manitoba, south to Kansas, Iowa and Missouri, E. Asia, ksacta Grassy places in the mountains of N. Japan[58].

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed usually germinates in 1 - 3 months to C. ambiguus[214]. Hand pollination is necessary if seed is 15°c, but may take a year. The seed should be completely required[1].

### 4.2.224 Lilium cernuum

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium cernuum is a BULB growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: RootEdible Uses: Bulb cooked[105, 177]. The bulb is up to 4cm in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

nrakta E. Asia - Korea, Manchuria, ksacta Exposed positions amongst grass and shrubs on alluvial soils and amongst slate rocks[143].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Lime tolerant[200]. Stem rooting, the bulbs should be planted 10 - 12cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. Closely allied to L. pumilum[143]. The plants are short lived in cultivation. The plant is well suited to growing at the foot of a rock garden[143]. The flowers are sweetly scented[245]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

### 4.2.225 Clintonia udensis

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc pcimhmim cyutli tcup hwicli hrasilut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Clintonia udensis is a PERENNIAL growing to 0.3 m (1ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and shoots - cooked as a vegetable[177, 272].

nrakta E. Asia - Himalayas to S.W. China. ksacta Birch forests and alpine shrubberies, 3000 - 4000 metres from Uttar Pradesh to China[51]. Sparse forests, alpine forests at elevations of 1600 - 4000 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the spring[200]. Stored seed should be sown in late winter or early spring in a cold frame[164]. It sometimes germinates within 1 - 3 months at separated from the fruit and should only just be covered by soil[164, 200]. If the seed has been sown thinly enough, then it is possible to leave the seedlings in the pot for their first growing season, dividing them after they become dormant. Make sure to give them liquid feeds at intervals through the spring and summer. Otherwise prick out the seedlings into individual pots when they are large enough to handle. Plant out in late spring or early summer at the beginning of their second or third years growth. Division in spring as new growth is just commencing[200].

nwatta Prefers a damp peaty sandy soil in a cool damp shady position[1, 42, 200]. Requires a moist neutral to acid soil[200]. Dormant plants are hardy to at least -25°c, but the new growth in spring can be damaged by late frosts[187]. Plants only produce their fruit in warm seasons in Britain[200].

### 4.2.226 Aquilegia formosa

Western Columbine

3 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 0.8 m hkuc

hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aquilegia formosa is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Flowers - raw. Rich in nectar, they are sweet and delightful[172, 213], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K]. Children enjoy sucking out the sweet nectar from the base of the flowers[257]. Early spring greens cooked and eaten as a vegetable[257]. Some caution is advised, see the notes above on toxicity. Root - cooked. Used by the N. American Indians as a famine food[213]. Some caution is advised, see the notes above on toxicity.

tcanta Hair Parasiticide ParasiticideThe seed is used to rid the hair of lice[172, 257]. The whole plant is boiled up and used as a hair wash[213, 257]. The seeds are aromatic. They can be crushed and rubbed on the body as a perfume or placed in a sachet and stored with clothes to impart a nice smell[257].

dwatta Antispasmodic Diaphoretic Parasiticide Parasiticide Resolvent SalveWestern columbine was quite frequently employed by a number of native North American Indian tribes who used it to treat a variety of complaints[257]. It is little used in modern herbalism. Antispasmodic, diaphoretic, parasiticide, resolvent, salve[172]. A decoction of the root is used in the treatment of diarrhoea and stomach aches[257]. A decoction of the roots and leaves is used in the treatment of VD, dizziness and biliousness[257]. The mashed fresh roots can be rubbed briskly on aching rheumatic joints[257]. A poultice of chewed roots or leaves is applied to bee stings, sores etc[257]. A decoction of the leaves is used in the treatment of sore throats, coughs and colds[257]. The seeds can be chewed as a remedy for stomach aches[257].

nrakta Western N. America - Alaska to California, east to W. Montana and Utah. ksacta Widely distributed in many habitats from the coast to the coastal mountains[60]. Moist woods and damp places in scrub and on banks from sea-level to 3000 metres[187].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sheltered sunny position[1] or partial shade[187]. Intolerant of heavy clay[200]. A very ornamental plant, it is hardy to about -15°c[187]. A short-lived species, often dying out after 2 - 3 years, though it usually produces seed prolifically[200, 233]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. This species is closely related to A. canadensis[200] and A. flavescens[60], often hybridizing with A. flavescens in the wild where their ranges overlap[270]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

### 4.2.227 Aguilegia coerulea

Rocky Mountain Columbine, Colorado blue columbine, Dailey's columbine, White Colorado columbine

3 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aquilegia coerulea is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw. Rich in nectar, they have a sweet taste[172], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K].

tcanta Parasiticide ParasiticideThe seed is used as a parasiticide to rid the hair of lice[172].

dwatta Antispasmodic Diaphoretic Parasiticide Parasiticide Resolvent SalveAntispasmodic, diaphoretic, parasiticide, resolvent, salve[172]. The seed was chewed, or an infusion of the root was used, to treat abdominal pains and general sickness[257].

nrakta Western N. America - Montana to Arizona and New Mexico. ksacta A wide range of habitats, especially in aspen groves[187], in the upper levels of the Rockies[60]. Rocky slopes or near streams in open woodland or herbland at elevations of 2100 - 3600 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sheltered sunny position[1]. It also succeeds in partial shade[187]. Intolerant of heavy clay soils[200]. A very ornamental plant, it is the state flower of Colorado[187, 270]. Most species are short-lived, dying out after 2 - 3 years, though they usually produce seed prolifically[200]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

### 4.2.228 Glechoma hederacea

Ground Ivy, Field Balm, Gill Over The Ground, Runaway

3 tlin 10 cyuc 2 kcak 3 tcan 3 dwat 0.2 m hkuc

hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Glechoma hederacea is an evergreen Perennial growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a fast rate. It is not frost tender. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and

female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista A report in the medicinal uses says the plant should be used with caution, no reason is given. Another report says that the plant might be toxic to horses[222]. Avoid if pregnant as abortifacient. Contraindicated in epilepsy. Avoid if kidney disease [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaYoung leaves - raw or cooked[9]. The leaves have a bitter flavour[5], they can be mixed into salads to add a slight aromatic tang[7]. They can also be cooked like spinach, added to soups etc or used as a flavouring[2, 183]. Available very early in the year. A herb tea is made from the fresh or dried leaves[2, 177, 183]. It is often used mixed with verbena leaves[7]. The herb has been added to beer in much the same way as hops in order to clear it and also to improve its flavour and keeping qualities[4, 183]. This species was the most common flavouring in beer prior to the use of hops from the 16th century onwards[238].

tcanta MiscellanyA good ground cover plant for shady places. It is rather vigorous though and can swamp smaller plants[197]

dwatta Anodyne Antidiarrhoeal Antiphlogistic Antirheumatic Appetizer Astringent Digestive Diuretic Febrifuge Miscellany Pectoral Stimulant Tonic Vermifuge-Ground ivy is a safe and effective herb that is used to treat many problems involving the mucous membranes of the ear, nose, throat and digestive system[254]. A well-tolerated treatment it can be given to children to clear lingering catarrh and to treat chronic conditions such as glue ear and sinusitis[254]. Throat and chest problems, especially those due to excess catarrh, also benefit from this remedy[254]. The leaves and flowering stems are anodyne, antiphlogistic. appetizer, astringent, digestive, diuretic, febrifuge, pectoral, gently stimulant, tonic and vermifuge[4, 9, 21, 100, 147, 165, 178]. They are best harvested in May whilst still fresh[4], and are dried for later use[238]. The leaves are used in the treatment of hypersensitivity in children and are useful in the treatment of kidney diseases and indigestion[4, 9, 21, 100, 147, 165, 178]. Applied externally, the expressed juice speeds the healing of bruises and black eyes[4]. Use with caution[21].

nrakta Most of Europe, including Britain, northern and western Asia to Japan. ksacta Damp waste ground, hedgerows and woodland margins[7].

propta Seed - we have no information for this species but suggest sowing the seed in situ as soon as it is ripe, or in the spring. Division in spring or autumn[188]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Container, Ground cover. Prefers a heavy soil and dappled shade[17, 31]. Prefers a moist well-drained soil, succeeding in sun or shade[188]. A very invasive plant, spreading freely at the roots[1, 31, 238]. A good bee plant[108]. Special Features:Attractive foliage, Fragrant foliage, Not North American native, Naturalizing, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

### 4.2.229 Calochortus pulchellus

Mount Diablo Globelily, Mt. diablo fairy-lantern 3 tlin 7 cyuc 2 koak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Calochortus pulchellus is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils

soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaYoung leaves, boiled[105, 177]. The fruit may be edible[105, 177]. No further details. The fruit is about 8mm in diameter[200]. These reports of edibility should be treated with some caution, see the notes above on toxicity. The flowers are a tea substitute[178].

dwatta Anodyne Anthelmintic Antiphlogistic Astringent Blood tonic Carminative EmmenagogueAnodyne, anthelmintic, antiphlogistic, astringent[178]. The stem and branches are alterative, analgesic, anthelmintic, anticoagulant, antipruritic, blood tonic, carminative, emmenagogue and purgative[147, 218]. A decoction is used in the treatment of 'cold' headache, general body aches, pruritis, irregular menstruation and other gynaecological diseases[147]. Plants contain the anticancer compound dulcitol[218].

nrakta E. Asia - Japan. ksacta Thickets and woods in lowland and mountains all over Japan.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Thrives in almost any well-drained soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. A very ornamental plant[1].

### 4.2.286 Aster tataricus

Tartarian Aster

3 tlin 7 cyuc 1 kcak 0 tcan 3 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

drutta Aster tataricus is a PERENNIAL growing to 2 m (6ft) by 1.2 m (4ft in). See above for USDA hardiness. It is nardy to UK zone 3. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant[105, 177]. No more details are given.

dwatta Antibacterial Antifungal Antitussive Cancer ExpectorantThis species has been used for at least 2.000 years in traditional Chinese medicine. The root contains triterpenes and triterpene saponins, and is a stimulant expectorant herb for the bronchial system, helping to clear infections[238, 279]. It is antibacterial, antifungal, antitussive, expectorant and stimulant[176, 218, 238, 279]. It has an antibacterial action, inhibiting the growth of Staphylococcus aureus, E. coli, Bacillus dysenteriae, B. typhi, Pseudomonas and Vibrio Proteus[176]. The root is taken internally in the treatment of chronic bronchitis and tuberculosis and is often used raw with honey in order to increase the expectorant effect[176, 238]. The root is harvested in the autumn and can be dried for later use[238]. The plant contains the triterpene epifriedelinol, which has shown anticancer activity, and is used as a folk cure for cancer[218, 279].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Subalpine meadows and wet places, C. and S. Japan[58, 187]. Marshy areas in mountains[279].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Basal cuttings

in the spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but also succeeds in partial shade[238]. Plants are hardy to at least -15°c[238]. Plants can suffer from mildew when growing in dry conditions[238]. This species is cultivated in China as a medicinal herb[238]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

### 4.2.287 Ilex verticillata

Winterberry, Common winterberry 3 tlin 7 cyuc 1 kcak 0 tcan 3 dwat 2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat-

priklwis hpa7tmwatli nyanhjen hjonli drutta llex verticillata is a deciduous Shrub growing to 2 m (6ft) by 1.5 m (5ft) at a slow rate. See above for USDA hardiness. It is hardy to ILK zone. 3. It is in flower from May

2 m (6ft) by 1.5 m (5ft) at a slow rate. See above for UŠDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is polinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274]. The fruit is poisonous[177].

kcakta Edible Parts: Edible Uses: TeaA tea is made from the dried and crumbled leaves[161, 177]. It does not contain caffeine[183].

dwatta Antiseptic Astringent Cathartic Malaria Skin TonicThe bark is antiseptic, astringent, cathartic and tonic[4, 238]. A decoction is used internally in the treatment of diarrhoea, malaria etc, and externally in the treatment of indolent sores and chronic skin disease[4, 238]. The bark contains about 4.8% tannin[4]. It is harvested in the autumn before the first frosts[4]. Another report says that the bark is harvested in the spring and dried for later use[238]. The fruit is cathartic[4].

nrakta Eastern N. America - Newfoundland to Minnesota and south to Georgia and Tennessee.. ksacta Swamps, pond margins and damp thickets[43].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years[78]. Division in the dormant season.

nwatta Succeeds in most soils so long as they are not water-logged[200]. This species tolerates wetter conditions than most members of the genus[238]. A very ornamental and cold-hardy plant, tolerating temperatures down to about

tcanta Cleanser Fibre InsecticideThe dried and powdered root is used as an insecticide and a parasiticide[46, 61, 212]. It is also effective against caterpillars and mammals so great caution is advised[1, 19, 20]. The roots have been grated, then added to the laundry water and used to clean clothing[257]. A fibre obtained from the stem is used for weaving wallets etc[99].

dwatta Analgesic Diaphoretic Emetic Expectorant Febrifuge Hypotensive Narcotic SedativeIndian poke is a highly toxic plant that was widely employed medicinally by several native North American Indian tribes who used it mainly externally in the treatment of wounds, pain etc[257]. It is rarely used in modern herbalism, though it is of potential interest because it contains steroidal and other alkaloids and chelidonic acid. Some of these alkaloids lower blood pressure and dilate the peripheral vessels - they have, for example, been used in conventional medicine to treat high blood pressure and rapid heart beat[207, 212, 254]. Any use of this plant should be carried out with great caution and preferably only under the supervision of a qualified practitioner[21]. Even when applied externally to unbroken skin it has been known to cause side-effects[254]. See also the notes above on toxicity The root is analgesic, diaphoretic, emetic. expectorant, febrifuge, narcotic and sedative[4, 21, 257]. It has been used in the treatment of acute cases of pneumonia, peritonitis and threatened apoplexy[244]. A decoction of the root has been used in the treatment of chronic coughs and constipation[257]. A portion of the root has been chewed, or a decoction used, in the treatment of stomach pain[257]. The roots are harvested in the autumn and can be dried for later use[254]. The root has been used to make a skin wash and compresses for bruises, sprains and fractures[257]. The powdered root has been applied as a healing agent to wounds[207] and as a delousing agent[254]. The stems have been scraped and the powder snuffed to induce sneezing[257]. An infusion of the leaves has been used as a wash to treat aches and pains[257]. The plant is used in homeopathic preparations to slow the heart rate[254].

nrakta Eastern N. America - New England to Georgia and Wisconsin, western from Alaska to Oregon. ksacta Swamps, moist meadows and low ground[21].

propta Unless stored in damp sand at around 4°c the seed has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in the greenhouse as soon as it is ripe[200]. Stored seed needs to be stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°c but can be much longer[200]. The plant produces just one seedleaf in its first year, this forms an over-wintering bulb. It takes up to 10 years for the plant to reach maturity[200]. Sow the seed thinly so there is no need to thin or transplant them, and grow the seedlings on undisturbed in the pot for their first two years of growth. Apply a liquid feed at intervals through the growing season to ensure the plants do not become nutrient deficient. At the end of the second year plant out the dormant plants into individual pots and grow them on in light shade in the greenhouse for a further year or two before planting them out into their permanent positions in late spring or early summer. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Division is best carried out in the autumn because the plants come into growth very early in the spring[233]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils, preferring to grow in a bog garden[42]. Grows best in a cool woodland garden or a north facing border[42]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants are long-lived and can be left in the same position for years without attention[233]. In some N. American Indian tribes, following the death of a chief, all the young aspirants to be chief were given a drink of this toxic plant and the person least affected was deemed to be the strongest and therefore made chief[200].

### 4.2.284 Eupatorium purpureum

Gravel Roo

3 tlin 9 cyuc 1 kcak 2 tcan 3 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Eupatorium purpureum is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: SaltThe roots have been burnt and their ashes used as salt to flavour foods[257]. tcanta Dye StrawThe stems have been used as straws[257]. The fruits yield a pink or red textile dye[268].

dwatta Astringent Diuretic Nervine Tonic UrinaryGravel root was used by the native N. American Indians as a diaphoretic to induce perspiration and break a fever. The plant was quickly adopted by the white settlers and still finds a use in modern herbalism[268]. The whole plant, but especially the root, is astringent, diuretic, nervine and tonic[4, 21. 165]. It works particularly on the genito-urinary system and the uterus[238]. Especially valuable as a diuretic and stimulant, as well as an astringent tonic[4], a tea made from the roots and leaves has been used to eliminate stones from the urinary tract, to treat urinary incontinence in children, cystitis, urethritis, impotence etc[222, 254, 268]. It is also said to be helpful in treating rheumatism and gout by increasing the removal of waste from the kidneys[254, 257]. The leaves and flowering stems are harvested in the summer before the buds open and are dried for later use. The roots are harvested in the autumn and dried for later use[238].

nrakta Eastern N. America - New Hampshire to Minnesota, south to Florida and Oklahoma[187]. ksacta Swampy and rich low ground and in woods, especially on calcareous soils[4, 21, 43].

propta Seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Landscape Uses:Border, Massing, Specimen. Woodland garden. Succeeds in ordinary garden soil that is well-drained but moisture retentive in sun or part shade[200]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very cold-hardy plant, tolerating temperatures down to about -25°c[187]. The bruised leaves have a vanilla-like odour[213]. Plants seem to be immune to the predations of rabbits [233]. Butterflies are attracted to this plant[187]. Special Features: North American native, Fragrant foliage, Naturalizing, Wetlands plant, Attracts butterflies, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

#### 4.2.285 Euonymus alatus apterus

Winged Spindle Tree

3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 2 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Euonymus alatus apterus is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline)

and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[46, 61, 105, 161, 257]. Rather small, usually smaller than a persons thumb, but easily harvested[207].

nrakta South-western N. America - California. ksacta Woody and brushy slopes in chaparral and pine and oak forest above 200 metres[71, 90].

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 - 6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. One report says that the bulbs must be planted into their permanent positions immediately[1], whilst another says that they can be stored overwinter and replanted in the spring[138]. Stem bulbils, harvested from the stems after flowering[200]. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a warm sunny position and must be kept dry over winter[1, 200]. Another report says that it is best grown in a good, very gritty soil in sun or semi-shade in a bulb frame[90]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter[1]. Another report says that the plant requires plenty of moisture when in growth, but very dry conditions after it has flowered[245]. It is easiest to grow in a bulb frame but this species is one of the least difficult of the genus[90] and is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in spring[138]. Another report says that they should be replanted immediately[1]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. Hand pollination is necessary if seed is required[1]. The flowers are sweetly scented[245]. This species is closely related to C. amabilis[200].

### 4.2.230 Calochortus luteus

Yellow Mariposa, Yellow mariposa lily 3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calochortus luteus is a BULB growing to  $0.3~\mathrm{m}$  (1ft) by  $0.1~\mathrm{m}$  (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[92, 105, 161]. About the size of a walnut, it is very palatable and nutritious[2]. The bulb can be harvested in early spring, peeled and eaten raw[257]. It can also be baked and eaten like potatoes[257]. The bulb can be used as a staple food[2].

nrakta South-western N. America - California ksacta Heavy soils in open places below 600 metres[71]. Also found in pine, evergreen oak and mixed woodlands[90].

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 - 6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient de-

ficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. One report says that the bulbs must be planted into their permanent positions immediately[1], whilst another says that they can be stored overwinter and replanted in the spring[138]. Stem bulbils, harvested from the stems after flowering[200]. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a warm sunny position and must be kept rather dry after it flowers and over winter[1, 90, 200]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter[42, 90]. It is easiest to grow in a bulb frame but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. Bulbs have succeeded in a cold frame with the cover removed from March to October[214]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in spring[138]. Another report says that the bulbs must be replanted as soon as they have been divided[1]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. Hand pollination is necessary if seed is required[1]. This species is closely allied to C. venus-

#### 4.2.231 Geum canadense

White Avens, Texan avens

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geum canadense is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Édible Uses: ChocolateThe boiled roots are a chocolate substitute[183]. The roots are also gathered in spring before the plant comes into growth and are used as a flavouring and preservative in ale[207].

nrakta Eastern N. America - Nova Scotia to Ontario, Georgia, Minnesota and Kansas. ksacta Rich thickets and borders of woods in various soils[204, 274].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer' Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Prefers a soil rich in organic matter[200]. Plants are hardy to at least -15°c[200]. Hybridizes freely with other members of this genus[200].

### 4.2.232 Primula elatior

Oxlin

3 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc

pcimhmim cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Primula elatior is a PERENNIAL growing to  $0.3\,\mathrm{m}$  (1ft) by  $0.2\,\mathrm{m}$  (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs)

and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves raw or cooked in soups etc[13]. They have a mild flavour and are available in late winter[K].

dwatta Diuretic Expectorant MiscellanyThe root is diuretic and expectorant[9, 13]. It is used in the treatment of coughs, flu and other febrile conditions, insomnia and migraine[9, 13]. The root can be harvested in the spring or autumn and is dried for later use[9]

nrakta Europe, including Britain, from Sweden to the Alps and S. Russia. ksacta Woods and meadows on chalky boulder clay[17, 50].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°c[200]. Prick out the seedlings into individual pots when large enough to handle and plant out in the summer. Division in autumn. This is best done every other year[200].

nwatta Prefers a medium to heavy moisture retentive humus rich loam in a cool position with light to medium shade[200], though it succeeds in heavier shade[187]. Grows well in heavy clay soils and in chalky soils[187]. A very ornamental plant[1], there are a number of subspecies[187]. The subspecies P. elatior meyeri is a parent of the P. x pruhonicensis group of ornamental hybrids[187]. This species hybridizes readily with P. vulgaris[17].

### 4.2.233 Equisetum arvense

Field Horsetail

3 tlin 11 cyuc 2 kcak 4 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Equisetum arvense is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. The seeds ripen in April. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the plant can be toxic. This is because it contains the enzyme thiaminase[172], a substance that can rob the body of the vitamin B complex[65]. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. The plant also contains equisetic acid - see the notes on medicinal uses for more information[213]. Avoid in patients with oedema due to heart failure or impaired kidney function [301].

kcakta Edible Parts: Root StemEdible Uses: Strobil (the fertile shoots in spring) - cooked and used as an asparagus substitute[7, 46, 61, 94]. They should be used when young[116] but even so it is probably best to change the water, perhaps 3 - 4 times[85, 102]. One report says that they can be eaten raw[172], they are peeled and the shoot tip is discarded[213]. It is said to be a very tedious operation and they should not be eaten raw in any quantity, see the notes above on toxicity[K]. Some native tribes liked to eat the young vegetative shoots, picked before they had branched out, and would often collect them in great quantity then hold a feast to eat them[257]. The leaf sheaths were peeled off and the stems eaten raw - they were said to be 'nothing but juice' [257]. Roots - raw[61]. The tuberous growths on the rhizomes are used in the spring[172]. The black nodules attached to the roots are edible[257]. It takes considerable effort to collect these nodules so it is normally only done in times of desperation. However, native peoples would sometimes raid the underground caches of roots collected by lemmings and other rodents in order to obtain these nodules[257]. A further report says that the peeled stems. base of the plant, root and tubers were eaten raw by the N. American Indians, the report went on to say that this may be inadvisable[85].

tcanta Dve Fungicide Liquid feed Musical Paper Polish Sandpaper ScourerThe stems contain 10% silica and are used for scouring metal[4, 7, 20, 94, 102] and as a fine sandpaper[7, 54, 99, 257]. They can also be used as a polish for brass, hardwood etc[94]. The infused stem is an effective fungicide against mildew, mint rust and blackspot on roses[14, 18, 20, 54]. It also makes a good liquid feed[54]. A light pink dye is obtained from the stem[99, 257]. It is yellowgray according to another report[102]. The plant has been used for making whistles[257].

dwatta Anodyne Antirheumatic Antiseptic Astringent Cardiac Carminative Diaphoretic Diuretic Eczema Galactogogue Haemostatic Homeopathy Nervine TB Urinary VulneraryHorsetails have an unusual chemistry compared to most other plants[238]. They are rich in silica, contain several alkaloids (including nicotine) and various minerals[238]. Horsetail is very astringent and makes an excellent clotting agent, staunching wounds, stopping nosebleeds and reducing the coughing up of blood[254]. It helps speed the repair of damaged connective tissue, improving its strength and elasticity[254]. The plant is anodyne, antihaemorrhagic, antiseptic, astringent, carminative, diaphoretic, diuretic, galactogogue, haemostatic and vulnerary [4, 7, 9, 20, 21, 46, 61, 165, 172, 218, 240]. The green infertile stems are used, they are most active when fresh but can also be harvested in late summer and dried for later use[4, 9]. Sometimes the ashes of the plant are used[4]. The plant is a useful diuretic when taken internally and is used in the treatment of kidnev and bladder problems, cystitis, urethritis, prostate disease and internal bleeding, proving especially useful when there is bleeding in the urinary tract[4, 238, 254]. A decoction applied externally will stop the bleeding of wounds and promote healing[4]. It is especially effective on nose bleeds[7]. A decoction of the herb added to a bath benefits slow-healing sprains and fractures, as well as certain irritable skin conditions such as eczema[254]. The plant contains equisetic acid, which is thought to be identical to aconitic acid. This substance is a potent heart and nerve sedative that is a dangerous poison when taken in high doses[213]. This plant contains irritant substances and should only be used for short periods of time[238]. It is also best only used under the supervision of a qualified practitioner. A homeopathic remedy is made from the fresh plant[7]. It is used in the treatment of cystitis and other complaints of the urinary system[7]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Equisetum arvense for urinary tract infections, kidney and bladder stones, wounds and burns (see [302] for critics of commission E).

nrakta Arctic and temperate regions of Europe, including Britain, N. America and Asia, ksacta Open fields, arable land, waste places, hedgerows and roadsides[9], usually on moist soils[4].

propta Spores - best collected as soon as they are ripe in the spring and surface-sown immediately on a sterile compost. Keep moist and pot up as soon as the plants are large enough to handle. Very difficult[200]. Division. The plants usually spread very freely when well sited and should not really need any assistance.

nwatta Prefers poor dusty ground[53, 54]. This rather contradicts another report which says that the presence of this plant indicates underground water[4]. Prefers a moist but well-drained fertile soil with a pH between 6.5 and 7.5[200, 238]. A very cold-hardy species tolerating temperatures down to about -30°c[200]. Plants have a deep and penetrating root system and can be invasive. If grown in the garden they are best kept in bounds by planting them in a large container which can be sunk into the ground[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

### 4.2.234 Sedum ternatum

Woodland stonecrop or Wild stonecrop 3 tlin 9 cyuc 2 kcak 2 tcan 0 dwat 0.2 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hrasilutnyik hpa7tli priklwisslip hpa7tmwatli hionli

drutta Sedum ternatum is an evergreen Perennial growing to 0.2 m (0ft 6in) by 0.3 m (1ft) at a medium rate. See

### 4.2.281 Ilex glabra

Inkberry

3 tlin 7 cyuc 1 kcak 2 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli nyanhjen hjonli

drutta Ilex glabra is an evergreen Shrub growing to 3 m (9ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantitv[274].

kcakta Edible Parts: Edible Uses: TeaThe dried roasted leaves are a good substitute for yaupon tea. They contain caffeine[161, 183].

tcanta Hedge HedgeA good hedging plant, the var. 'Compacta' is used[200].

nrakta Eastern N. America - Nova Scotia to Florida and west to Montana. ksacta Wet acid soils[184]. Low sandy or peaty soils[43].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils so long as they are not water-logged[200]. Another report says that it needs an acid soil[182]. Hardy to about -20°c[184]. Plants are very slow growing[11] and seldom exceed 1metre in height in British gardens[184]. Plants have stoloniferous roots[182]. This species is closely related to I. coriacea[182]. There are some named varieties, selected for their ornamental value[200]. Resents root disturbance, especially as the plant grows older[1, 11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required. A report says that some plants are monoecious. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2].

#### 4.2.282 Rudbeckia laciniata

Cone Flower, Cutleaf coneflower, Green Headed Coneflower 3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 2.4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rudbeckia laciniata is a PERENNIAL growing to 2.4 m (7ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, hoverflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista This plant is reputed to be poisonous to cattle, sheep and pigs[155].

kcakta Edible Parts: StemEdible Uses: Edible young stems[105, 155, 161]. Cooked and eaten in the spring for 'good health' [222, 257]. The young stems can be eaten like celery[257]. The stems can also be dried for later use[257]. Some caution is advised, see the notes above on toxicity.

tcanta DyeA green dye is obtained from the flow-

dwatta Carminative PoulticeA tea made from the root (mixed with Caulophyllum thalictroides) is used in the treatment of indigestion[222, 257]. A poultice of the flowers (mixed with Agastache anisatum and Solidago sp.) is applied to burns[222, 257].

nrakta N. America - Quebec to Manitoba, Colorado Florida. Locally naturalized garden escape in Britain[17]. ksacta Stream banks and moist places in rich low ground[43,

propta Seed - sow April in a greenhouse. Only just cover the seed. Germination should take place within 2 weeks, prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer[K]. The seed can also be sown in situ[111]. Division in spring or autumn[111]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer

nwatta Landscape Uses:Container, Massing. Succeeds in an ordinary medium soil in sun or shade[111]. Requires a moist soil[1]. Prefers a well-drained soil[188]. Tolerates considerable wind exposure without support[K]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. They grow particularly well in long hot late summers[200]. Dormant plants are hardy to about -25°c[187]. Some named forms have been selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants can be invasive[200]. Special Features: Attracts birds, North American native, All or parts of this plant are poisonous, Attracts butterflies, Suitable for cut flowers.

#### 4.2.283 Veratrum viride

Indian Poke American Hellehore

3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 2 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Veratrum viride is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista All parts of the plant are highly poisonous[1, 4, 19, 62, 65]. After the plant dies down in the autumn and has been frosted, the toxins decrease and the plant becomes harmless to animals[212].

kcakta One report says that the leaves have been used in soups[257]. The plant is highly toxic, so this use is probably best avoided[K].

#### 4.2.279 Artemisia michauxiana

Mountain Sagewort, Michaux's wormwood 3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hionli

drutta Artemisia michauxiana is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: SeedEdible Uses: Seed[105, 161, 177]. No further details are given, but the seed is very small and fiddly to use.

dwatta PoulticeA hot infusion of the plant has been used in the treatment of headaches[257]. A poultice of the chewed plant is applied to sprains and swellings[257].

nrakta Western N. America - British Columbia to California. ksacta Rocky places in mountains, usually at rather high elevations[60].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 4.2.280 Symphoricarpos albus laevigatus

Snowberry

3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 3 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Symphoricarpos albus laevigatus is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The fruit contains saponins. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins but it would take extremely large doses of many kilos of fruit from this plant in order to produce toxic symptoms[65]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 161]. An insipid flavour, it is best if cooked[177]. The fruit is rather boring[K]. The fruit is about

15mm in diameter[200]. See the notes at top of page regarding possible toxicity.

tcanta Broom Cosmetic Disinfectant Hair Hedge Hedge Soap Soil stabilizationPlants have extensive root systems and are used to stabilize soils on banks and slopes[200]. The branches can be tied together and used as a broom[99, 257]. The berries contain saponins and have been used as a hair wash[257]. A mild decoction of the wood has been used as a cleansing wash for babies[257]. The crushed berries have been rubbed into the armpits as an antiperspirant[257]. Very tolerant of trimming, it can be grown as a medium to tall hedge[29]. Its main drawback as a hedge is its propensity to sucker[K].

dwatta Disinfectant Diuretic Febrifuge Laxative Ophthalmic Poultice Salve Skin Stomachic TB VD WartsSnowberry was commonly employed medicinally by several native North American Indian tribes who valued it especially for the saponins it contains. These saponins can be toxic, but when applied externally they have a gentle cleansing and healing effect upon the skin, killing body parasites and helping in the healing of wounds. The native Americans used it to treat a variety of complaints but especially as an external wash on the skin[257]. The plant is little, if at all, used in modern herbalism. Any internal use of this plant should be carried out with care, and preferably under the supervision of a qualified practitioner. See the notes above on toxicity. The whole plant is disinfectant, diuretic, febrifuge and laxative [257]. An infusion of the stems has been drunk to treat stomach problems and menstrual disorders[213]. A decoction of the leaves has been used in the treatment of colds[257]. A poultice of the chewed leaves has been applied, or an infusion of the leaves has been used as a wash, in the treatment of external injuries[257]. A weak solution of the stems and leaves has been used as a wash for children whilst a stronger solution is applied to sores[213]. The fruit has been eaten, or used as an infusion, in the treatment of diarrhoea[257]. An infusion of the fruit has been used as an eye wash for sore eyes[257]. The berries have been rubbed on the skin as a treatment for burns, rashes, itches and sores[257]. The berries have also been rubbed on warts in order to get rid of them - this treatment needs to be carried out at least three times a day for a period of a few weeks[257]. A poultice of the crushed leaves, fruit and bark has been used in the treatment of burns, sores, cuts, chapped and injured skin[257]. An infusion of the roots has been used in the treatment of fevers (including childhood fevers), stomach aches and colds[257]. A decoction of the root bark has been used in the treatment of venereal disease and to restore the flow of urine[257]. An infusion of the root has been used as an eyewash for sore eyes[257]. An infusion of the whole plant has been drunk and also applied externally in the treatment of skin rashes[257]. A decoction of the roots and stems has been used in the treatment of the inability to urinate venereal disease tuberculosis and the fevers associated with teething sickness[257].

nrakta Western N. America. Naturalized in Britain[17]. ksacta Banks and flats in canyons and near streams below 1200 metres in California[71].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 3 months warm then 5 months cold stratification[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood, 15 - 25cm long preferably with a heel, in a sheltered bed outdoors in winter. High percentage[78, 200]. Division of suckers in winter. They can be planted straight Tu into their permanent positions.

nwatta Tolerates most soils and conditions, including poor soils and amongst the roots and under the drip of trees[11, 200]. Grows well in heavy clay soils. Prefers a well-drained soil[200]. Does well in sun or shade[1]. Tolerates urban pollution and maritime exposure[200]. A very hardy plant, tolerating temperatures down to about -40°c[200]. A very ornamental but invasive plant, spreading by means of suckers[1, 11]. Its flowers are much visited by bees and the fruit is very attractive to wild life[1, 94]. There are some named varieties, developed for their ornamental value[11]. 'Constance Spry' bears a copious crop of large round berries. Plants in this genus are notably resistant to honey fungus[200].

above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known

kcakta Leaves. Succulent young leaves [1-2].

tcanta Ground cover including semi-shade. A good rock gardens plant. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2]. The flower nectar and pollen of stonecrops (Sedum spp.) attract various kinds of bees, including Andrena forbesii (Krombein et al., 1979). Less often, wasps and flies visit flowers of these plants. Insects that feed on the foliage of Wild Stonecrop (Sedum ternatum) include the Sedum Aphid (Aphis sedi) and the aphid Aphis acrita. The Eastern Chipmunk eats the roots of this plant (Wrazen and Svendsen, 1978).

nrakta Native to the eastern United States from Maine to Georgia and west from Michigan to Iowa and Arkansas. ksacta Wooded ravines, partially shaded banks along rivers and streams, lightly shaded cliffs, and rocky wooded slopes. Found on slopes where there is little ground vegetation normally in or near woodlands.

propta Division, Cuttings. Easy - divide or cut stems and lay on potting soil or place shallowly into the potting soil.

nwatta The preference is partial sun to light shade, moist to dry-mesic conditions, and a loamy or rocky soil. Tolerates part shade and moist soils better than most other sedums. Bloom Time: April to May. Bloom Description: White. Flower: Showy. Attracts: Bees, Butterflies. Tolerates rabbit, deer, drought, air pollution. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

### 4.2.235 Prunella vulgaris

Self-Heal, Common selfheal, Aleutian selfheal, Lance selfheal 3 tlin 7 cyuc 2 kcak 0 tcan 3 dwat 0.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunella vulgaris is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: DrinkLeaves - raw or cooked[9]. They can be used in salads, soups, stews etc[183]. Somewhat bitter due to the presence of tannin in the leaves, though this can be removed by washing the leaves[177]. A cold water infusion of the freshly chopped or dried and powdered leaves is used as a refreshing beverage[161, 183]. Very tasty[168].

tcanta DyeAn olive-green dye is obtained from the flowers and stems[168]. The plant is a good ground-cover in sunny positions or light shade[200].

dwatta Alterative Antibacterial Antibiotic Antidiarrhoeal Antipyretic Antiseptic Antispasmodic Astringent Carminative Diurretic Febrifuge Hypotensive Stomachic Styptic Tonic Vermifuge VulnerarySelf heal has a long history of folk use, especially in the treatment of wounds, ulcers, sores etc[7]. It was also taken internally as a tea in the treatment of fevers, diarrhoea, sore mouth, internal bleeding etc[4, 222]. In Korea it is used to treat oedema, nephritis, scrofula and goitre[279]. The whole plant is alterative, antibacterial, antipyretic, antiseptic, antispasmodic, astringent, carminative, diuretic, febrifuge, hypotensive, stomachic, styptic, tonic, vermifuge and vulnerary[4, 9, 13, 21, 176, 218]. It has an antibacterial action, inhibiting the growth of Pseudomonas, Bacillus typhi, E. coli, Mycobacterium tuberculi etc[176]. It

above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects. It is noted for attracting willdlife. Suitable for: light (sandy), medium (loamy) hypotensive[218, 222].

nrakta Europe, including Britain, from Norway south and east to N. Africa and temperate Asia. ksacta Waste ground, grassland, woodland edges etc, usually on basic and neutral soils[9, 17].

propta Seed - sow in mid spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed then it can be sown outdoors in situ in mid to late spring. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Thrives in any damp soil[1], in full sun or in light shade[238]. Plants are apt to become troublesome weeds in turf that is at all damp[1]. Self heal is a good plant for growing in the spring meadow[24].

#### 4.2.236 Calochortus venustus

Butterfly Mariposa Lily

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calochortus venustus is a BULB growing to 0.6 m (2ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[94, 105, 257]. A sweet flavour[161].

nrakta South-western N. America - California. ksacta Light sandy soil, often decomposed granite, below 2400 metres[71, 90]. In grassland and in mixed evergreen forests[90, 2001.

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful for spring-sown seed, though this species usually germinates within two months without any treatment[120]. Germination usually takes place within 1 - 6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. One report says that the bulbs must be planted into their permanent positions immediately[1], whilst another says that they can be stored overwinter and replanted in the spring[138]. Stem bulbils, harvested from the stems after flowering. Can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a sunny position and must be kept rather dry from when the bulb flowers until late winter[1, 90, 200]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter[1, 90]. It is easiest to grow in a bulb frame but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. It should not be crowded by other plants[214]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in spring[138]. Another report says that they should be replanted immediately[1]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. Hand pollination is necessary if seed is required[1].

### 4.2.237 Empetrum eamesii

Rockberry, Purple crowberry 3 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Empetrum eamesii is an evergreen Shrub growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177, 200]. The fruit is about 4mm in diameter[200]. tcanta Succeeds as a ground cover plant in exposed positions[200].

nrakta North-eastern N. America - S.E. Labrador to Newfoundland and Nova Scotia. ksacta Exposed sands and siliceous gravels and rocks[43].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be very slow to germinate, stored seed requires 5 months warm then 3 months cold stratification at  $5^{\circ} ([200])$ . When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 3cm with a heel, July/August in a frame. Takes 3 weeks. Good percentage[78, 200]. Cuttings of mature wood of the current year's growth, 3cm with a heel, October in a frame. Requires shade. Good percentage[78, 200].

nwatta Landscape Uses:Erosion control, Foundation, Ground cover, Massing, Rock garden. A calcifuge plant, it is easily grown in a lime-free soil[200]. Prefers a moist sandy peaty soil and some shade[1, 3]. The flowers of this species are usually hermaphrodite, but some female flowers are produced[200]. Special Features:Attractive foliage, North American native, Inconspicuous flowers or blooms.

### 4.2.238 Elymus canadensis

Canadian Wild Rye

3 tlin 7 cyuc 2 koak 0 tcan 0 dwat 0.8 m hkuc htut cyutli hgattcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elymus canadensis is a PERENNIAL growing to  $0.8~\mathrm{m}$  (2ft 7in) by  $1~\mathrm{m}$  (3ft 3in). See above for USDA hardiness. It is hardy to UK zone  $3~\mathrm{and}$  is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed -cooked[105, 161, 177]. It can be ground into a flour and used to make bread. Quite fiddly to use, the seed is small and difficult to separate[K]. The seed was an important item of food for the Paiute Indians of south-western N. America[183].

tcanta Soil stabilizationThe plant has an extensive root system and can be used for binding sand dunes[61].

nrakta N. America - in most areas except the far south. Recorded, but not yet naturalized in N. Europe[50] ksacta Dry sandy gravelly or rocky soil[43]. Thickets and open woods in limestone and sandy clay soils in Texas[274].

propta Seed - sow mid spring in situ and only just cover the seed[162]. Germination should take place within 2 weeks. If the supply of seed is limited, it can also be sown in mid spring in a cold frame. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in summer[K] Division in spring or summer[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, it succeeds in most soils, preferring a sandy soil and a sunny position[1, 162]. Plants can flower too late to ripen their seed in Britain, especially in the western half of the country[K]. A polymorphic species[1].

#### 4.2.239 Hosta ventricosa

Blue plantain lily, Hosta 3 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Hosta ventricosa is a PERENNIAL growing to  $0.6\,\mathrm{m}$  (2ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked. The white part of the stem is boiled[46, 61, 177].

tcanta A good ground cover plant[104], succeeding in dense shade but rather slow to spread[197]. Plants should be spaced about 60cm apart each way[208].

dwatta OdontalgicOdontalgic[74]. The root is used.

nrakta E. Asia - China. ksacta Rocky or stony river banks near ponds and lakes[74]. Forests, grassy slopes and hill-sides at elevations of 500 - 2400 metres[266].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1- 3 months at  $10^{\circ}c$ . Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3- 5 years to allow the leaves to reach maturity[200].

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Seashore, Specimen. Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A vigorous plant, forming medium to large clumps[200]. Hybridizes freely with other members of this genus[200]. Since this species produces its seed apomictically, it should breed true[200] (unless there is also cross pollination of course). Cultivated for its root (used medicinally) in China[74]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A number of named forms have been selected for their ornamental value[187]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers.

Plants seem to be immune to the predations of rabbits[233]. Dioecious. Male and female plants must be grown if seed is required.

### 4.2.276 Galium mollugo

Hedge Bedstraw, False baby's breath 3 tlin 7 cvuc 1 kcak 0 tcan 2 dwat m hkuc

hmim cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Galium mollugo is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is polinated by Flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[62].

tcanta DyeA red dye is obtained from the root[100, 168]. It is very fiddly to utilize[169]. A good ground cover for growing in cool shade under shrubs or in the woodland garden[200].

dwatta Antispasmodic Epilepsy Lithontripic Vulnerary. The plant is lithontripic and vulnerary. It is also used in the treatment of epilepsy and hysteria[4]. Both Asperuloside (a terpenoid) and Coumarin (a benzopyrone) occur in some species of Galium. Asperuloside can be converted into prostaglandins (hormone-like compounds that stimulate the uterus and affect blood vessels), making the genus of great interest to the pharmaceutical industry[238].

nrakta Most of Europe, including Britain, to N. Africa and temperate Asia. ksacta Hedgebanks, open woodland, scrub and grassy slopes, especially on base-rich and calcareous soils171.

propta Seed - best sown in situ as soon as it is ripe in late summer[200]. The seed can also be sown in spring though it may be very slow to germinate[200]. This plant does not really need any help to reproduce itself. Division in spring or throughout the growing season if the plants are kept well watered[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a loose moist leafy soil in some shade[200]. Tolerates dry soils but the leaves quickly become scorched when growing in full sun[200]. This species does not thrive in a hot climate[200]. A polymorphic species[17].

#### 4.2.277 Hydrangea paniculata

Panicled hydrangea, Hybrid Hydrangea, PeeGee Hydrangea, Panicle Hydrangea

3 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 4 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Hydrangea paniculata is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Edible Uses: RutinThe flowers contain up to 4.06% rutin[240].

tcanta Nails Paper WoodThe bark is used to make Japanese paper [46, 61, 74]. Wood-hard, white, fine grained. Used for small items, nails, walking sticks etc [46, 61, 74].

dwatta Blood tonicThe flowers contain up to 4.06% rutin[240]. This makes them useful for reducing the incidence of recurrent haemorrhages associated with increased

capillary fragility, particularly in hypertension[240]. The flowers also contain 2.5% of a phenolic compound[240].

nrakta E. Asia - China, Japan. ksacta Bamboo scrub, open forests and by streams[184]. Sparse forests or thickets in valleys or on mountain slopes or tops, at elevations of 300 - 2100 metres in China[266].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[2001].

nwatta Landscape Uses: Border, Massing, Specimen. Woodland garden. Tolerates most soil[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Tolerates boggy soils[74]. Dislikes very alkaline soils[202]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Plants are hardy to about -25°c[184] when dormant but the young growth in spring can be killed by late frosts. A fast-growing plant[202]. A number of cultivars have been selected for their ornamental value[182]. Plants are very tolerant of pruning and can be cut back into old wood if required[188]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Suitable for cut flowers, Suitable for dried flowers, Blooms are very showy.

### 4.2.278 Lonicera chrysantha

Honeysuckl

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 4 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lonicera chrysantha is a deciduous Shrub growing to 4 m (13ft lin). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177]. The fruit is about 7mm in diameter[200].

nrakta E. Asia - Japan. ksacta In deciduous coastal and montane forests and meadows[275]..

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta An easily grown plant, succeeding in any fertile soil, and preferring a good moist soil in a sunny position[200]. It does not fruit so well when grown in the shade[200]. A very hardy plant, tolerating temperatures down to about -40°c[200]. Flowers and fruits are freely produced in Britain[184]. Closely related to L. demissa[182]. Some named forms have been developed for their ornamental value[182].

#### 4.2.273 Lonicera morrowii

Morrow's honeysuckle

3 tlin 7 cvuc 1 kcak 0 tcan 1 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lonicera morrowii is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The fruit is poisonous[275].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 179]. There is a question mark as to whether this fruit might be poisonous, or perhaps cathartic and emetic[105, 179]. The fruit is about 7mm in diameter[200].

dwatta Cathartic EmeticThe fruit is cathartic and emetic[179]

nrakta E. Asia - Japan. ksacta Open places in meadows, river sides, sandy coasts, and open deciduous forests of low-lands and montane regions[275].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta An easily grown plant, succeeding in any fertile soil, and preferring a good moist soil in a sunny position[11, 200]. There is at least one named variety, developed for its ornamental value. 'Guldperle' is from Denmark and has yellow berries[182].

#### 4.2.274 Armeria maritima

Sea Thrift, Thrift seapink, California seapink, Interior seapink, Siberian sea thrift

3 tlin 9 cyuc 1 kcak 0 tcan 1 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Armeria maritima is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - cooked[177]. Used for slimming[61]. Root[69]. No more details are given[69]

tcanta A good ground-cover for a sunny position[200]. The cultivar 'Vindictive' has been especially recommended[188] and so has 'Alba'[190]. Plants form a slowly spreading carpet[208].

dwatta ÜrinarySea thrift is rarely used in herbal medicine, though the dried flowering plant is antibiotic and has been used in the treatment of obesity, some nervous disorders and urinary infections[268]. It cannot be used externally as an antibiotic poultice because it can cause dermatitis or local irritation[268].

nrakta W. Europe, including Britain, from Iceland to N. Spain. ksacta Coastal salt marshes, pastures and maritime cliffs[17]. Dry, sandy, somewhat acidic soils in sandy turf, coastal salt marshes, cliffs and mountain pastures[268].

propta Seed - pre-soak for 8 hours in warm water and then sow in pots of sandy soil in a cold frame. Germination

usually takes place in 2 - 3 weeks at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring or early summer. Division in spring or after flowering[111]. Fairly easy, large divisions can be planted out straight into their permanent positions whilst it is probably best to pot up smaller divisions and to grow them on in light shade in a cold frame until they are rooting well.

nwatta Landscape Uses:Alpine garden, Border, Container, Massing, Rock garden, Seashore, Specimen. Succeeds in most soils including clay and poor sands[200]. Prefers a well-drained sandy soil with added leaf mould and a sunny position[1, 111, 134]. Requires an acid soil according to one report[24] whilst others say that it dislikes acid soils. Plants are very wind-tolerant and succeed in maritime gardens[233]. Established plants are drought tolerant[190]. Succeeds when grown at the top of a retaining wall or a cavity wall[219]. The plant tolerants [19th treading[200]. It forms a slowly expanding clump and makes a good edging plant[111]. A good butterfly plant[24, 30]. The flower is a symbol of sympathy, used at funerals[66]. Special Features: North American native, Suitable for cut flowers.

### 4.2.275 Anaphalis margaritacea

Pearly Everlasting, Western pearly everlasting 3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Anaphális margaritacea is a PERENNIAL growing to 0.9 m (3ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in August, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

tcanta Dye IncenseYellow to gold, also green and brown dyes can be obtained from the flowers, stems and leaves combined[168]. The leaves, flowers and stems have been used as an incense, especially in baby cradles[257].

dwatta Anodyne Antiseptic Astringent Dysentery Expectorant Poultice SedativePearly everlasting was often employed medicinally by native North American Indian tribes who used it in the treatment of a range of ailments[257]. It is little used in modern herbalism. The whole plant is anodyne, antiseptic, astringent, expectorant and sedative[4, 61, 168, 222]. Used internally, it is a good remedy for diarrhoea, dysentery and pulmonary affections[4]. A poultice of the flowers or the whole plant is applied to burns, sores, utcers, bruises, swellings and rheumatic joints[4, 222, 257]. An infusion of the plant is steamed and inhaled in the treatment of headaches[257]. a cooled infusion of the roots and shots has been used as a laxative and emetic to treat 'poison stomach'[257].

nrakta N. America. N.E. Asia. Naturalized in Britain. ksacta Moist meadows, by rivers, on wall tops and in sandy and waste places[17].

propta Seed - sów spring in a cold frame[1, 133]. The seed is best sown when it is ripe in the autumn. It usually germinates in 4 - 8 weeks at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is very easy at almost any time of the year, the divisions can be planted straight into their permanent positions if required.

nwatta Prefers a light well-drained soil and a sunny position[1, 133]. Requires a moist soil[208]. Succeeds in most soils[200]. including poor ones[1], and also in light shade[200]. Succeeds in the shade of buildings, but not of trees[233]. Plants are hardy to about -25°c[187]. The flowering stems can be dried and used as everlasting flowers[212].

#### 4.2.240 Maianthemum dilatatum

Wild Lily Of The Valley, False lily of the valley 3 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Maianthemum dilatatum is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for later use[118, 177]. The fruits are about the size of small peas and are produced in terminal clusters on the plants, they are not regarded very highly[256]. North American Indian children would eat the raw unripe green berries straight from the plant[256]. Adults would usually harvest the green berries and then store them in water until they turned red and were soft[256]. Alternatively they would dry the green berries and then boil them for a few minutes[256]. Young leaves - cooked[177].

dwatta Infertility Ophthalmic Poultice TBA poultice made of the whole or the mashed leaves has been applied to boils, burns, cuts and wounds[257]. The fruit has been used as a good medicine in the treatment of tuberculosis[257]. The root has been chewed in order to correct sterility[257]. (This probably means to restore fertility[K]) An infusion of the pounded roots has been used as a wash for sore eyes, whilst the chewed roots have been used as a poultice on the eyes[257].

nrakta Western N. America - California to Alaska. ksacta Shaded or moist streambanks and open to dense coniferous and broadleaves woods if they are moist[60, 270], in humusrich slightly acid soils[200] to 1000 metres[60].

propta Seed - best sown quite thinly it as soon as it is ripe in a cold frame, it should germinate in the spring. Stored seed should be sown in late winter in a cold frame, it might take 18 months to germinate. Allow the seedlings to grow on in the pot for their first year, giving liquid feeds as necessary to ensure that they do not go hungry. Divide the plants into individual pots once they have died down in late summer. Grow them on in pots for another year or more until large enough to plant out[K]. Division as new growth commences in the spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a cool shady moist but not wet position[1, 187]. Plants tolerate warm summers only if the soil remains moist[200]. A mat forming plant, it can be invasive in good conditions[200].

#### 4.2.241 Podophyllum peltatum

American Mandrake, Mayapple, Ground Lemon, Mandrake, Mayapple

3 tlin 9 cyuc 2 kcak 2 tcan 4 dwat 0.3 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli dyatxre7t hjonli

drutta Podophyllum peltatum is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from April to October, in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The leaves and the roots are very poisonous[1, 4, 19, 62, 222].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked or made into jams, jellies, marmalades, pies etc[1, 2, 4, 43, 101, 183]. The fruit can also be dried for later use[257]. The fruit should only be eaten when it is fully ripe[55, 62,

95], the unripe fruit is strongly laxative[183]. Remove the rind[95]. The fruit is very aromatic[95], and has a peculiar though agreeable flavour[183]. Sweet and acid. Do not eat the seeds[62]. In excess the fruit can cause colic[22, 65, 159]. The fruit is about 5cm long[200].

tcanta InsecticideAn infusion of the boiled leaves has been sprayed on potato plants to protect them from insects[213]. Other reports suggest that it is insecticidal rather than repellent[238, 257]. The root ooze has been used to soak corn seed prior to planting it out in order to prevent it being eaten by crows or insects[257].

dwatta Antibilious Cancer Cathartic Cytostatic Homeopathy Hydrogogue Purgative Warts Women's complaintsAmerican mandrake is a most powerful and useful herbal medicine, exercising an influence on every part of the system and stimulating the glands to healthy action[4]. Its greatest power lies in its action on the liver and bowels[4]. It is a gastro-intestinal irritant, a powerful hepatic and intestinal stimulant[4]. Although often used internally in the past, the plant's cytotoxic action makes it an unsafe remedy for internal use[254]. The root is antibilious, cathartic, cytostatic. hydrogogue and purgative[4, 19, 46, 57, 64, 124, 222]. The plant contains podophyllin, which has an antimiotic effect (it interferes with cell division and can thus prevent the growth of cells). It is, therefore, a possible treatment for cancer, and has been used especially in the treatment of ovarian cancer[46, 51, 57, 64, 65, 124, 244]. However, alopecia is said to be a common side-effect of this treatment[244]. The root is most active medicinally in early spring when it is beginning to shoot[4]. The resin, which is obtained from the root[207], is used in the treatment of warts and has been found to be effective against uterine warts that are sometimes experienced in pregnancy[200, 222]. It is also used in the treatment of small-cell carcinoma[207]. The root is harvested in the autumn and either dried for later use or the resin is extracted[238]. The whole plant, apart from the ripe fruit, is highly poisonous and should only be used under the supervision of a qualified practitioner[238]. It should not be prescribed for pregnant women[238]. Large doses have been used to commit suicide[213]. A homeopathic remedy is obtained from the fresh root, harvested before the fruit is ripe[232]. This is used particularly in the treatment of diarrhoea[232]. nrakta Eastern N. America - Southern Maine to Florida.

west to Texas and Minnesota. ksacta Moist soils in rich woods, thickets and pastures[43, 130].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in a cold frame in early spring. The seed germinates in 1 - 4 months at 15°c. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a shady part of the greenhouse for at least 2 growing seasons. Plant them out into their permanent positions in the winter when the plants are dormant. Division in March/April[111].

nwatta Landscape Uses:Ground cover, Woodland garden. Prefers a moist peaty soil and filtered light or shade[4. 111]. Grows well in a moist open woodland[28, 31] and also succeeds under beech trees in a deep moist leafy soil[130]. Succeeds in a pH ranging from 4 to 7[238]. A very hardy plant[4], tolerating temperatures down to -15°c or lower when dormant[187], though the young leaves in spring can be damaged by late frosts[233]. Plants in this genus have excited quite a lot of interest for the compounds found in their roots which have been shown to have anti-cancer activity[124]. There are various research projects under way (as of 1990)[124]. The flower has a foul smell[232]. The plant takes some years to become established[124] but is very long lived in a suitable habitat[130] and can become a vigorous colonizer[233]. Special Features: North American native, Naturalizing. The plant is heat tolerant in zones 8 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones. 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also userunner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

### 4.2.242 Bergenia crassifolia

3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc pcimhmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli

flatpriklwis hpa7tmwatli xre7t hionli

drutta Bergenia crassifolia is an evergreen Perennial growing to 0.3 m (1ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from March to April. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[2, 61, 105, 177, 183].

tcanta TanninA useful ground cover plant[188], though rather slow to spread[197]. It forms a clump[208]. Tannin is obtained from the bark[61]. The roots contain 15 - 22% tannin, exceptionally 26%[223]. The leaves and stems contain 17 - 25% tannin[223].

nrakta E. Asia - N.W. China to Siberia. ksacta On shady north-facing rocks, stony slopes, rock streams and old moraines in the forest and alpine zones[74].

propta Seed - surface sow in a greenhouse. Make sure that the compost does not dry out. Two weeks cold stratification can speed up germination which usually takes 1 - 6 months at 15°c[134]. Fresh seed, sown as soon as it is ripe in late spring is liable to germinate better than stored seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in late spring after flowering[188] or in autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in full sun or light shade in most soils[134, 200] but prefers a deep fertile soil that does not dry out fully[134]. Established plants are drought tolerant according to another report[190]. Grows well in heavy clay soils. Plants are at their best in a medium-heavy soil[208]. Requires a position sheltered from cold drying winds and from the early morning sun. The leaf colour is best when plants are grown in a poor soil in a sunny position[188]. A very ornamental plant, it is hardy to about -20°c[187]. The young growth in spring, even on mature plants, is frosttender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants seem to be immune to the predations of rabbits[233]. The different species of this genus will hybridise freely when grown near each other[233].

## tum

Mountain Crowberry, Rockberry 3 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli fyifxre7t hjonli

drutta Empetrum eamesii hermaphroditum is an evergreen Shrub growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower in March. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist

ful and given here if available. The plant growth habit is a soil. The plant can tolerates strong winds but not maritime

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[61]. A watery flavour, it is mainly used for making drinks, pies, preserves etc[183]. The Inuit dry or freeze them for winter use[183]. The fruit is about 4mm in diameter[200]. A tea can be made from the twigs[183].

tcanta Plants can be used for groundcover in exposed locations[200].

nrakta Northern Europe, including Britain, mountains in southern Europe, Greenland, Canada and Siberia, ksacta On mountain tops and moors, mostly at high altitudes but down to sea level in the far north of its range[17].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be very slow to germinate, stored seed requires 5 months warm then 3 months cold stratification at 5°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 3cm with a heel, July/August in a frame. Takes 3 weeks. Good percentage[78, 200]. Cuttings of mature wood of the current year's growth, 3cm with a heel, October in a frame. Requires shade. Good percentage[78, 200].

nwatta Landscape Uses:Erosion control, Foundation, Ground cover, Massing, Rock garden. A calcifuge plant, it is easily grown in a moist lime-free peaty soil[11, 182. 200]. Unlike most members of this genus, this species is hermaphrodite and self-fertile[183]. There has been some confusion over the name of this plant. Some authorities refer to it as E. hermaphroditum and others include it in E. nigrum or E. eamesii[200]. Special Features: Attractive foliage, North American native, Inconspicuous flowers or blooms.

### 4.2.244 Adenophora liliifolia

Ladybells, Lilyleaf

3 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc

htut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Adenophora liliifolia is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a medium rate. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. Thick and esculent[2, 61, 105], it has a sweet flavour[74]. Eaten boiled and in soups etc[46, 177].

nrakta C. Europe to Siberia ksacta Woods and damp

propta Seed - best sown in a cold frame as soon as it is ripe[200]. The seed can also be sown in spring. Surface sow 2 - 3 seeds per pot in the spring in order to avoid transplanting[133]. We have found that if transplanted when very small seedlings grow away without difficulty[K]. Germinates in 1 - 3 months at 10°c[133]. Plant out into their permanent positions whilst young. Basal cuttings in spring[K]. Division in spring - very difficult because the plant dislikes root disturbance[1]

4.2.243 Empetrum eamesii hermaphrodianden. Prefers a light rich slightly alkaline soil that is not too dry, and a warm sunny position[1, 200]. Plants are intolerant of root disturbance and should be planted out into their permanent positions when young[1]. This species has been cultivated for its edible root in Japan[46, 238]. The flowers have a sweet but refreshing perfume[245]. This is the only member of the genus with scented flowers[245]. The young growth is extremely attractive to slugs, they have been known to destroy even mature plants[K]. Special Features: Not North American native, Naturalizing, Suitable for cut flowers, Fragrant flowers.

#### 4.2.245 Leucanthemum vulgare

Ox-Eye Daisy, Marguerite 3 tlin 9 cyuc 2 kcak 2 tcan 2 dwat 0.6 m hkuc is made from the leaves and twigs[102, 105, 177, 257].

tcanta Cosmetic Miscellany Rootstock Tannin WoodUsed as a rootstock for the ornamental species in this genus[182]. The plant is very rich in tannin[7]. It is used cosmetically as an ingredient in almost any preparation made to relieve capillary weaknesses[7]. The stems have been used for water divining[257]. Wood - heavy, hard, very close grained[82]. It weighs 43lb per cubic foot[235]. The trees are too small to be a useful lumber source[229].

dwatta Antidiarrhoeal Astringent Dysentery Haemostatic Homeopathy Miscellany Sedative TonicWitch hazel bark is a traditional herb of the North American Indians who used it to heal wounds, treat tumours, eye problems etc[254]. A very astringent herb, it is commonly used in the West and is widely available from both herbalists and chemists[222]. It is an important ingredient of proprietary eye drops, skin creams, ointments and skin tonics[238]. It is widely used as an external application to bruises, sore muscles, varicose veins, haemorrhoids, sore nipples, inflammations etc[238]. The bark is astringent, haemostatic, sedative and tonic[4, 14, 21, 165, 171, 222]. Tannins in the bark are believed to be responsible for its astringent and haemostatic properties[222]. Bottled witch hazel water is a steam distillate that does not contain the tannins from the shrub[222], this is less effective in its action than a tincture[238]. The bark is used internally in the treatment of diarrhoea, colitis, dysentery, haemorrhoids, vaginal discharge, excessive menstruation, internal bleeding and prolapsed organs[238]. Branches and twigs are harvested for the bark in the spring[238]. An infusion of the leaves is used to reduce inflammations, treat piles, internal haemorrhages and eye inflammations[213]. The leaves are harvested in the summer and can be dried for later use[238]. A homeopathic remedy is made from fresh bark[232]. It is used in the treatment of nosebleeds, piles and varicose veins[232].

nrakta Eastern N. America - Nova Scotia to Wisconsin and south to Texas and N. Florida. ksacta Edges of dry or moist woods, in rich soil and on the rocky banks of streams[43, 82]. The best specimens are found in deep rich soils[229].

propta Seed - this can be very slow to germinate. It is best to harvest the seed 'green' (as soon as it is mature but before it has dried on the plant) around the end of August and sow it immediately in a cold frame[80, 98]. It may still take 18 months to germinate[200] but will normally be quicker than stored seed which will require 2 months warm stratification then 1 month cold followed by another 2 weeks warm and then a further 4 months cold stratification[113]. Scarification may also improve germination of stored seed[80]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Overwinter them in a greenhouse for their first winter and plant out in late spring[78]. Layering in early spring or autumn[78, 200]. Takes 12 months. Good percentage[78]. Softwood cuttings, summer in a frame[200].

nwatta Landscape Uses:Border, Pest tolerant, Specimen, Woodland garden. Prefers a moist sandy loam[14, 130] in a sunny position[1], though it tolerates some shade[14]. Prefers a rich well-drained soil[1]. Dislikes dry limy soils but will succeed in a calcareous soil if it is moist[130]. Prefers a position sheltered from cold drying winds in a neutral to slightly acid soil[200]. A very hardy plant tolerating temperatures down to about -35°c[184]. Plants seldom produce seeds in Britain[4]. Witch hazel is a widely used medicinal herb. The bark is harvested commercially from the wild in N. America[61]. The twigs have been used in the past as dowsing rods for water divining[229]. A slow growing shrub, it takes about 6 years to flower from seed[200]. The flowers have a soft sweet perfume[245]. This species is notably susceptible to honey fungus[200]. Special Features: North American native, Attracts butterflies, Fragrant flowers, Inconspicuous flowers or blooms.

#### 4.2.271 Lithospermum multiflorum

Manyflowered Gromwell, Manyflowered stoneseed 3 tlin 7 cvuc 1 kcak 0 tcan 1 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwisslip hpa7tmwatli xre7t hionli

drutta Lithospermum multiflorum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The

species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: The seeds have been used for food[257].

tcanta Dve MiscellanyA purple dve is obtained from the

dwatta MiscellanyThe root has been used as a 'life medicine' by some native North American Indian tribes[257]. nrakta Western N. America. ksacta Gravelly soils in Texas, 1800 - 3600 metres, mainly in the juniper and pine

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings. Division.

nwatta Requires a warm sunny position in a moderately fertile well-drained calcareous soil[1, 200]. Grows well in dry

#### 4.2.272 Monarda menthifolia

Mint-Leaved Bergamot, Mintleaf bergamot 3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Monarda menthifolia is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves used as an aromatic tea[212]. The leaves are a very common and popular potherb with the Hopi Indians - they are gathered and dried in bundles for winter use[216].

dwatta Anaesthetic Antiseptic DiaphoreticThe leaves and flowering stems are anaesthetic, antiseptic and diaphoretic[238]. An infusion is used in the treatment of fevers and sore throats[257]. The pulverized plant has been rubbed on the head to bring relief from a headache[257]. An infusion of the plant is used as a wash on wounds[257]. The plant is a source of the medicinal essential oil 'thymol', which is an-

nrakta N. America - Manitoba to Alberta, south to Arizona and Texas, ksacta Medium-dry to moist soils in valleys. prairies and mountains to 2,100 metres[212].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°c. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Requires a moist soil and a sunny position[200]. A good bee plant[200]. Subject to mildew in dry summers[200]. The Hopi Indians occasionally cultivate this plant as a pot herb[216].

a frame[200]. Layering in spring before new growth begins. Takes 12 months[78]. Division of suckers in late winter. They can be planted straight out into their permanent positions.

nwatta Landscape Uses:Border, Standard, Seashore, Specimen. Succeeds in most soils, including chalk, but disiles acid soils[11]. Prefers a deep stiff well-drained loam in a warm sunny position[11, 200]. A very ornamental plant[1], it does tend to sucker quite freely though[200]. There are many named varieties, developed for their ornamental value[182]. The flowers attract butterflies and moths[30]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Blooms are very showy.

#### 4.2.269 Prunus cerasus

Sour Cherry

3 tlin 7 cyuc 1 kcak 3 tcan 2 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Prunus cerasus is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Gum Gum Oil Oil TeaFruit - raw or cooked[1, 2, 5, 11, 12]. Pleasantly acid, the fruit can be eaten out of hand, used in pies, preserves etc or dried for later use[183]. The fruit is about 18mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible oil is obtained from the seed[46, 61]. When refined it is used as a salad oil[183]. The leaves are used as a tea substitute[46, 61, 183]. A gum obtained from the trunk is used for chewing[61, 64].

tcanta Adhesive Dye Gum Gum Hedge Hedge Oil Oil WoodAgroforestry Uses: Plants can be grown as a hedge[50] ], succeeding in fairly exposed positions[K]. An excellent nectar plant, yielding both nectar and pollen[74]. Other Uses: An edible drying oil obtained from the seed is also used in cosmetics[61]. Seeds contain an almond -flavoured fatty oil (24 - 35%) which rapidly becomes more bitter; this is used in the manufacture of soap and is suitable for burning. The oil contains a large quantity of amygdalin[74]. The stones are used as well: according to American data, 1,000 tons of stones yields 448 tons of kernels which can yield to 96 235 5 kg (95,563 liters) of syrup, 22,736 liters of spirits, 338,130 liters qf gum, 200 tons of powder, 3 tons of essential oil, and 4.134 tons of fatty oil[74]. The gum obtained from the stem can be used as an adhesive[61, 64]. It is used in the manufacture of cloth[74] (as a size?). A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The plant can be used as a rootstock for cultivated cherries [74]. The plant is used in breeding programmes for the sweet cherry. The bark contains 5 - 7% tannins, including some guercetin[74]. The vellowish red wood is compact, rather heavy. It is suitable for use in woodwork and lathework for making pipes, cigarette holders, hoops for barrels etc[74].

dwatta Astringent Bitter Febrifuge Nervine SalveThe bark is astringent, bitter and febrifuge[240]. An infusion of the bark has been used in the treatment of fevers, coughs and colds[257]. The root bark has been used as a wash for

old sores and ulcers[257]. The seed is nervine[240]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S.E. Europe to W. Asia. Naturalized in Britain. ksacta Hedges in S. England[17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Prefers an acid soil according to another report[5]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants are succeeding in a fairly exposed maritime position at Rosewarne in N. Cornwall[K]. Plants are hardy to about -20°c[184]. Long cultivated for its edible fruit, there are many named varieties[1, 50]. See separate entries for the various sub-species[K]. It is also a parent, with P. avium, of many cultivars of sweet cherries[1, 17]. Many cultivars will succeed on a north or east facing wall[219]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants produce suckers freely[184]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

### 4.2.270 Hamamelis virginiana

Witch Hazel, American witchhazel, Common Witchhazel, Virginian Witchhazel, Witchhazel

3 tlin 8 cyuc 1 kcak 0 tcan 5 dwat 5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Hamamelis virginiana is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from September to November, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Avoid long-term use due to cancer risk (from high tannin content). Avoid during pregnancy and breastfeeding. 1g ingested can cause vomiting, nausea, impaction. Topical use may cause dermatitis (301).

kcakta Edible Parts: SeedEdible Uses: TeaSeed - raw or cooked[232]. An oily texture[4, 102, 177, 213]. The seeds are about the size of a barley grain and have a thick bony coat[2]. The reports of edibility must be treated with some suspicion, they all seem to stem from one questionable report in the 'Medical Flora' of Refinesque[2]. A refreshing tea

htut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Leucanthemum vulgare is a PERENNIAL growing to 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves raw or cooked[2, 115]. The young spring shoots are finely chopped and added to salads[4, 7, 183]. Rather pungent[9], they should be used sparingly or mixed with other salad plants[183]. Root - raw[5]. Used in sprind[207].

tcanta Groundcover and Specialist Nectary. Landscape Uses:Ground cover, Massing. Special Features:Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers.

dwatta Antispasmodic Antitussive Diaphoretic Diuretic Emmenagogue Tonic VulneraryThe whole plant, and especially the flowers[7], is antispasmodic, antitussive, diaphoretic, diuretic, emmenagogue, tonic and vulnerary[4, 7, 21]. It is harvested in May and June then dried for later use[4]. The plant has been employed successfully in the treatment of whooping cough, asthma and nervous excitability[4]. Externally it is used as a lotion on bruises, wounds, ulcers and some cutaneous diseases[4, 7]. A decoction of the dried flowers and stems has been used as a wash for chapped hands[257]. A distilled water made from the flowers is an effective eve lotion in the treatment of conjunctivitis[7].

nrakta Europe, including Britain, from Lapland south and east to the Mediterranean and Siberia. ksacta A common weed of grassy fields on all the better types of soil, avoiding acid soils and shadel 171.

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in spring. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Easily grown in a good garden soil in a sunny position[187]. Prefers a rich soil[17]. Plants are hardy to at least -20°c[187]. The whole plant is permeated with an acrid juice, making it obnoxious to insects[4]. The flowers have a smell like stale perspiration[245]. Grows well in the summer meadow but may need some help in maintaining it-self[24]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

### 4.2.246 Calochortus aureus

Mariposa Lily, Golden mariposa lily 3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calochortus aureus is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers RootEdible Uses: Bulb-raw[44, 61, 105, 161]. The bulbs are gathered in early spring and peeled before being eaten[257]. Flowers[257]. No more details are given.

nrakta South-western N. America - Arizona, New Mexico and Utah. ksacta Dry sandy-clayey places at elevations of 1200 - 2000 metres[270]. Mesas, slopes and open pine forests in Arizona.

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 - 6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. One report says that the bulbs must be planted into their permanent positions immediately[1], whilst another says that they can be stored overwinter and replanted in the spring[138]. Stem bulbils, harvested from the stems after flowering[200]. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a sunny position and must be kept dry over winter[1, 200]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter. It is easiest to grow in a bulb frame but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. Bulbs can be lifted as soon as the foliage dies down in the sumer and stored overwinter in a cool dry place, replanting in spring[138]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. Hand pollination is necessary if seed is required[1].

### 4.2.247 Artemisia frigida

Fringed Wormwood, Prairie sagewort 3 tlin 10 cyuc 2 kcak 3 tcan 2 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Artemisia frigida is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: Edible Uses: CondimentThe leaves are used by the Hopi Indians as a flavouring for sweet corn[61, 172, 177, 183, 257].

tcanta Deodorant Disinfectant Dye Essential Repellent-Both the growing and the dried plant can be used as an insect repellent[172]. The leaves can be placed on a camp fire to repel mosquitoes[257]. The aromatic leaves have been used in pillows etc as a deodorant[257]. Bunches of the soft leaves have been used as towels, toilet paper etc[257]. A green dye is obtained from the leaves[257]. Cultivated for its foliage effects, and has gained the Royal Horticultural Society's Award of Garden Merit. Used in landscaping and for erosion control and revegetation of rangeland. It is drought-resistant. Provides shelter for beneficial invertebrates: insects and other arthropods. A specialist nectary plant [1-2]. Groundcover [1-2].

dwatta Antispasmodic Deodorant Disinfectant Poultice Stimulant Stomachic Vermifuge Women's complaintsThe leaves are stomachic, vermifuge and used in the treatment of women's complaints[172]. The plant contains camphor, which is stimulant and antispasmodic[213]. An infusion of the leaves is used in the treatment of billiousness, indigestion, coughs and colds whilst the leaves are chewed and the juice swallowed to treat heartburn[257]. A poultice of the chewed leaves is used as a poultice to reduce swellings and the leaves

are also placed in the nose to stop nosebleeds[257]. A hot 4.2.249 Achillea ptarmica poultice of the leaves has been used to treat toothache[257]. The leaves can be used as a sanitary towel to help reduce skin irritation[257]. They are also drunk as a tea when the woman is menstruating or to treat irregular menstruation[257]. The dried leaves are burnt in a room as a disinfectant[257]. A decoction of the root is used as a stimulant and tonic[257].

nrakta N. America - Minnesota to Saskatchewan, Yukon, Texas and Arizona, N. Asia, ksacta Dry prairies, plains and rocks to 3300 metres in N. America[43, 164].

propta Seed - surface sow from late winter to early summer in a greenhouse in a very free-draining soil, but make sure that the compost does not dry out. The seed usually germinates within 1 - 2 weeks in a warm greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame. Division in spring or autumn[200].

nwatta Requires a sunny position and a well-drained soil that is not too rich[1, 200]. Requires a lime-free soil. Established plants are very drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. A very ornamental plant[1]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

### 4.2.248 Lewisia pygmaea

Pigmy Bitterroot, Alpine lewisia 3 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Lewisia pygmaea is a PERENNIAL growing to 0.1 m (Oft 4in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf from September to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: RootEdible Uses: Root - cooked. Steeped and boiled[177]. It can also be dried for later use[257]. The root is said to be extremely nutritious[85], though some native North American Indian tribes believed that eating it could cause insanity[257]. It is easiest to use when the plant is in flower because the outer layer of the root (which is very bitter) slips off easily at this time of the year[85]. The root has a good taste though a decided bitter flavour develops afterwards[105, 161].

nrakta Western N. America - British Columbia to California, Arizona and New Mexico. ksacta Open, often gravelly, moist to dryish areas in mountains to above the tree line[60]. Open places in short turf or gravelly or rocky substrates at elevations of 2300 - 4200 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame in a very freely draining soil[129]. Sow stored seed as soon as possible in a cold frame. One months cold stratification should improve germination, though this is still likely to be very slow. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first two winters. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March/April. Very difficult

nwatta Requires a very well-drained gritty humus-rich deep soil in a sunny position[1, 200]. Prefers a neutral to acid soil[188]. This species is not reliably hardy in Britain. It can withstand consistently very cold weather but does not like alternating periods of mild and cold conditions, nor does it like winter wet[1]. The plant is very susceptible to rotting at the neck in a damp soil[200]. Plants die down after flowering and start growing again in the autumn[188]. A very ornamental plant[1]. Polymorphic[60]. Very apt to hybridize with other members of this genus[1].

Sneeze-Wort, Sneezeweed

3 tlin 9 cyuc 2 kcak 2 tcan 1 dwat 0.6 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Achillea ptarmica is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[17, 105, 177]. Used as a flavouring in salads[172].

tcanta Essential Hair Miscellany RepellentThe dried, powdered leaves are used as a sneezing powder[61, 100]. Yields an essential oil that is used medicinally 1001. The report does not say what part of the plant the oil is obtained from, it is most likely to be the leaves harvested just before flowering[K]. The leaves are used as an insect repellent[172].

dwatta Antidiarrhoeal Antiemetic Antiflatulent Antirheumatic Appetizer Cardiac Diaphoretic Digestive Emmenagogue Miscellany Odontalgic Sternutatory StypticCardiac, diaphoretic, digestive, emmenagogue, odontalgic, sternutatory, styptic[46, 172]. The leaf is chewed to relieve toothache[207].

nrakta Europe, including Britain but excluding the Mediterranean, east to Siberia and W. Asia, ksacta Damp meadows, marshes and by streams[17].

propta Seed - sow spring or early autumn in a cold frame[133]. The seed usually germinates in 1 - 3 months[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be planted direct into their permanent positions. Basal cuttings of new shoots in spring. Very easy, collect the shoots when they are about 10cm tall, potting them up individually in pots and keeping them in a warm but lightly shaded position. They should root within 3 weeks and will be ready to plant out in the summer.

nwatta Landscape Uses:Border, Container, Rock garden. Seashore. Specimen. Succeeds in most soils but prefers a moist well-drained soil in a sunny position[1, 187]. Plants also succeed in partial shade[187]. Plants succeed in maritime gardens[233]. They live longer when growing in a poor soil[200]. The plant has a spreading root system and can be very invasive[233]. Hardy to at least -25°c[187]. There are some named varieties, selected for their ornamental value[233]. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat, Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 4.2.250 Clintonia borealis

Bluebeard

3 tlin 7 cyuc 2 kcak 2 tcan 1 dwat 0.3 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

(when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses: Container, Standard, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil[11] and a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Plants produce prodigious root growth but little top growth in first year from seed[133]. This species is closely related to A. mono[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features: Not North American native, Inconspicuous flowers or blooms.

### 4.2.267 Euonymus europaeus

Spindle Tree, European spindletree 3 tlin 7 cyuc 1 kcak 3 tcan 2 dwat 6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Euonymus europaeus is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

pcista Poisonous. No further details.

kcakta Edible Parts: Manna OilEdible Uses: Colouring OilAn edible yellow dye is obtained from the fruit and seed[46, 61, 103, 183]. Pink from the fruit case, orange from the seed[141]. These reports should be treated with some caution since many members of this genus are poisonous. One report suggests that the plant is a source of a manna[183], there are no further details.

tcanta Charcoal Dve Insecticide Latex Oil Parasiticide WoodThe whole plant yields a volatile oil that is used in soap making[13, 46]. Other reports say that the oil is obtained from the seed[46, 61, 103, 115]. It is possible that there are two oils, an essential oil from the plant and an oil from the seed[K]. A good yellow dye is obtained from the fleshy coating around the seeds[4]. This becomes green with the addition of alum, but unfortunately both colours are rather fugitive[4]. The baked and powdered berries are used to remove lice from the hair[6, 19, 66], they are also used as an insecticide[15]. The leaves are used[115]. Roots yield up to 4% gutta-percha, a non elastic rubber used as an electrical insulation and for making plastics[74]. Wood - very hard, easily split, fine-grained, not durable[4, 6, 13, 46]. Used for spindles, skewers, knitting needles, toothpicks, carving etc[6, 100, 103]. A high quality charcoal is obtained from the wood, it is used by artists[46, 74, 103, 115].

dwatta Alterative Cholagogue Hepatic Laxative Parasiticide Purgative Stimulant TonicThe bark is alterative, cholagogue, hepatic, laxative, stimulant and tonic[4, 7]. The root bark is the part normally used, though bark from the stems is sometimes employed as a substitute[4]. In small doses it stimulates the appetite, in larger doses it irritates the intestines[4]. The bark is especially useful in the treatment. of liver disorders which follow or accompany fevers[4]. The seeds are strongly emetic and purgative[4]. The fresh leaves, and the dried fruit and seeds, are used externally to treat

scabies, lice (head, body or pubic), ticks and other skin parasites[268]

nrakta Europe, including Britain, from Sweden suth and east to Spain, the Caucasus and W. Asia. ksacta Woods, scrub and hedges, usually on calcareous soils[9, 17].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. One report says that the seed can be sown in an outdoors seedbed in early spring with good results[78]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood, November in a frame[113]. Layering in July/August. Takes 14 months[78].

nwatta An easily grown plant, it thrives in almost any soil, including chalk, and is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. If cultivated for its latex it is best grown in a dry open position[74]. A very cold-hardy plant, tolerating temperatures down to about -25°c[184]. A very ornamental plant, there are many named varieties[11]. This species is often damaged by caterpillars during the flowering season[11]. It is a favoured home for blackfly, so should not be grown near broad beans[121]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 4.2.268 Syringa vulgaris

Lilac, Common lilac

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Syringa vulgaris is a deciduous Shrub growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw or folded into batter and fried to make fritters[183].

tcanta Dye Essential Hedge Hedge RootstockAn essential oil is obtained from the flowers. Used in perfumery [171]. A green dye is obtained from the flowers[168]. Green and brown dues can be obtained from the leaves[168]. A velloworange dye is obtained from the twigs[168]. Plants can be grown as an informal hedge[200]. The plant is often used as a rootstock for the various ornamental cultivars of lilac. Its main disadvantage is that it can sucker very freely[200].

dwatta Antiperiodic Febrifuge Mouthwash Tonic VermifugeThe leaves and the fruit are antiperiodic, febrifuge, tonic and vermifuge[4]. The bark or leaves have been chewed by children as a treatment for sore mouth[257].

nrakta E. Europe. Occasionally naturalized in Britain[17]. ksacta Scrub on rocky hill slopes in Europe[50]. Found in hedges, thickets and shrubberies in Britain[17].

propta Seed - sow March in a north facing cold frame Pre-treating the seed with 4 weeks warm then 3 weeks cold stratification improves germination. It is probable that sowing the seed as soon as it is ripe in a cold frame would be a more reliable method[K]. Prick the seedlings out into individual pots once they are large enough to handle. Plant them out in the summer if sufficient growth has been made, otherwise grow them on in a cold frame for their first winter and plant out in late spring of the following year. Cuttings of young shoots, 7cm with a heel, June in a frame[200]. Cuttings of half-ripe wood, 7cm with a heel, July/August in

Special Features:Not North American native, Naturalizing, Inconspicuous flowers or blooms.

### 4.2.264 Acer ginnala

Amur Maple

3 tlin 8 cyuc 1 kcak 3 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Acer ginnala is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe young leaves are used as a tea substitute[177, 183].

tcanta Dye Preservative TanninThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Black, blue and brown dyes are obtained from the dried leaves[151]. The leaves contain the dyestuff quercetin[223]. They also contain about 30% tannin[223].

nrakta E. Asia - China, Japan, Manchuria. ksacta Found in many habitats in Korea, especially along streamsides and swampy places[151]. Forests at elevations of 100 - 800 metres in China[266]

propta Seed of garden origin rarely comes true to type. The seed is best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 -8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Fairly easy from cuttings.

nwatta Of easy cultivation, it prefers a good moist well-drained soil on the acid side[11, 182]. Prefers a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. A very ornamental tree[1], there are some named varieties[11]. The form 'Bailey Compact' is a compact form originating in N. America. Very closely related to and possibly only a ssp. of A. tataricum[11]. The dried leaves are exported to China in large quantities for their use as a dye[151]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 201]

#### 4.2.265 Salix alaxensis

Feltleaf Wiillow

3 tlin 7 cyuc 1 kcak 2 tcan 2 dwat 10 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix alaxensis is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil.

Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Inner bark Leaves NectarEdible Uses: Inner bark - raw or cooked. A sweet flavour[172], it has been eaten as a winter tibit[257]. The taste is somewhat like watermelon or cucumber[257]. The bark has been used as a survival food[229]. It can be dried, ground into a powder and used as a thickening in soups or can be added to cereal flour for use in making bread etc. Young tender leaves and shoots - raw or cooked[257]. The shoots are peeled and eaten in spring[172]. A source of vitamin C[257]. The flowers have been sucked by children for the sweet nectar[257].

tcanta In northern parts of this plant's range, its wood is often the sole source of firewood[229]. Dynamic accumulator

dwatta Anodyne Febrifuge Vitamin CThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta North-western N. America - Alaska to British Columbia, east to Hudson Bay. ksacta Moist tundra and gravels[172, 204]. Prefers rocky soils along the sides of rivers and lakes[226]. Grows up to and beyond the tree-line, when it becomes a small recumbent low-spreading shrub[226].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame. Very easy.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. It is an aggregate species[172] and ranges in habit from a small tree right down to a dwarf shrub growing along the ground in exposed sites[229]. The following notes are based on the general needs of the genus. Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 4.2.266 Acer truncatum

Shantung Maple, Purpleblow Maple 3 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Acer truncatum is a deciduous Tree growing to 8 m (26ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed roasted[105, 177]. Rather small and fiddly to utilize[K].

tcanta Companion PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - N. China, Korea, Manchuria. ksacta Deciduous oak forests at elevations of 400 - 1000 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. The seed of this species has hypogeal germination, that is the true seed leaves remain below the soil and the first leaves to appear above soil level are true leaves. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at  $1 - 8^{\circ} c$ . It can be slow to germinate. The seed can be harvested 'green'

drutta Clintonia borealis is a PERENNIAL growing to  $0.3\,\mathrm{m}$  (1ft) by  $0.3\,\mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked[61, 105, 177]. Harvested in spring before they fully unfurl[62], they have a slightly sweetish cucumber flavour[55, 183]. Older leaves can be used as a potherb[55].

tcanta Disinfectant RepellentThe crushed leaves have been rubbed on the face and hands as a protection from mosquitoes[257].

dwatta Cardiac Disinfectant PoulticeThe leaves are cardiac and disinfectant[257]. A poultice has been applied to open wounds, burns, ulcers, scrofulous sores and infections[257].

nrakta North-eastern N. America - Newfoundland to Manitoba, south to N. Carolina and Wisconsin. ksacta Rich woodlands, deep thickets, higher elevations in cool moist sites[43, 62].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the spring[200]. Stored seed should be sown in late winter or early spring in a cold frame[164]. It sometimes germinates within 1 - 3 months at 15°c, but may take a year. The seed should be completely separated from the fruit and should only just be covered by soil[164, 200]. If the seed has been sown thinly enough, then it is possible to leave the seedlings in the pot for their first growing season, dividing them after they become dormant. Make sure to give them liquid feeds at intervals through the spring and summer. Otherwise prick out the seedlings into individual pots when they are large enough to handle. Plant out in late spring or early summer at the beginning of their second or third years growth. Division in spring as new growth is just commencing[200].

nwatta Prefers a damp peaty sandy soil in a cool damp shady position[1, 42, 200]. Requires a moist neutral to acid soil[200]. The dormant plant is hardy to at least -25°c, but new growth in spring can be damaged by late frosts[187]. Plants only produce their fruit in warm seasons in Britain[200]. They have creeping underground stems and form dense colonies[187]. This species is closely related to C. andrewsiana[188]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 4.2.251 Hypericum perforatum

St. John's Wort, Common St. Johnswort 3 tlin 7 cyuc 2 kcak 2 tcan 4 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Hypericum perforatum is a PERENNIAL growing to  $0.9~\mathrm{m}$  (3ft) by  $0.6~\mathrm{m}$  (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly actid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the sap, or ingestion of the plant, can cause photosensitivity in some people[13, 76, 222]. Common side-effects are gastointestinal disturbances, allergic reactions and fatigue. If used with drugs classed as serotonin reuptake inhibitors (fluoxetine:Prozac, paroxetine:Paxil) symptoms of serotonin syndrome may occurmental confusion, hallucinations, agitation, headache, coma, shivering, sweating, fever, hypertension, tachycardia, nausea, diarrheoa, tremors. St John's wort can reduce the effectiveness of prescription medicine inc: contraceptive pill, antidepressants, immune suppressants, HIV medications, warfarin, digoxin [301].

kcakta Edible Parts: Edible Uses: TeaThe herb and the fruit are sometimes used as a tea substitute[7, 183]. The flowers can be used in making mead[183].

tcanta Dye TanninYellow, gold and brown dyes are obtained from the flowers and leaves[168]. A red is obtained from the flowers after acidification[141]. A red dye is obtained from the whole plant when infused in oil or alcohol[7, 61, 115]. A yellow is obtained when it is infused in water[7, 74, 115]. The plant is said to contain good quantities of tannin, though exact figures are not available[223].

dwatta Analgesic Antidepressant Antiseptic Antispasmodic Aromatic Astringent Cholagogue Digestive Diuretic Expectorant Homeopathy Nervine Resolvent Sedative Stimulant Vermifuge VulnerarySt. John's wort has a long history of herbal use. It fell out of favour in the nineteenth century but recent research has brought it back to prominence as an extremely valuable remedy for nervous problems[254]. In clinical trials about 67% of patients with mild to moderate depression improved when taking this plant[254]. The flowers and leaves are analgesic, antiseptic, antispasmodic, aromatic, astringent, cholagogue, digestive, diuretic, expectorant, nervine, resolvent, sedative, stimulant, vermifuge and vulnerary[4, 9, 13, 21, 165, 218, 222]. The herb is used in treating a wide range of disorders, including pulmonary complaints, bladder problems, diarrhoea and nervous depression[4]. It is also very effectual in treating overnight incontinence of urine in children[4]. Externally, it is used in poultices to dispel herd tumours, caked breasts, bruising etc[4]. The flowering shoots are harvested in early summer and dried for later use[7]. Use the plant with caution and do not prescribe it for patients with chronic depression[238]. The plant was used to procure an abortion by some native North Americans, so it is best not used by pregnant women[257]. See also the notes above on toxicity[21, 222]. A tea or tincture of the fresh flowers is a popular treatment for external ulcers, burns, wounds (especially those with severed nerve tissue), sores, bruises, cramps etc[222, 238]. An infusion of the flowers in olive oil is applied externally to wounds, sores, ulcers, swellings, rheumatism etc[240]. It is also valued in the treatment of sunburn and as a cosmetic preparation to the skin[240]. The plant contains many biologically active compounds including rutin, pectin, choline, sitosterol, hypericin and pseudohypericin[222]. These last two compounds have been shown to have potent anti-retroviral activity without serious side effects and they are being researched in the treatment of AIDS[222, 238]. A homeopathic remedy is made from the fresh whole flowering plant[232]. It is used in the treatment of injuries, bites, stings etc and is said to be the first remedy to consider when nerve-rich areas such as the spine, eyes, fingers etc are injured[232].

nrakta Europe, including Britain, south and east to N. Africa, the Azores, Madeira and W. Asia. ksacta Open woods, hedgebanks and grassland, in dry sunny places, usually on calcareous soils[7, 17].

propta Seed - sow in a greenhouse as soon as it is ripe in the autumn or in the spring. It normally germinates in 1 - 3 months at 10°c. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111, 238]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any reasonably good well-drained but moisture retentive soil[1]. Succeeds in dry soils[238]. Plants grow well in sun or semi-shade but they flower better when in a sunny position[200]. St. John's wort is often found as a weed in the garden[1]. It grows well in the summer meadow and is a useful plant for attracting in-

sects[24]. The whole plant, especially when in bloom, gives off a most unpleasant smell when handled[245]. Hypericum perforatum is apparently an allotetraploid that would appear to have arisen from a cross between two diploid taxa, viz. H. maculatum subsp. maculatum (Europe to western Siberia) and H. attenuatum (western Siberia to China)[266]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

### 4.2.252 Thymus pseudolanuginosus

Woolly Thyme

3 tlin 9 cyuc 2 kcak 2 tcan 2 dwat 0.1 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Thymus pseudolanuginosus is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta The leaves have a thyme scent and are used as a flavouring in food[238].

tcanta An essential oil is obtained from the leaves. Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, theses are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level groundcovers provide little fuel.

dwatta The leaves, and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta The original habitat of this plant is obscure. ksacta Not known in a wild situation

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Landscape Uses:Alpine garden, Border, Ground cover, Rock garden, Specimen. Prefers a light, well-drained calcareous soil and a sunny position[200]. Plants tolerate occasional walking on and can be grown in cracks in paths, they also succeed on walls[200]. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to at least -15°c[238]. The flowers are rich in nectar and are very attractive to honey bees[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native. Heat Zone: 9-1.

### 4.2.253 Filipendula vulgaris

Dropwort, Meadowsweet 3 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.8 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli priklwisslip hpa7tmwatli fyifxre7t hjonli drutta Filipendula vulgaris is a PERENNIAL growing to  $0.8~\mathrm{m}$  (2ft 7in) by  $0.4~\mathrm{m}$  (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - raw or cooked[61, 177, 200]. They can be added to salads and soups[183]. Root - raw or cooked[61, 115, 177, 200]. Rather bitter[5]. Astringent[100]. Best if roasted[141]. A famine food, it is only used in times of scarcity[183].

tcanta Plants can be used as a ground cover when planted about 45cm apart each way[208]. The cultivar 'Flore Pleno' with sweetly scented double flowers has been recommended[208].

dwatta Anthelmintic Antispasmodic Epilepsy LithontripicThe root is anthelmintic and lithontripic. It is used in the treatment of epilepsy, kidney and bladder stones, genital discharges and intestinal worms[61].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, Siberia and the Caucasus. ksacta Dry pastures on limestone or chalky soils[4].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Massing, Rock garden. Prefers a well-drained moisture retentive soil[200]. Dislikes shade[17]. Tolerates dry soils[200]. Grows well on calcareous soils[17]. The flowers are sweetly scented and are very attractive to bees[245]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers.

### 4.2.254 Aquilegia jonesii

Columbine, Jones' columbine, Blue limestone columbine 3 tlin 7 cyuc 2 koak 0 tcan 1 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Aquilegia jonesii is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: Flowers Edible Uses: Flowers - raw. Rich in nectar, they are sweet and delightful[172], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K].

tcanta Parasiticide Parasiticide The seed is used as a parasiticide to rid the hair of lice[172].

dwatta Antispasmodic Diaphoretic Parasiticide Parasiticide Resolvent SalveAntispasmodic, diaphoretic, parasiticide, resolvent, salve[172].

nrakta Western N. America - Alberta, Montana and Wyoming. ksacta Usually sub-alpine on scree slopes or in rock crevices in limestone areas only at elevations of 1800 - 3400 metres[60, 270].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored

sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Street tree. Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. A fast-growing tree[188]. Plants have little tolerance of shade[226]. Cultivated as a timber tree in C. and S.E. Europe where it is sometimes naturalized[50]. The cultivar 'Patmore' is disease resistant[188]. Dioecious. Male and female plants must be grown if seed is required. Special Features:North American native, Attracts butterflies, Inconspicuous flowers or blooms.

### 4.2.262 Carpinus caroliniana

American Hornbeam, Blue Beech, Ironwood, American Hornbeam

3 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 12 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Carpinus caroliniana is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed -cooked[105]. An emergency food, used when all else fails[177].

tcanta WoodWood - heavy, close grained, very hard, strong, but not very durable in the soil. It weighs 45lb per cubic foot. Too small to be exploited commercially, this high quality wood is often used locally for flooring, cogs, tool handles, golf clubs etc[46, 61, 82, 171, 226, 227, 229, 235]. It is especially suitable for making levers[171] and is also a good fuel[61].

dwatta AstringentAmerican hornbeam was employed medicinally by some native North American Indian tribes, though it is not used in modern herbalism[257]. The inner bark is astringent[257]. An infusion has been used in the treatment of diarrhoea and difficult urination with discharge[257].

nrakta Eastern N. America - Nova Scotia to Ontario, south to Florida and Texas. ksacta Usually found as an understorey tree in rich woods and the borders of streams and swamps in deep rich moist soils[43, 82, 229].

propta Seed - best sown in an outdoors seedbed as soon as it is ripe[78]. Germination is usually good, though it may take 18 months[80]. If collected whilst still 'green' (after the seed is ripe but before it has dried fully on the plant) and sown immediately it should germinate in the following spring[80]. Grow the plants on for two years in the seedbed and then plant them out into their permanent positions in the winter. The average seed viability is around 65%[98]. Pretreat stored seed with 4 weeks warm and 12 weeks cold stratification and sow in a cold frame[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 15cm tall before planting them into their permanent positions.

nwatta Landscape Uses:Espalier, Pest tolerant, Hedge, Standard, Superior hedge, Specimen, Street tree, Woodland garden. Thrives in any good loam, including chalk, it does not demand much light[1, 11]. Prefers a deep open loam[1]. Grows well in heavy clay soils. A slow-growing and short-lived tree in the wild[229], it is slower growing than C. betulinus in cultivation[11]. Seed production is cyclic, a year of heavy yields being followed by 2 - 4 years of low yields[229]. Special Features: North American native, Attracts butterflies, Inconspicuous flowers or blooms.

#### 4.2.263 Phellodendron amurense

Amur Cork Tree, Chinese Corktree
3 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 12 m hkuc
htut cyutli tcun hwicli brasilutnyik hna7tli flatnriklwissl

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Phellodendron amurense is a deciduous Tree growing to  $12\ m$  (39ft) by  $15\ m$  (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista High doses can cause nausea and vomiting. Avoid with spleen and stomach disorders. Avoid during pregnancy as high berberine content [301]

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit[105, 177]. The fruit is about 1cm in diameter and has a strong scent of turpentine[200].

tcanta Cork Dye Insecticide Oil WoodA yellow dye is obtained from the inner bark[178]. An oil obtained from the seed has insecticidal properties similar to pyrethrum[57]. Wood heavy, hard, strong, close grained. Used for furniture[74]. The bark is a cork substitute[74].

dwatta Antibacterial Bitter Cholagogue Diuretic Dysentery Expectorant Hypoglycaemic Ophthalmic Skin Stomachic Urinary VasodilatorAmur cork tree, called Huang Bai in China, is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs, but one that should be used with care[218, 254]. A strongly bitter remedy, the bark acts strongly on the kidneys and is regarded as a detoxicant for hot damp conditions[238]. Recent research has shown that the plant is useful in the treatment of meningitis and conjunctivitis[254]. Huang Bai should only be used under professional supervision and should not be take during pregnancy[254]. The bark is alterative, antibacterial. antirheumatic, aphrodisiac, bitter stomachic, cholagogue, diuretic, expectorant, febrifuge, hypoglycaemic, ophthalmic, skin, vasodilator and tonic[4, 61, 174, 176, 178, 218, 238, 279]. It is taken internally in the treatment of acute diarrhoea, dysentery, jaundice, vaginal infections including Trichomonas, acute urinary tract infections, enteritis, boils, abscesses, night sweats and skin diseases[238, 254]. It is commonly used in conjunction with Scutellaria baicalensis and Coptis chinensis in a preparation called 'injection of three yellow herbs'[238]. It is given intramuscularly for upper respiratory tract infections[238]. The bark of 10 year old trees is harvested in the winter or spring and dried for later use[238, 254]. The fruit is expectorant[218].

nrakta E. Asia - N. China and Manchuria. ksacta Forests in valleys and on mountains [74].

propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 2 months cold stratification, sow in late winter in a cold frame[78, 113]. Germination is usually good. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with a heel, July/August in a frame. Pot up in autumn and over winter in a cold frame. Fair to good percentage[78]. Root cuttings - obtain in December and store in leafmold in a warm place for 3 weeks. Cut into 4cm lengths and plant horizontally in pots. Grow on in a warm greenhouse. Good percentage[78].

nwatta Landscape Uses:Pest tolerant, Specimen, Street tree. Prefers a moisture retentive well-drained deep rich loam in full sun[11, 200]. Prefers a neutral to alkaline soil[238]. Succeeds in shallow chalky soils[245]. Grows best in areas with long hot summers[200]. Plants are gross feeders and require a rich soil if they are to perform well[11]. Dormant plants are fully hardy in Britain[188], but the young growth is liable to damage from late spring frosts[11, 188, 200]. The leaves are aromatic[188]. This species is occasionally cultivated for timber in S.E. Europe[50]. Dioecious. Male and female plants must be grown if seed is required.

the winter and they are then very subject to damage by late frosts and cold winds[1]. Plants are not very successful in Britain, they have been tried on many occasions but have failed to make a satisfactory tree[11, 185]. A specimen at the Hillier Arboretum was 4.5 metres tall in 1970 and suffered frost damage each year[185]. This species is impossible to grow in lowland Britain, though it should succeed above a height of 300 metres in the eastern Scottish Highlands[200]. Growth is normally slow in Britain with average height increases of less than 30cm per year[185]. Hybridizes freely with other members of this genus[200]. Closely related to L. occidentalis[200]. Open ground plants, 1 year x 1 year are the best for planting out, do not use container grown plants with spiralled roots[200]. Plants transplant well, even when coming into growth in the spring[200]. Plants in this genus are notably resistant to honey fungus[200].

### 4.2.260 Populus alba

White Poplar 3 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 20 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Populus alba is a deciduous Tree growing to 20 m (65ft) by  $12\ m$  (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Leaves - rich in Vitamin C[179]. Inner bark - dried, ground into a powder and added to flour for making bread[2, 105]. A famine food, it is only used when all else fails[177].

tcanta Dye Rooting hormone Shelterbelt WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. A yellow dye is obtained from the bark[100]. Wood - rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion, very light, soft, elastic. It is used for less good quality purposes such as making matches, packing materials etc[11, 13, 46, 61, 100, 115].

dwatta Alterative Anodyne Antiinflammatory Antiiseptic Astringent Diuretic Febrifuge Tonic Urinary Vitamin CThe stem bark is anodyne, anti-inflammatory, antiseptic, astringent, diuretic and tonic[14, 46, 61, 178, 218]. The bark contains salicylates, from which the proprietary medicine aspirin is derived[238]. It is used internally in the treatment of rheumatism, arthritis, gout, lower back pains, urinary complaints, digestive and liver disorders, debility, anorexia, also to reduce fevers and relieve the pain of menstrual cramps[14, 46, 61, 178, 213, 238]. Externally, the bark is used to treat chilblains, haemorrhoids, infected wounds and sprains[238]. The bark is harvested from side branches or coppiced trees and dried for later use[238]. The leaves are used in the treatment of caries of teeth and bones[218]. The twigs are depurative[218]

nrakta C. Europe to Asia. Frequently planted in Britain but not naturalized[17]. ksacta Woods and watersides[100].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. This species does not often produce viable seed in Britain[11]. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature

wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta Landscape Uses: Erosion control, Aggressive surface roots possible, Specimen. An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich welldrained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. This species thrives on drier soils than other members of the genus [188]. It does not do well in exposed upland sites[11] but it is tolerant of maritime exposure, though it can be wind pruned in such a situation[11, 200]. Dislikes shade, it is intolerant of root or branch competition[200]. Tolerates both hot and cool summers[200]. A very ornamental tree, it is fast-growing but fairly short-lived[1, 11, 227]. There are several named varieties[188]. An important food plant for the caterpillars of many species of butterflies[30]. The leaf buds are resinous and exude an aromatic perfume in the spring[245]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Invasive, Inconspicuous flowers or blooms.

### 4.2.261 Fraxinus pennsylvanica

Red Ash, Green ash, Water Ash 3 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Fraxinus pennsylvanica is a deciduous Tree growing to 20 m (65ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen in October. The species is diocious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

coked[105, 161, 177]. The cambium layer can be scraped down in long, fluffy layers and cooked[257]. It is said to taste like eggs[257]. Inner bark can also be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread.

tcanta Basketry Dye Shelterbelt WoodA fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. A red dye is extracted from the bark[226]. Logs of wood can be beaten with mauls to separate the growth layers, these layers can then be cut into strips and woven into baskets[257]. Wood - hard, heavy, rather strong, tough, elastic, brittle, coarse-grained. It weighs 44lb per cubic foot. Used for tool handles, furniture etc[61, 82, 149, 171, 235]. The wood is of poorer quality than F. americana, though it is usually sold under that name[226].

dwatta Bitter Diuretic TonicThe bark and leaves are a bitter tonic[4, 61]. An infusion of the inner bark has been used in the treatment of depression and fatigue[257]. The root is diuretic[41.

nrakta Eastern N. America - Nova Scotia to Alberta, south to Florida and Texas. ksacta Streambanks, floodplains and wet upland sites[229], rarely in pure stands[226].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have

seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Prefers a well-drained friable sandy loam with leaf mold[1]. Intolerant of heavy clay[200]. A very ornamental plant[1]. This species deeply resents root disturbance and cannot be transplanted[60]. Most species are short-lived, dying out after 2 - 3 years, though they usually produce seed prolifically[200]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

### 4.2.255 Pinus radiata

Monterey Pine

3 tlin 11 cyuc 1 kcak 3 tcan 2 dwat 65 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dvat hionli

drutta Pinus radiata is an evergreen Tree growing to 65 m (213ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from February to March, and the seeds ripen from January to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222]. kcakta Edible Parts: Edible Uses: CondimentA vanillin

kcakta Edible Parts: Edible Uses: CondimentA vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dve Hedge Hedge Herbicide Shelterbelt Wood-Very tolerant of maritime exposure and salt-laden winds, it is also very fast growing. Increases in height of between 1 and 2.5 metres per year have been recorded even in exposed positions, it makes an excellent shelterbelt tree[11, 75]. A tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleoresins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - tough and hard[229]. It is light, soft, brittle, close-grained and not strong according to another report[82]. It is widely grown for lumber in warm temperate zones[200] and has been used for flooring, finishings and fuel[229].

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta South-western N. America - California. ksacta Found only in a narrow belt a few kilometres wide near the California coast, in dry bluffs and slopes below 300 metres[71, 82].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81]

nwatta Industrial Crop: Hydrocarbon Management: Standard Regional TimberLandscape Uses:Screen, Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Very resistant to maritime exposure[75], the leaves can be badly burned by cold dry winds but this does not seem to affect growth[11]. Mature trees produce a broad heavy crown and are somewhat likely to be blown down in severe gales[200]. Trees are somewhat tender when young[11]. Any transplanting is best done when the plant is in active growth in the summer. Only small plants should be moved[200]. Extensively cultivated for timber in warm temperate zones, especially in New Zealand, it grows larger in cultivation than it does in the wild[200]. It is a very vigorous tree in S.W. England[11] where growth takes place almost all year round and annual height increases of 2.5 metres in young plants are not uncommon[185]. Outside the milder areas growth is less vigorous, taking place from June to September [185]. A short-lived tree in the wild, where it rarely lives longer than 100 years[81]. It is probably going to be long-lived in cultivation in Britain[185]. It often self-sows in Britain, though the seedlings are usually found in the shade of the tree and do not flourish there[185]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. The cones are 8 - 17cm long[82], they remain closed on the tree for many years, only opening after the heat of a forest fire followed by rain[200]. Plants can produce new shoots from reasonably old wood so the lower branches can be cut back to produce a hedge-like effect[11]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

#### **4.2.256** Pinus nigra

Austrian Pine, Black Pine

3 tlin 7 cvuc 1 kcak 0 tcan 2 dwat 30 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli dyat hjonli

drutta Pinus nigra is an evergreen Tree growing to 30 m (98ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Edible Uses: CondimentA vanillin flavouring is obtained as a by-product of other resins that are

released from the pulpwood[200].

tcanta Dye Herbicide Plaster Shelterbelt WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. A very wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Trees have proved to be very resistant to maritime exposure on our Cornwall trial grounds[K]. Resin and turpentine are obtained from the wood, they are used in ointments and plasters[46, 64, 171]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4]. 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc. for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - non durable. Used for rough carpentry and furniture[100].

dwatta PlasterThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[41]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta Europe - Austria. ksacta Mountains, often on calcareous soils[100].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses:Firewood, Specimen. Succeeds on all soil types, including chalk[1, 11, 200]. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Requires a sunny position[11]. A very hardy tree, it is extensively planted for timber and shelter[50, 200], tolerating maritime exposure[11, 75]. Fast growing when young, it outgrows the Corsican pine (P. nigra maritima) for the first 5 or 6 years but is then rapidly overtaken by that species[185]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow beneath the tree[18]. Trees tend to be shortlived in cultivation[11]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

#### 4.2.257 Populus angustifolia

Narrowleaf Cottonwood

3 tlin 7 cyuc 1 kcak 2 tcan 2 dwat 30 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Populus angustifolia is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Inner barkEdible Uses: Gum SweetenerInner bark[105, 161, 177] There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. A 'honeydew', produced on the undersides of leaves by aphis, was collected by various native North American Indian tribes and used as a sweetener[227]. The buds have been used as a chewing guml[257].

tcanta Basketry Gum Rooting hormone Soil stabilization WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. The young shoots are used in making baskets[227, 257]. The highly developed root system helps to reduce erosion when trees are planted on banks and slopes[226]. Wood - weak, soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11, 227]. It weighs 24lb per cubic foot[235]. The tree's scarcity and small size make it commercially unimportant, though it is sometimes used locally for fence posts and fuel[227, 229].

dwatta Analgesic Antiinflammatory Antiscorbutic Febrifuge OdontalgicA tea made from the inner bark is used in the treatment of scurvy[161]. The bark contains salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 226, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238]. The woolly fruit is moistened and applied to the gums in order to treat infections[226]. A tea made from the fruits is used in the treatment of toothache[2261.

nrakta Western N. America - Alberta to Mexico. ksacta Streambanks in dry mountains, foothills and dry plains[60].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. Dislikes shade, it is intolerant of root or branch competition[200]. A fast-growing but short-lived species in the wild[229]. The young leaves and expanding buds emit a pleasant distinctive fragrance in the spring[226]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200].

### 4.2.258 Populus nigra

Black Poplar, Lombardy poplar 3 tlin 9 cyuc 1 kcak 4 tcan 3 dwat 30 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhien hjonli

drutta Populus nigra is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in April, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure

kcakta Edible Parts: Inner barkEdible Uses: Inner bark-dried, ground then added to flour and used for making bread etc[2]. A famine food, used when all else fails[177].

tcanta Cork Fodder Rooting hormone Shelterbelt WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A fast growing tree, it is often used to provide a quick screen or wind-break[200]. The cultivar 'Italica' is commonly used for this purpose though it is not a very suitable choice because it has fragile branches and is prone to basal rots which can cause sudden collapse[200]. The cultivar 'Plantierensis' is much more suitable[200]. A resin obtained from the buds is made into a salve and used in home remedies[46]. The bark is used as a cork substitute for floats etc[115]. Wood - very soft, very light, rather woolly in texture, without smell or taste, of low flammability, not durable, easy to work, very resistant to abrasion. Used for lower quality purposes[11, 46, 61, 115, 2271].

dwatta Alterative Anodyne Antiinflammatory Astringent Diaphoretic Diuretic Expectorant Febrifuge Salve Stimulant Tonic Urinary VulneraryThe leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[4, 213]. They also contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213]. The buds are antiscorbutic, antiseptic, balsamic, diaphoretic, diuretic, expectorant, febrifuge, salve, stimulant, tonic and vulnerary [4, 9, 21, 165, 238]. They are taken internally in the treatment of bronchitis and upper respiratory tract infections, stomach and kidney disorders[4, 238]. They should not be prescribed to patients who are sensitive to aspirin[238]. Externally, the buds are used to treat colds, sinusitis, arthritis, rheumatism, muscular pain and dry skin conditions[238]. They can be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The buds are harvested in the spring before they open and are dried for later use[238]. The stem bark is anodyne, anti-inflammatory, antiseptic, astringent, diuretic and tonic[14, 46, 61, 178, 2181. The bark contains salicylates, from which the proprietary medicine aspirin is derived[238]. It is used internally in the treatment of rheumatism, arthritis, gout, lower back pains, urinary complaints, digestive and liver disorders, debility, anorexia, also to reduce fevers and relieve the pain of menstrual cramps[14, 46, 61, 178, 213, 238]. Externally, the bark is used to treat chilblains, haemorrhoids, infected wounds and sprains[238]. The bark is harvested from side branches or coppiced trees and dried for later use[238].

nrakta Central and southern Europe, including Britain, Mediterranean, temperate Asia to the Himalayas. ksacta Moist ground in woods and by streams[9, 17].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas

with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78]. This species rarely produces suckers[238].

nwatta Agroforestry Services: Living trellis Agroforestry Services: Windbreak Fodder: Bank Historic Crop Industrial Crop: Biomass Management: Coppice Management: Standard Other Systems: Irreg. Intercrop Other Systems: SRC Other Systems: Strip intercropA very easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It is fairly wind tolerant, though it does not do well in exposed upland sites, or in maritime exposure[11, Kl. It dislikes shade and is intolerant of root or branch competition[200]. A fast-growing tree, reaching maturity in about 100 years and declining thereafter[186]. There are several named varieties that have been selected mainly for their ornamental value[11]. The leaf buds, as they swell in the spring, and the young leaves have a pleasing fragrance of balsam[245]. The fragrance is especially pronounced as the leaves unfold[245]. Very tolerant of hard pruning, the trees have often been pollarded in the past[186]. Plants seldom produce suckers[186]. An important food plant for the caterpillars of several species of butterfly[30]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Not North American native, Inconspicuous flowers or blooms.

### 4.2.259 Larix lyallii

Sub-Alpine Larch

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 25 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Larix lyallii is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: The shoot-tips are used as a flavouring in soups[177].

tcanta Tannin WoodThe bark contains tannin[229]. Wood - strong, heavy, hard, coarse-grained and durable[82, 220]

nrakta Western N. America - Washington to British Columbia. ksacta Sub-alpine to alpine zones, often on north-facing slopes where snow lies until late in the season[60].

propta Seed - sow late winter in pots in a cold frame. One months cold stratification helps germination[113]. It is best to give the seedlings light shade for the first year[78]. As soon as they are large enough to handle, prick out the seedlings into individual pots. Although only a few centimetres tall, they can be planted out into their permanent positions in the summer providing you give them an effective weed-excluding mulch and preferably some winter protection for their first year. Otherwise grow them on in the cold frame for their first winter and plant them out in early summer of the following year. The seed remains viable for 3 years[113] If you are growing larger quantities of plants, you can sow the seed in an outdoor seedbed in late winter. Grow on the seedlings in the seedbed for a couple of years until they are ready to go into their permanent positions then plant them out during the winter.

nwatta Prefers an open airy position in a light or gravelly well-drained soil[200]. Intolerant of badly drained soils, but tolerates acid and infertile soils[200]. Succeeds on rocky hill or mountain sides and slopes[200]. A north or east aspect is more suitable than west or south[1]. This species is very cold-hardy when fully dormant, but the trees can be excited into premature growth in Britain by mild spells during

hmimhtut cyutli tcuphja7n hwicli hyishrasjlut hpa7tli frusflatpriklwishsom hpa7tmwatli hjonli

drutta Agrostis capillaris is an evergreen Perennial growing to 0.4 m (1ft 4in) by 0.1 m (0ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. It can tolerate atmospheric pollution.

pcista None Known kcakta None Known

tcanta FodderForest garden path mix [1-9]. Environmental Uses: Amenity, Erosion control or dune stabilization, Landscape improvement, Revegetation, Soil conservation, Ornamental: garden plant, Seed trade [1-8]. Agronomically valuable fodder and pasture grass for livestock production, occasionally cut for hay. Used in garden lawn mixtures and in particular for tennis courts and golf course fairways. Widely grown in mild (cool-humid) summers, including some parts of Australia, northern Europe, the USA and New Zealand. Compared to A. stolonifera. A. capillaris has a more upright growth habit and does not spread aggressively. Used outside its native range for erosion control and in rehabilitation work. A food source for herbivores, including rabbits [1-8].

dwatta None Known

nrakta Native to Eurasia, from Ireland and Britain in the west, through Siberia and Central Asia, as far east as China and from Scandinavia south to the Mediterranean, including Tunisia in North Africa. Introduced and naturalized in the Americas (USA, Canada, Greenland, Brazil, Argentina and Chile), southern Africa, Australia and New Zealand [1-8]. ksacta Grasslands and pastures. Dominant on poor and acidic soils and is well adapted to grazing pressure. Invades ruderal, disturbed areas, heathland, woodland, scrub and sand dune habitats. Abundant in wetlands and cultivated areas. In Australia, it is reported from dry coastal vegetation, heathy woodlands, lowland grasslands, grassy woodlands, dry and damp sclerophyll forests, riparian vegetation and alpine and sub-alpine vegetation, including montane peatlands and swamps [1-8]

propta Seed

nwatta A rhizomatous and stoloniferous attractive, relatively short perennial grass. Ranging from 10 to 70 cm high. Soil drainage: free or impeded. Soil reaction: acid, alkaline, neutral. Dominant on poor and acidic soils. Soil texture: light or medium [1-8]. Found on a wide range of soils both damp and dry and from neutral to acidic. A hardy grass forming short grazed turf on poor soils on hills and mountains. Common and widespread in both lowland and upland pasture, meadows, heaths, open woodlands, road verges and banks. Upper elevation limit = 945m. Lower elevation limit = 0m

### 4.2.419 Delphinium nudicaule

Red Larkspur, Larkspur

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Delphinium nudicaule is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[172]. The plant is most toxic when it is young[200].

tcanta A blue dve is obtained from the flowers[207]. An ink can be made from the dye[207]. A parasiticide is obtained from the leaves[172]. It is quite toxic and so is for external

dwatta NarcoticThe root is considered by some native North American Indians to be highly narcotic[213, 257].

nrakta South-western N. America - California, oregon ksacta Dry slopes among shrubs and in woods, below 2150

metres[71]. Moist talus and cliff faces from sea level to 2600

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°c[200]. Temperatures above 15°c inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden, Seashore, Specimen. Prefers a rich well-drained soil[111, 200]. Dislikes water-logged soils[200]. Requires an open sunny position[188]. Plants can flower in their first year from spring-sown seed, they are reliably perennial in their native environment, but often die overwinter in most parts of Britain[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Slugs and snails are very attracted to this plant[200]. Special Features: Attracts birds, Attractive foliage, North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above.

### 4.2.420 Actaea pachypoda

3 tlin 7 cvuc 0 kcak 0 tcan 2 dwat 0.8 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Actaea pachypoda is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers

pcista All parts of the plant are toxic, causing severe gastrointestinal inflammation and skin blisters[222].

dwatta Antipruritic Antirheumatic Emmenagogue Galactogogue Hypnotic Oxytoxic Stimulant VDThe whole plant, but especially the root, is anticonvulsive, antirheumatic, emmenagogue, mildly hypnotic, oxytocic and stimulant[207, 257]. Use with caution, see the notes above on toxicity[222]. A decoction of the roots has been used in the treatment of coughs, colds, rheumatism and syphilis[213, 257]. It is also used in small doses to ease the pain of childbirth[222] and is used as a stimulant to revive and rally patients at the point of death[257]. An infusion of the roots has been used externally to treat itchy skin and as a gargle for sore throats[257]. An infusion of leaves was drunk by the women of some Indian tribes in order to stimulate the flow of milk[213]

nrakta Eastern N. America - S. Canada to Georgia, west to Oklahoma and Minnesota. ksacta Deciduous forests, less often with pines, junipers, or other conifers[270].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame or in a sheltered outdoor bed[200]. Completely remove the seed pulp since this can inhibit germination. Stored seed does not usually germinate well[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in late spring or early summer of the following year. Division in spring.

nwatta Tolerates most conditions[233], but prefers a humus-rich moist soil in light shade[200, 233]. Grows best in the wild or woodland garden[200]. This species is closely related to A. rubra[200].

### 4.2.421 Echinops latifolius

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

When used with dilute sulphuric acid they produce a rather permanent green dye, this becomes brown with the addition of alkalis[4, 13, 100, 168]. An infusion of the flowers is sometimes used to dye the hair a golden colour[4, 200]. The flowering stems can be dipped in wax and used as torches[53, 106, 124]. The down on the leaves and stems makes an excellent tinder when quite dry[4, 53, 115]. It is also used as an insulation in shoes to keep the feet warm[4, 200] and to make wicks for candle[1, 4, 13, 100, 115, 124]. One report says that the leaves contain rotenone, though it does not say in what quantity[222]. Rotenone is used as an insecticide[K]. Special Features: Attracts birds. Attractive foliage. Edible. Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for dried flowers, Attractive flowers or blooms. Dynamic accumulator.

dwatta Anodyne Antiseptic Astringent Demulcent Emollient Expectorant Homeopathy Narcotic Odontalgic VulneraryGreat mullein is a commonly used domestic herbal remedy, valued for its efficacy in the treatment of pectoral complaints[4]. It acts by reducing the formation of mucus and stimulating the coughing up of phlegm, and is a specific treatment for tracheitis and bronchitis[254]. The leaves and the flowers are anodyne, anti-inflammatory, antiseptic, antispasmodic, astringent, demulcent, diuretic, emollient, expectorant and vulnerary[4, 7, 13, 21, 46, 53, 165, 222]. An infusion is taken internally in the treatment of a wide range of chest complaints and also to treat diarrhoea[4, 238]. The plant combines well with other expectorants such as coltsfoot (Tussilago farfara) and thyme (Thymus vulgaris)[254]. Externally, a poultice of the leaves is a good healer of wounds and is also applied to ulcers, tumours and piles[4, 222, 254]. Any preparation made from the leaves needs to be carefully strained in order to remove the small hairs which can be an irritant[7]. The plant is harvested when in flower and is dried for later use[238]. An infusion of the flowers in olive oil is used as earache drops, or as a local application in the treatment of piles and other mucous membrane inflammations[4, 222, 238]. This infusion is also strongly bactericidal[4]. A decoction of the roots is said to alleviate toothache and also relieve cramps and convulsions[4]. The juice of the plant and powder made from the dried roots is said to quickly remove rough warts when rubbed on them[4]. It is not thought to be so useful for smooth warts[4]. The seeds are slightly narcotic and also contain saponins[4]. A poultice made from the seeds and leaves is used to draw out splinters[4]. A decoction of the seeds is used to soothe chilblains and chapped skin[7]. A homeopathic remedy is made from the fresh leaves[4]. It is used in the treatment of long-standing headaches accompanied with oppression of the ear[4].

nrakta Europe, including Britain, from Norway south and east to Spain, temperate Asia to China. ksacta Sunny positions in uncultivated fields and waste ground, especially on dry soils[7, 13, 17].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta An easily grown plant, it succeeds in most welldrained soils, including dry ones, and prefers a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200]. A very ornamental plant, it often self-sows, especially on dry calcareous soils[53, 124]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 4.2.311 Coreopsis verticillata

Whorled tickseed 3 tlin 9 cyuc 1 kcak 3 tcan 1 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli hionli

drutta Coreopsis verticillata is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known

kcakta Edible Parts: FlowersEdible Uses: Edible flowers

tcanta Soil stabilizationGroundcover. A good medium to high density fast growing groundcover [1-2]. Erosion Control. Ornamental: Good in flower beds, borders, mass plantings, entrace ways, foundations, raised planters, and naturalized sunny areas. A good plant for areas with poor, dry soils. Container Garden. Cut Flower. Insectory:Long flowering period attracts butterflies. [318-1].

dwatta DiureticDiuretic [318-1]

nrakta Found primarily in the east-central United States, from Maryland south to Georgia, with isolated populations as far west as Oklahoma and as far north as Québec and Ontario. ksacta Open rocky dry woods, open pineland, margins of woods, pine savannahs and post oak savannahs.

propta Propagation is by seed or division of the rhi-

nwatta A hardy herbaceous rhizomatous perennial. It can tolerate drought, poor soil, extreme heat, and neglect. Life Span: Short-Lived Perennial. Stand Persistence: Long. Form: Clump. Texture: Fine. Sun: Full Sun. Soil Type: Sandy, Loamy, Silty. Soil Moisture: Moderate, Dry. Soil pH: 6.5 - 7.5. Root Type: Rhizome. Seasonal Interest: Summer-Fall. Notes: Spreads via rhizome, forms a dense clump. Seeds resemble ticks, hence the name. Cultivars available. The following notable cultivars have all gained the Royal Horticultural Society's Award of Garden Merit: 'Grandiflora' - taller than other cultivars, with slightly larger flowers. 'Moonbeam' - pale, sulphur-yellow flowers, slightly shorter growth. 'Zagreb' - shorter than the species, bright vellow flowers. Flower Color: Yellow. Drought: Tolerant. Flood: Sensitive. Cold Injury: Infrequent. Wind Storm Damage: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Animal Damage: Deer. Bloom Time: Summer - Late Fall. Fruit Time: Summer - Fall [318-1]. Tends to sprawl, particularly if grown in moist and/or fertile soils. Crown rot may occur if grown in moist, poorly drained soils. Plants may be sheared in mid to late summer to promote a fall rebloom and to remove any sprawling or unkempt foliage. Species plants can spread somewhat aggressively in the garden by both rhizomes and self-seeding [368-1]. For polyculture design as well as the above-ground architecture (form tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

#### 4.2.312 Echinacea purpurea

Echinacea, Eastern purple coneflower, Hedge Coneflower, Black Sampson , Purple Coneflower

3 tlin 10 cyuc 1 kcak 2 tcan 5 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Echinacea purpurea is a PERENNIAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs)

and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought

pcista Possible suppression of immunity with habitual use. High doses over 1000 mg may cause dizziness. Use of herb for 10-14 days recommended followed by a short break.

kcakta Edible Parts: LeavesEdible Uses: Leaves[160]. No more details are given.

tcanta Nectar for insects. Deer resistant foliage.

dwatta Adaptogen Alterative Antiseptic Aphrodisiac Depurative Digestive Sialagogue UrinaryEchinacea is considered to be the most effective detoxicant in Western herbal medicine for the circulatory, lymphatic and respiratory systems[238, 254]. Its use has also been adopted by Avuryedic medicine[238]. Plants in this genus were probably the most frequently used of N. American Indian herbal remedies. They had a very wide range of applications and many of these uses have been confirmed by modern science. This species is the most easily cultivated of the genus and so has been more generally adopted for its medicinal uses[238]. The plant has a general stimulatory effect on the immune system and is widely used in modern herbal treatments[222]. In Germany over 200 pharmaceutical preparations are made from Echinacea[222]. There has been some doubt over the ability of the body to absorb the medicinally active ingredients orally (intravenous injections being considered the only effective way to administer the plant), but recent research has demonstrated significant absorption from orally administered applications[222]. The roots and the whole plant are considered particularly beneficial in the treatment of sores, wounds, burns etc, possessing cortisone-like and antibacterial activity[222]. The plant was used by N. American Indians as a universal application to treat the bites and stings of all types of insects[213]. An infusion of the plant was also used to treat snakebites[213]. The root is adaptogen, alterative, antiseptic, aphrodisiac, depurative, diaphoretic, digestive, sialagogue[4, 21, 61, 160, 165, 213]. It is harvested in the autumn and dried for later use[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Echinacea for common cold, cough and bronchitis, fevers and cold, urinary tract infections, inflammation of the mouth and pharynx, increase resistance to infection, wounds and burns (see [302] for critics of commission E).

nrakta N. America - Virginia to Ohio and Michigan, south to Georgia and Louisiana. ksacta Dry open woods, prairies and barrens[43]

propta Seed - sow March/April in a greenhouse and only just cover the seed[175, K]. Diurnal temperature fluctuations aid germination[175]. The seed usually germinates in 10 - 21 days at 25°c[175]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for the first summer. Plant them out in the late spring or early summer of the following year and give them some protection from slugs at least until they are established[K]. Division in spring or autumn[111]. Larger clumps can be replanted direct into their permanent positions, though it is best to not up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings, October in a frame[200]

nwatta Landscape Uses:Border, Container, Massing, Seashore, Specimen. Prefers a deep rich loam with plenty of leafmold[1] and a sunny position[175]. Succeeds in dry soils and tolerates drought once it is established[160]. Prefers a good light soil[187]. A very ornamental plant, there are some named varieties[187]. Slugs love this plant[K]. Special Features: Attracts birds, North American native, Edible, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

### 4.2.313 Poa pratensis

Kentucky Blue Grass, Spreading bluegrass 3 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Poa pratensis is a PERENNIAL growing to 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic

202

(mildly alkaline) soils. It cannot grow in the shade. It prefers

kcakta Edible Parts: SeedEdible Uses: One report suggests that it might be edible but gives no details[177]. It is quite probably referring to the seed (which is small and very fiddly too utilize) but might be referring to the base of the leaf stems, which is eaten in one other member of this genus.

nrakta Most of Europe, including Britain, to N. Africa, temperate Asia and N. America. ksacta Meadows and grassy places, it is also found on dunes[17]. Common and widespread in Britain, but it is only found on mountains in the south of its range[17].

propta Seed - surface sow in the spring in a cold frame. Do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Erosion control, Ground cover. Succeeds in any well-drained moderately fertile soil in a sunny position[200]. A polymorphic species[17]. It can be grown in lawns[1]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

### 4.2.314 Cimicifuga foetida

3 tlin 7 cyuc 1 kcak 0 tcan 3 dwat 1.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cimicifuga foetida is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers

pcista Although no specific mention of toxicity has been seen for this species, it does belong to a family that contains a number of toxic species and at least one species in this genus is said to be mildly poisonous. Some caution is therefore ad-

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked[105]. Some caution is advised, see the notes above

tcanta RepellentBoth the growing and the dried plant is used as an insect repellent in Siberia[1, 211, 240].

dwatta Analgesic Antibacterial Antiperiodic Antiviral Depurative Diaphoretic Diuretic Febrifuge Sedative Tonic-Foetid bugbane is an anti-infective herb that lowers fevers and reduces pain[238]. The root is analgesic, antibacterial, antiperiodic, antiviral, depurative, diaphoretic, diuretic, febrifuge, sedative, tonic[46, 61, 147, 176, 218, 240]. It is used internally in the treatment of rheumatic complaints. coughs, colds, headaches, gum diseases and feverish infections such as measles[238, 240]. The root is harvested in the autumn and used fresh or dried[238]. Use with caution[176], see the notes above on toxicity.

nrakta E. Asia - C. Russia to Japan. ksacta Shrubberies and forest clearings on open humus-rich soils, to 4000 metres in the Himalayas[51, 145]. Frequently found in fir forests in Kashmir[211].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 1 -12 months or even longer at 15°c[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°c and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they

pcista A toxic principle is present in very small quantities in the plant [7, 9, 13, 19, 65]. It is poorly absorbed so poisoning is unlikely[65].

dwatta Antianxiety Antiarrhythmic Cardiotonic Diuretic Sedative VasoconstrictorMedicinal Parts: Roots and whole plant[301]. Pheasant's eve has a long history of medicinal use and is still retained in the Pharmacopoeias of several European countries[268]. The plant contains cardiac glycosides similar to those found in the foxglove (Digitalis purpurea)[254]. These substances improve the heart's efficiency, increasing its output at the same time as slowing its rate[254]. It also has a sedative action and so is generally prescribed for patients whose hearts are beating too fast or irregularly[254]. The herb is not often prescribed, however, due to irregular absorption[268]. The herb is cardiotonic, diuretic, sedative and vasoconstrictor[4, 7, 9, 13, 46. 2381. It has sometimes been used internally as a cardiotonic with success where the better known foxglove (Digitalis purpurea) has failed - especially where there is also kidney disease[4]. The herb is also used in the treatment of low blood pressure and its strong diuretic action can be used to counter water retention[254]. It is included in many proprietary medicines, especially since its effects are not cumulative[238]. The plants are harvested every third year as they come into flower[7], they are dried for use in tinctures and liquid extracts[238]. The herb does not store well so stocks should be replaced every year[238]. Use with great caution[9], see the notes above on toxicity. The plant is used in homeopathy as a treatment for angina[254]. The German Commission E Monographs, a therapeutic guide to herbal medicine approve Adonis vernalis for arrhythmia, and nervous heart complaints (see [302] for critics of commission E)

nrakta C. and S. Europe ksacta Sunny grassy hills on dry calcareous soils[9]. A rare plant in most of its range, it has legal protection from gathering in most countries[238].

propta Seed - best sown in a cold frame as soon as it is ripe or else it can be slow and erratic to germinate[200, 238]. Sow the seed in partial shade in rich soil in September or March[111]. Prick out the seedlings when they are large enough to handle and grow them on in the cold frame for their first season. Plant out when dormant in the autumn[K]. Division in early spring or in autumn. The divisions can be difficult to establish[200], so it is probably best to pot them up and keep them in a cold frame or greenhouse until they are growing away well.

nwatta Grows well in any ordinary garden soil that is not too heavy[1]. Prefers a moist well-drained soil in sun or semi-shade[4, 200]. Easily grown in a very well-drained rather dry soil in sun or part shade [187]. Plants flower better when growing in a sunny position[268]. This plant is adored by slugs and is therefore very difficult to grow in the open garden where slugs are common[187]. A very ornamental plant[1], it is rather rare in the wild so only cultivated plants should be harvested[7]. A greedy plant inhibiting the growth of nearby plants, especially legumes[54].

#### 4.2.416 Lycopodium complanatum

Ground Pine, Groundcedar

3 tlin 7 cyuc 0 kcak 0 tcan 3 dwat 0.1 m hkuc

pcimhmim cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Lycopodium complanatum is an evergreen Fern growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The plant contains lycopodine, which is poisonous by paralysing the motor nerves[21, 218]. It also contains clavatine which is toxic to many mammals[218]. The spores, however, are not toxic[21].

tcanta Miscellany Mordant WeavingThe plant can be used as a mordant in dveing[172, 257]. The following uses are for L. clavatum. They quite possibly also apply to this species[K]. The spores are water repellent and can be used as a dusting powder to stop things sticking together[106, 171]. They are also used as a talcum powder and for dressing moulds in iron foundries[74]. They can also be used as explosives in fireworks and for artificial lightning [46, 57, 102, 171,

213]. The stems are made into matting[46].

dwatta Analgesic Miscellany Tonic UrinaryA decoction of the plant is analgesic, antirheumatic, carminative, mildly diuretic, stomachic and tonic[4, 218, 238]. It is used internally in the treatment of urinary and kidney disorders, catarrhal cystitis, gastritis etc[238]. It is applied externally to skin diseases and irritations[238]. The plant can be harvested all year round and is used fresh or dried[238]. The spores of this plant are antipruritic, decongestant, diuretic and stomachic[4]. They are applied externally as a dusting powder to various skin diseases, to wounds or inhaled to stop bleeding noses[4, 7]. They can also be used to absorb fluids from injured tissues[213, 218]. The spores are harvested when ripe in late summer[9]. The spores can also be used as a dusting powder to prevent pills sticking together[4, 213]. A homeopathic remedy is made from the spores[232]. It has a wide range of applications including dry coughs, mumps and rheumatic pains[232, 238].

nrakta Europe to E. Asia and northern N. America. ksacta Moist coniferous woods, from lowlands to moderate elevations in the mountains of Western N. America[60].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. The spores are generally produced in abundance but are difficult to grow successfully[200]. Layering of growing tips[200].

nwatta Thrives in a rough spongy peat in a shady position[1]. Requires a humid atmosphere[200]. Terrestrial members of this genus are hard to establish. The roots are delicate and liable to rot, most water being absorbed through the foliage[200]. The plant has an aromatic resinous smell[4]. Members of this genus are rarely if ever troubled by browsing deer[233]. Although looking more like a moss, this genus is closely related to the ferns[200].

### 4.2.417 Digitalis grandiflora

Large Yellow Foxglove

3 tlin 10 cvuc 0 kcak 0 tcan 2 dwat 0.9 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Digitalis grandiflora is an evergreen Perennial growing to 0.9 m (3ft) by 0.3 m (1ft in) at a medium rate. It is in leaf all year, in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable nH· mildly acid neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista All parts of the plant are poisonous[7, 65].

dwatta Cardiac Stimulant TonicThe leaves are cardiac stimulant and tonic[46, 61]. They are often used in the treatment of certain heart complaints.

nrakta Europe to W. Asia. ksacta Woods in mountains[50, 148] and in drier stonier habitats[200].

propta Seed - surface sow early spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 20°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Landscape Uses: Border, Specimen. An easily grown plant, succeeding in ordinary garden soil, especially if it is rich in organic matter[1]. It also succeeds in dry soils and, once established, is drought tolerant[188, 190]. It prefers semi-shade but succeeds in full sun if the soil is moist[188, 200]. Plants are hardy to about -20°c[187]. A short-lived perennial or biennial[187]. Members of this genus are rarely if ever troubled by browsing deer and rabbits[233]. Special Features: Not North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Attractive flowers or blooms.

#### 4.2.418 Agrostis capillaris

Browntop Bent Grass 3 tlin 10 cyuc 0 kcak 4 tcan 0 dwat 0.4 m hkuc

nrakta Eastern N. America - Pennsylvania and New Jersey to Wisconsin, south to Florida and Louisiana. ks-acta Meadows, borders of marshes, savannahs, damp slopes etc[43]. Poor dry ridges[190].

propta Seed - best sown as soon as it is ripe in autumn in a greenhouse [200]. Sow stored seed as soon as possible in the year in a greenhouse. Prick out the seedlings into individual pots when they are large enough to handle and grow the plants on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings taken in spring as growth commences. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Foundation, Massing, Seashore, Specimen. Grows well in a moderately good light soil[1]. Requires a moist to wet position[1, 200, 238]. Established plants are very drought tolerant so long as there is plenty of humus in the soil[190]. Prefers a sunny position[108] but succeeds in shade[111]. Plants are hardy to about '25°c[187]. The plant has an agreeable odour, due to the presence of coumarins[4]. A good bee plant[1]. Rodents are very fond of the tubers so the plants may require some protection[200]. Slugs are fond of the young shoots in spring[238]. Special Features: Attracts birds, Attractive foliage, North American native, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers.

### 4.2.413 Liatris scariosa

Devil's Bite

3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Liatris scariosa is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

dwatta Appetizer Diuretic Poultice TonicThe root is appetizer, diuretic and tonic[4, 61, 238, 257]. It is used in the treatment of abdominal complaints, kidney and bladder problems[257]. A poultice made from the powdered roots is applied to snake bites[238] and external inflammations[257].

nrakta South-eastern N. America. ksacta Dry stony soils on prairies and open forest glades[200].

propta Seed - best sown as soon as it is ripe in autumn in a greenhouse[200]. Sow stored seed as soon as possible in the year in a greenhouse. Prick out the seedlings into individual pots when they are large enough to handle and grow the plants on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings taken in spring as growth commences. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer

nwatta Grows well in a moderately good light soil[200]. Tolerates poor soils[200]. Plants are prone to rot overwinter in wet soils[200]. There are several named varieties, selected for their ornamental value[200]. A good bee plant. Rodents are very fond of the tubers so the plants may require some protection[200].

### 4.2.414 Solidago flexicaulis

Zigzag goldenrod

3 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.6 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Solidago flexicaulis is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known

kcakta Leaves used for tea [1-2]. Edible seed [1-2]. No further information available

tcanta A good nurse plant for sites prone to drought. Erosion Control. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2]. The flowerheads are pollinated by many kinds of insects, including long-tongued bees, smalltongued bees, wasps, flies, and butterflies. Several bees are oligoleges of Solidago spp. (Goldenrods). These species include: Andrena hirticincta, Andrena nubecula, Andrena placata, Andrena simplex, Andrena solidaginis, and Colletes simulans armata. Many insects feed on the leaves, flowers, seeds, and roots of goldenrods. These insect feeders include plant bugs, stink bugs, aphids, leaf beetles, and the caterpillars of many moths. These insects are a source of food to many woodland songbirds and some upland gamebirds. White-tailed Deer readily browse on the foliage of Zigzag Goldenrod [1-6]. An interesting goldenrod for shady woodland areas [368-1].

dwatta Many species of Solidago have medicinal qualities although we have been unable to find information on Solidago flexicaulis.

nrakta Native to the eastern and central parts of the United States and Canada, from Nova Scotia west to Ontario and the Dakotas, and south as far as Alabama and Louisiana. ksacta Rich deciduous woods, wooded east and north facing slopes, rocky woods, edges of floodplain forests, shaded calcareous seeps, wooded stream banks, edges of limestone glades and cliffs.

propta Root Division, Seeds. Fresh seed or root division. Seed Collection: Seeds ripen soon after plant blooms.

nwatta A long-lived upright herbaceous perennial in the sunflower family (Compositae/Asteraceae). Prefers average, medium moisture, well-drained soils in full sun to part shade. This is a woodland species that perhaps does best in sundappled part shade, but will also grow in full shade. Established plants tolerate some dry soils [368-1]. Soil Type: Loamy, Silty. Tolerat clay or rocky soils. Soil Moisture: Moderate - mesic or dry soils. Minimum Root Depth: 20cm/8 inches. Root Type: Fibrous Shallow. Yellow flower: adds bright color to woodland gardens in fall. Bloom Time: July to September. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 4.2.415 Adonis vernalis

Pheasant's Eye, Spring pheasant's eye 3 tlin 7 cyuc 0 koak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Adonis vernalis is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

are rooting well. Plant them out in the summer or following spring.

nwatta Prefers a moist humus rich soil and some shade[1, 200]. Succeeds in ordinary garden soil[1]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. There is some confusion over the name of this species, C. foetida (Auct.) is given as a synonym for C. europaea Schipez (said to be native to E. Europe) whilst another authority cites C. europaea as a synonym of C. foetida. It is possible that entries under this species apply also (or instead) to C. europaea[50]. A very attractive plant, but the flowers and the green seed pods have an unusual, slightly unpleasant smell[188] that is reminiscent of decaying fish[245].

### 4.2.315 Lithospermum incisum

Narrow-Leaf Gromwell, Narrowleaf stoneseed 3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Lithospermum incisum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: TeaRoot - cooked[105, 161, 207, 212]. Eaten boiled or roasted[257]. The root has been used to make a tea[257].

tcanta Beads Dye Incense MiscellanyThe dried plant tops have been burnt as an incense[257]. A blue dye has been obtained from the roots[257]. A red dye is obtained from the roots[274]. It is quite possible that both colours can be obtained, depending on the mordant used[K]. The seeds have been used as beads[257].

dwatta Contraceptive Kidney Miscellany Ophthalmic Pectoral StomachicThe root has been chewed by some native North American Indian tribes as a treatment for colds[213]. The finely powdered leaves, root and stem have been rubbed on the body in the treatment of paralyzed limbs[257]. An inusion of the root has been used in the treatment of stomach aches and kidney problems[257]. The plant has been eaten as an oral contraceptive and also as a treatment for lung haemorrhages, coughs and colds[257]. A cold infusion of the pulverized root and seed has been used as an eyewash[257]. This plant was used as a medicine by various native North American Indian tribes and interest in the plant has revived recently as a possible source of modern drugs[212]. No more details are given.

nrakta Central N. America - British Columbia to Manitoba, south to Illinois, Texas and Arizona. ksacta Dry soils of plains, foothills and ridges in mountains to 2100 metres[212].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings. Division.

nwatta Requires a warm sunny position in a moderately fertile well-drained soil[1, 200]. Dislikes acid soils[1]. After producing large, conspicuous flowers in the spring, the plant produces lots of small very fertile cleistogamous flowers[274].

#### 4.2.316 Lithospermum canescens

Paint Indian, Hoary puccoon 3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lithospermum canescens is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: ColouringThe roots have been chewed with gum in order to colour the gum red[257]. The flowers have been chewed with gum in order to colour it yellow[257].

tcanta Dye MiscellanyA red dye is obtained from the root[46, 61, 207].

dwatta MiscellanyA tea made from the leaves is applied externally in the treatment of fevers accompanied by spasms[222].

nrakta Eastern N. America - Ontario to Georgia, west to Saskatchewan and Texas. ksacta Dry or sandy open woods, prairies etc[43].

propta Seed - sow spring in a cold frame. It is best sown in a soilless medium[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings. Division.

nwatta Requires a warm sunny position in a moderately fertile well-drained lime-free sandy soil[1, 200].

### 4.2.317 Mertensia longiflora

Small bluebells

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mertensia longiflora is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

nrakta Western N. America - British Columbia to California. ksacta Open or lightly shaded places in plains and foothills, often with sagebrush or ponderosa pine, occasionally to 1500 metres[60].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division, with care, in early spring or autumn[200].

nwatta Easily grown in an ordinary garden soil with some shade[1, 111].

### 4.2.318 Panax quinquefolius

American Ginseng

3 tlin 7 cyuc 1 kcak 0 tcan 3 dwat 0.3 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Panax quinquefolius is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: TeaA tea is made from the leaves and the roots[105, 177, 183]. The aromatic root is candied and used as a masticatory[183].

dwatta Adaptogen Cardiotonic Demulcent Sedative Sialagogue Stimulant StomachicThis N. American species of ginseng is said to have similar properties to the Oriental ginseng, P. ginseng, though it is said to have a milder action and is more likely to be prescribed for younger patients[238, 254]. It is cultivated in some areas of America as a medicinal crop and is also often harvested from the wild[238]. The root is said to be adaptogen, cardiotonic, demulcent, panacea, sedative, sialagogue, stimulant and stomachic[21, 35, 46, 147, 165, 176, 222]. It is used in the treatment of chronic

cough, low-grade fever, spontaneous or night sweating and fatigue due to chronic consumptive disease[176]. When taken over an extended period it is said to increase mental efficiency and physical performance whilst helping the body adapt to high or low temperatures and stress[222]. Some caution is advised, though, because large doses are said to raise blood pressure[222]. The root is harvested in the autumn and dried for later use[254]. The following notes are the list of uses for P. ginseng. Ginseng has a history of herbal use going back over 5,000 years[238]. It is one of the most highly regarded of herbal medicines in the Orient, where it has gained an almost magical reputation for being able to promote health, general body vigour and also to prolong life[218]. The root is adaptogen, alterative, carminative, demulcent, emetic, expectorant, stimulant and tonic[165, 176, 178, 218]. It both stimulates and relaxes the nervous system, encourages the secretion of hormones, improves stamina, lowers blood sugar and cholesterol levels and increases resistance to disease[238]. It is used internally in the treatment of debility associated with old age or illness, lack of appetite, insomnia, stress, shock and chronic illness[238]. Ginseng is not normally prescribed for pregnant women, or for patients under the age of 40, or those with depression, acute anxiety or acute inflammatory disease[238]. It is normally only taken for a period of 3 weeks[238]. Excess can cause headaches, restlessness, raised blood pressure and other side effects, especially if it is taken with caffeine, alcohol, turnips and bitter or spicy foods[238]. The roots are harvested in the autumn, preferably from plants 6 - 7 years old, and can be used fresh or dried[238]. A dose of 10ug/ml of ginseng saponins has been shown to be significantly radio-protective when it is administered prior to gamma-irradiation[218]. The leaf is emetic and expectorant[218].

nrakta Eastern N. America - Maine to Georgia, west to Oklahoma and Minnesota. ksacta Rich cool woods[43].

propta Seed - sow in a shady position in a cold frame preferably as soon as it is ripe, otherwise as soon as the seed is obtained. It can be very slow and erratic to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a shady position in the greenhouse or frame for at least their first winter. Make sure the pots are deep enough to accommodate the roots. Plant out into their permanent positions in late summer. Division in spring.

nwatta Requires a deep moist humus rich soil in a shady position in a woodland[200]. Requires deep shade, growing well on north-facing slopes and in woodland [4, 14, 20]. Often grown as a medicinal plant[4, 57], though considered to be inferior to Korean ginseng, P. ginseng[200]. It is exported from N. America, mainly to Hong Kong[207]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2].

### 4.2.319 Veronica spuria

bastard speedwell

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Veronica spuria is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - raw or cooked. A famine food, they are only used when all else fails[179].

nrakta S.E. Europe to central Asia. A rare garden escape in Britain[17], ksacta Mountain slopes and steppes around. 1100 metres in NW Xinjiang province, China[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient quantity the seed can be sown outdoors in situ in the autumn or the spring. Division in autumn or spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200].

### 4.2.320 Athyrium niponicum

Painted Fern, Japanese Silver Painted Fern 3 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc pcimhmim cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Athyrium niponicum is a FERN growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: Very young fronds (croziers) - boiled[177]. Some caution is advised. See the notes above on toxicity.

nrakta E. Asia - China, Japan, Korea. ksacta Shaded places in lowland all over Japan [58].

propta Spores - surface sow in a pot of sterile compost in a shady part of the greenhouse and keep moist, this is most easily done by putting the pot in a plastic bag. Pot up small clumps of the plants when they are large enough to handle and keep them moist until they are established. Plant out in late spring of the following year. Division in spring as plants come into growth. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Landscape Uses:Alpine garden, Border, Container, Massing, Rock garden, Woodland garden. An easily grown plant, it is calcifuge and prefers an acid soil with a pH from 4.5 to 6.5, but it tolerates alkaline soils if plenty of leaf mould is added[200]. Grows well in heavy clay soils. Prefers a moist sheltered site with moderately high atmospheric humidity[200]. Succeeds in a semi-shaded bog-garden or in damp woodland, also in garden borders in full or part shade[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive fo-

### 4.2.321 Gaillardia x grandiflora

Blanket flower

3 tlin 10 cyuc 1 kcak 3 tcan 0 dwat 0.3 m hkuc htut cyutli hqatkyuctcup hwicli hyishrasjlut hpa7tli frusflatpriklwisslip hpa7tmwatli hjonli

growing to 0.6 m (2ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers welldrained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known kcakta None Known

tcanta Groundcover: Works well as a groundcover for shaded areas. Grows with a low to medium coverage density, but will guickly take over large areas and isn't advised for small gardens. Wildlife Habitat: ay scented fern provides good cover for wildlife when growing in large colonies. Ornamental: Lacy triangular fronds. Light green during summer turning shades of yellow/copper during autumn. Aromatics/Fragrance: The fronds emit a scent reminiscent of hay or cut grass when they are brushed, bruised, or crushed [318-1]. A good fern for naturalizing in woodland areas, shade gardens, cottage gardens or wild areas [368-1].

nrakta Native to eastern North America, from Newfoundland west to Wisconsin and Arkansas, and south in the Appalachian Mountains to northern Alabama. ksacta Found in forest edges and canopy openings, along the sides of trails and roads, on hillsides, stream banks, and rocky slopes, and in meadows and old fields in part shade to full shade from sea level up to 1,200 m altitude...

propta Propagate by spores or rhizome division. Cut rhizomes between fronds, set apart and trim back at least half of each frond

nwatta A temperate fern. Sun: Partial Shade, Shade. Soil Type: Sandy, Loamy, Silty, Clay. Tolerates a wide range of soils, including poor rocky soils and, once well established, dry soils [368-1]. Soil pH: 4.5 - 6.8. Soil Moisture: Moderate, Dry. Grows best in rich, humus soils. Can tolerate full sun if given enough moisture. Spreads aggressively. One of the first ferns to colonize after fire. Growth Rate: Fast, Life Span: Long-Lived Perennial, Stand Persistence: Long. Form: Clump. Texture: Medium. Root Type: Rhizome. Fungal Types: Endomycorrhizal. Seasonal Interest: Spring-Summer. USDA Hardiness Zones: 3 - 8. Drought: Tolerant. Flood: Moderate. Salt: Moderate. Soil Compaction: Tolerant. Mowing: Intolerant. Fire Damage: Moderate. Cold Injury: Infrequent. Wind Storm Damage: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Animal Damage: Deer, Rabbits [318-1]. In this ecological community, you'll typically see Hay-scented Ferns growing among wildflowers such as goldenrods, hawkweeds, dandelions, Oldfield Cinquefoil. Common Evening Primrose. Field Chickweed. New England Aster, and Oueen Anne's Lace. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 4.2.411 Packera aurea

Golden Groundsel - Life Root, Golden ragwort 3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Packera aurea is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Possible liver damage due to pyrrolizidine alkaloids. Toxic if taken internally (legally restricted in some countries) [301].

dwatta Abortifacient Birthing aid Diaphoretic Diuretic Emmenagoque Pectoral Stimulant Tonic Uterine tonicGolden groundsel is a medicinal plant that is deserving of greater

drutta Dennstaedtia punctilobula is an evergreen Fern attention[4]. This species was widely used by N. American Indians to treat various complaints of the female reproductive system, and also to ease childbirth[238]. Whilst often stated to be completely safe to use, recent research has found that the plant contains pyrrolizidine alkaloids that, in isolation, can cause liver damage and so this remedy can no longer be recommended for internal use[238, 254]. The roots and leaves are abortifacient, diaphoretic, diuretic, emmenagogue, pectoral, stimulant and uterine tonic[4, 46, 165, 207, 222]. It is used externally in the treatment of vaginal discharge[238]. A tea made from the plant was frequently used by the N. American Indians as a remedy for various female troubles, including the pain of childbirth[207, 213]. Pharmacologists have not reported any uterine effects, but the plant does contain an essential oil (inuline) plus the alkaloids senecine and senecionine (which are poisonous to grazing animals)[213]. The plant is harvested before flowering and the roots are harvested in the autumn, both are dried for later use[238].

nrakta Eastern N. America - Newfoundland to Florida, west to Texas. ksacta Rich calcareous woods and bottoms and upland swamps[43]. Damp thickets and prairies[200].

propta Seed - sow spring in a greenhouse. Only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta An easily grown plant, it succeeds in a sunny position in most moderately fertile well-drained soils[200]. Prefers a damp to wet soil and also succeeds in partial shade[238]. Succeeds in the wild garden though it is invasive[200]. This species is cultivated in parts of Russia for use in the pharmaceutical industry[238]. A polymorphic species, there are many named varieties[43]. Senecio aureus L. is a synonym of Packera aurea (L.) Á.Löve and D.Löve For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

### 4.2.412 Liatris spicata

Gayfeather, Dense blazing star, Spiked Blazing Star, Button Snakewot, Gayfeather, Spiked Gayfeather,

3 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Liatris spicata is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in September, and the seeds ripen in October. The species is hermanhrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought.

pcista Although we have no records of toxicity for this plant, one record says that the leaves contain coumarins. These have an anti-clotting effect on the blood and can prevent natural clotting of the blood when there is a cut[K].

tcanta Pot-pourri RepellentThe aromatic leaves and roots are added to pot-pourri[238]. The leaves and the roots are added to various insect-repellent herbal mixtures[238].

dwatta Anodyne Antibacterial Astringent Carminative Diaphoretic Diuretic Emmenagogue Expectorant Stimulant Tonic VDThe leaves and root are anodyne, antibacterial, astringent, carminative, diaphoretic, diuretic, emmenagogue, expectorant, stimulant and tonic[4, 21, 106, 238, 257]. The plant is said to be extremely efficacious when used as a local application in the treatment of sore throats and gonorrhoea[4]. It is also used in treating kidney diseases[238]. The leaves are harvested in the summer, the roots in the autumn. Both can be used fresh or dried[238].

to partial shade and loamy to clay soil. Soil moisture is wet, to moderate and soil pH: 5.8 - 7.0. it is drought intolerant. There are a few distinct subspecies. It can be evergreen or deciduous. Non-mycorrhizal. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length.

#### 4.2.407 Androsace sarmentosa

Rock Iasmine

3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 0.1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli lwisslip hpa7tmwatli xre7t hionli

drutta Androsace sarmentosa is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Can be used as a low-growing ground cover[200]. dwatta ResolventThe entire plant is used in Tibetan medicine, it is said to have a bitter taste and a cooling and coarsening potency[241]. A resolutive, it dries up serous fluids[241]. It is used in the treatment of disorders from tumours, inflammations of fluids and other serous fluid disorders[241].

nrakta E. Asia - Himalayas from Sikkim to Kashmir, ksacta Mixed forests and grassy slopes at elevations of 2800 -4000 metres[266].

propta Seed - requires a period of cold stratification. Where possible, the seed is best sown as soon as it is ripe in a cold frame - all watering should be from the bottom of the pot[200]. The seed can take 2 years to germinate, prick out the seedlings into individual pots as soon as they are large enough to handle and grow on in a partially shaded cold frame[200]. Plant out in late spring or early summer. Division of runners in early summer. Pot them up into a sandy compost and grow them on until they are well-rooted before planting them into their permanent positions[200].

nwatta Requires a very well-drained light or sandy alkaline soil of low nutrient status and with the addition of limestone chippings if necessary[200]. Usually best in full sun, though in hot-summer areas it can be better if given some shade, especially from the hottest sun[200]. Grows well on dry stone walls, or as a low ground cover, and tolerates hot humid summers[200].

### 4.2.408 Woodwardia virginica

Virginia Chain Fern

3 tlin 10 cyuc 0 kcak 3 tcan 0 dwat 0.4 m hkuc hmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Woodwardia virginica is a deciduous Fern growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista None Known

kcakta None Known

tcanta Groundcover. A good high density groundcover that will work in a wet and shady spot. Garden Uses: Shade gardens, native plant gardens, woodland gardens or naturalized areas. Also effective along streams and ponds [368-1]. Provides shelter for frogs, toads, newts.

nrakta Endemic to eastern North America from Florida to Nova Scotia and west to Michigan and Illinois. ksacta Grows in anthropogenic (man-made or disturbed habitats). bogs, marshes, swamps, and wetland margins (New England Wild Flower Society 2011-2015). Wet soils of open wet swampy woods, acid bogs, and along streams and roadside

ditches, avoiding calcareous substrates. An important constituent of the field layer of flatwoods, Atlantic white cedar (Chamaecyparis thyoides) swamp forest and bay (Magnolia virginiana) forests.

propta Propagate by spores or rhizome division.

nwatta A deciduous, perennial, colony-forming, waxy green, deciduous fern. Prefers organically rich, medium to wet, well-drained soils in part shade to full shade. Does well in average garden soils and will take considerable sun as long as soils are kept consistently moist[368-1]. Soil pH: Acidic (pH<6.8). Typically occurs in woodland swamps and bogs. Bloom Time: Non-flowering. Bloom Description: Nonflowering. Can be mistaken for Osmundastrum cinnamomeum (Činnamon Fern). For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

### 4.2.409 Galanthus nivalis

Snowdrop, Common Snowdrop 3 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc hmim cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Galanthus nivalis is a BULB growing to 0.2 m (Oft 8in) by 0.1 m (Oft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from January to June, in flower from February to March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The bulb is somewhat poisonous[100, 200] dwatta EmmenagogueThe plant is emmenagogue[4].

nrakta Europe, including Britain, the Netherlands to the Pyrenees, east to N. Syria, S. E. Russia, W. Asia. ksacta Shady pastures, woods and orchards, usually on damp soils[4, 13, 17]. Probably native in Wales and W. England. but naturalized in other parts of Britain[17].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Sow the seed thinly so that there is no need to thin them. The seed usually germinates in the spring[1]. Grow them on in the same pot in a cold frame for the first two years, giving an occasional liquid feed to ensure the plants do not become nutrient deficient. Pot up the small bulbs whilst they are still in leaf in early summer of their second year's growth, putting about 3 bulbs in each pot. Grow them on in the cold frame for a further year before planting them out into their permanent positions in late spring whilst they are still in growth. The plants take about 4 years to flower from seed[200]. Division of offsets[1, 200]. This is best done immediately after the plants have finished flowering (and still have green leaves) though it can also be done in late summer and early autumn when the plants are dormant[200]. Scoop-

nwatta Landscape Uses:Alpine garden, Border, Container, Foundation, Massing, Rock garden, Woodland garden. Prefers a moist heavy loam[108], growing well in grass or amongst shrubs[1]. Prefers a shady position[28, 31]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°c[214]. A very ornamental plant[1], it grows well on the woodland edge[24]. The bulbs should be planted about 5 - 7cm deep as early in the spring as possible[1]. A good bee plant, providing an early source of pollen and nectar[108]. Special Features:Not North American native, Naturalizing, All or parts of this plant are poisonous. Fragrant flowers.

#### 4.2.410 Dennstaedtia punctilobula

Hay-scented fern

3 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Gaillardia x grandiflora is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Butterflies birds. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The juice, sap, or thorns of these plants may cause a skin rash or irritation.

kcakta Edible Parts: LeavesEdible Uses: Leaf [2-1]. The species Gaillardia pinnatifida dried seeds can be ground into a powder then kneaded into seed butter and spread on bread[257] but no information was found for Gaillardia × grandiflora.

tcanta Containers Cut flowersGround cover for compact cultivars. Compact cultivars include G. x grandiflora "Arizona Sun" with stunning mahogany-red rimmed golden yellows (0.3m 12inches). G. x grandiflora "Mesa Peach" and "Mesa Red" (0.4m, 18 inches). Landscape uses include beds, borders, patios and containers. Locations include rock gardens, cottage garden, meadow, prairie, coastal, cutting garden and food forest. Sometimes grown as an annual. Attractive to butterflies and native bees. Insectory - excellent source of nectar for butterflies. Seeds provide food for birds. Good For Cut Flowers, Good For Containers, Extended Bloom Time (more than 4 weeks)

dwatta The species Gaillardia pinnatifida is known as a diuretic, taken to give relief from painful urination[216, 257]. And an infusion of the leaves is taken internally, and a poultice applied externally, in the treatment of gout[257]. No information could be found on Gaillardia × grandiflora.

nrakta Garden origin, ksacta A hybrid.

propta Seed, basal cuttings, or division. Dividing them in spring or early fall every two to three years will improve

nwatta A short-lived perennial winter hardy to USDA Zones 3 [368-1]. It prefers full sun, sandy, Loamy or Silty soil and moderate to dry soil moisture. Soil pH: 5.5 - 7.9. Gaillardia × grandiflora is drought tolerant but prefers a moist well-drained soil. Performs poorly in unamended heavy clay soils [368-1]. Gaillardia x grandiflora is a tetraploid hybrid resulting from a cross between a 3' tall perennial gaillardia (G. aristata) and a 2' tall annual gaillardia (G. pulchella). It arguably inherited its perennial habit from the former and its long flowering period and rapid growth rate from the latter [368-1]. Flower Color: Orange, Red, Rust, or Yellow. Blooms late spring to fall. Heat zones 1 -8. Plants are so prolific and long blooming that they often exhaust themselves and are then short-lived[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Several cultivars exist, among them 'Arizona sun' and 'Arizona red shades'. Minimum Root Depth: 16 inches. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a 'clumping' habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

#### 4.2.322 Chrysosplenium americanum

Water Mat, American golden saxifrage 3 tlin 7 cyuc 1 kcak 2 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Chrysosplenium americanum is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Edible Uses: CondimentUsed as a spice in salads[177].

tcanta The plants creeping habit makes it a good ground cover for the bog garden[200].

nrakta Central and Western N. America - Quebec to Minnesota, south to Nova Scotia and Montana. ksacta Acid soils[200] in springheads, rills and cold wet places[43]

propta Seed - sow spring or autumn in a lightly shaded position in a cold frame. Stand the pot in 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in light shade in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils if they are moist. Reguires a constantly wet but well-drained soil[200]. Prefers acid soils[200]. Prefers a shady position, succeeding in woodland. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

### 4.2.323 Panax trifolius

Ground Nut, Dwarf ginseng 3 tlin 7 cvuc 1 kcak 0 tcan 2 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Panax trifolius is a PERENNIAL growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from April to June, in flower in April. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[57. 63]. A very palatable taste after being boiled[183]. When cold it has a taste somewhat like nuts[183].

dwatta MiscellanyAlthough closely related to the wellknown herbal medicine ginseng, this species has been little researched for its medicinal virtues[222]. A tea made from the whole plant has been used in the treatment of colic, indigestion, gout, hepatitis etc[222]. The root is analgesic[257]. It has been chewed as a treatment for headache, short breath, fainting and nervous debility[222, 257].

nrakta Eastern N. America - Nova Scotia to Pennsylvania, west to Georgia, Indiana, Iowa and Minnesota. ksacta Rich woods and damp clearings[43].

propta Seed - sow in a shady position in a cold frame preferably as soon as it is ripe, otherwise as soon as the seed is obtained. It can be very slow and erratic to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a shady position in the greenhouse or frame for at least their first winter. Make sure the pots are deep enough to accommodate the roots. Plant out into their permanent positions in late summer. Division in spring.

nwatta Requires a moist humus-rich soil in a shady position in a woodland[1, 200]. The plant has leaves above the ground for only two months each year[222]. Although plants are hermaphrodite, individual flowers are often male[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

### 4.2.324 Dryopteris fragrans

Fragrant Woodfern

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc

hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Dryopteris fragrans is an evergreen Fern growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caution is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B. though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised.

kcakta Edible Parts: Edible Uses: TeaThe leaves are made into a tea[177, 183].

tcanta BeddingThe plant has been used as a bedding[257].

nrakta N. Europe. N. Asia. N. America. ksacta Rocks and screes in Arctic Finland[50]. Shaded cliffs and talus, often of limestone at elevations of 50 -1800 metres in northern N. America[270].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at 20°c. Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers an acid soil[200], requiring a welldrained gritty soil in a sunny or shady position[200]. Dislikes heavy clay. Prefers a good supply of water at its roots but succeeds in dry shade and tolerates drought when it is established. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1].

### 4.2.325 Liatris punctata

Snakeroot, Dotted blazing star, Mexican blazing star, Nebraska blazing star

3 tlin 7 cvuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Liatris punctata is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[46, 61, 105, 161, 212, 257]. A sweet flavour when harvested in the spring and baked[257]. Eating the root is said to improve the appetite[257].

dwatta Antipruritic Diuretic Poultice StomachicAn infusion of the roots has been used in the treatment of stomach aches, bloody urine and women's bladder complaints[257]. The root has been chewed and the juice swallowed in the treatment of swollen testes[257]. A decoction of the roots is used as a wash for itching skin complaints[238, 257]. A poultice of the boiled roots is applied to swellings[257].

nrakta Eastern N. America - Alberta to New Mexico and Texas, east to Minnesota and Nebraska.. ksacta Dry prairies and plains[43].

propta Seed - best sown as soon as it is ripe in autumn in a greenhouse[200]. Sow stored seed as soon as possible in the year in a greenhouse. Prick out the seedlings into individual pots when they are large enough to handle and grow the plants on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings taken in spring as growth commences. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Grows well in a moderately good light soil[200]. Tolerates poor soils[200]. Plants are prone to rot overwinter in wet soils[200]. A good bee plant. Rodents are very fond of the tubers so the plants may require some protection[200].

### 4.2.326 Calochortus elegans

Star Tulip, Elegant mariposa lily 3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calochortus elegans is a BULB growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[2, 46, 61, 105, 161].

nrakta South-western N. America - Oregon, Idaho, Montana and Washington. ksacta Grassy hillsides and open coniferous woods at elevations of 1500 - 2500 metres[60, 270].

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 -6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth [138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. The bulbs can be planted straight out into their permanent positions but in areas with wet winters it might be best to store them overwinter and replant them in the spring. Stem bulbils, harvested from the stems after flowering. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandv soil in a warm sunny position and must be kept dry from mid summer to late autumn[1, 42, 200]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter[1, 42]. It is easiest to grow in a bulb frame but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in spring[138]. The bulbs must be replanted immediately according to another report[1]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. This species is closely related to C. tolmiei[200]. Hand pollination is necessary if seed is required[1].

### 4.2.327 Marrubium vulgare

White Horehound, Horehound 3 tlin 7 cyuc 1 kcak 3 tcan 3 dwat 0.5 m hkuc moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material [200]. Not as invasive as other Symphytum species. The root system is very deep and difficult to eradicate, even small fragments of root left in the soil can produce new plants. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30?C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2]. This plant is the ornamental variety and so often mistaken for Common Comfrey it has the same distinct leaf continuation down the stem but is softer and more esthetically pleasing than Common Comfrey (Symphytum officinal).

### 4.2.404 Potentilla norvegica

Norwegian Cinquefoil 3 tlin 7 cvuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla norvegica is a ANNUAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

dwatta The root is astringent. A decoction of the root has been gargled, or the root has been chewed, in the treatment of sore throats[257]. A cold infusion of the whole plant has been used to relieve pain[257]. The plant has been burnt and the fumes used to treat sexual infections[257]. All the above uses are recorded for the sub-species P. norvegical monspeliensis. (L.)Aschers. and Graebn.[257].

nrakta Northern Temperate zones, through Asia, Europe to N. America. Naturalized in Britain[17]. ksacta Waste ground, southwards from Inverness but mainly in southeastern England[17]

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to not up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. An annual, biennial or short-lived perennial plant[17]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 4.2.405 Fritillaria pallidiflora

Pale-Flowered Fritillary 3 tlin 7 cyuc 0 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Fritillaria pallidiflora is a BULB growing to 0.6 m (2ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antispasmodic Antitussive Expectorant Febrifuge PectoralThe bulbs are antitussive, expectorant, febrifuge and pectoral[91, 176, 238]. They contain fritimine which lowers blood pressure, diminishes excitability of respiratory centres, paralyses voluntary movement and counters effects of opium[61, 238]. An infusion of the dried powdered bulb is used internally in the treatment of coughs, bronchitis, pneumonia, feverish illnesses, abscesses etc[238]. The bulbs also have a folk history of use against cancer of the breast and lungs in China[218, 238]. This remedy should only be used under the supervision of a qualified practitioner, excessive doses can cause breathing difficulties and heart failure[238]. The bulbs are harvested in the winter whilst they are dormant and are dried for later use[238].

nrakta E. Asia - China to E. Siberia. ksacta Alpine meadows, woods and scrub[244]. Slopes in the sub-alpine zone[74]. Forests, thickets, meadows, grassy slopes, mountain steppes, 1300 - 2500 metres in NW Xinjiang, China[266].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta One of the best species in this genus for growing outdoors in Britain[90], it is easily grown in a moderately fertile well-drained soil so long as it is not allowed to dry out[42. 200]. Prefers a rich peaty soil in semi-shade[90]. Another report says that it succeeds outdoors when grown in a bed of river sand and leafmould about 60cm deep[1]. A very ornamental plant[1]. Cultivated for medicinal use in China[266].

### 4.2.406 Carex sylvatica

Wood sedge

3 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcuphia7n hwicli ilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Carex sylvatica is an evergreen Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Wind, Insects. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista None Known

tcanta InsulationA good evergreen ground cover supplying winter interest. Can be used on slope or Banks. Good in containers. Can make a good edging plant. Deer resistant and shade tolerant. Recommended as a groundcover under trees and shrubs. Wildlife Habitat - provides cover for small wildlife. Fiber. C. sylvatica was used as wadding in order to retain heat by Laplanders (English Botany, Sowerby and Smith, 1802). Ornamental [318-1].

dwatta None Known

nrakta Europe, Asia, and far east to Iran.Introduced to North America, and New Zealand. ksacta Deciduous woodlands on heavy soils; Sometimes found in unwooded areas.

propta Propagate by plant division in spring or seeding

nwatta C. sylvatica is a clump-forming, log-lived, evergreen to semi-evergreen perennial 0.15m to 0.6m (6 inches - 24 inches) high and a spread of 0.15m to 0.6m (6 inches -24 inches). It has a moderate Growth Rate. It prefers sun sible[1], it usually germinates in the autumn to spring. Seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species produces flowering plants in 2 - 3 years from seed[200]. Division after flowering or in autumn. Take care since the plant resents disturbance[111, 2001.

nwatta Cultivation of this plant is not always easy, it prefers a rich limy soil in partial shade[187]. Succeeds in any good garden soil[1], growing and flowering best in a moist well-drained rich loam in a sheltered position in partial shade[1, 4, 31, 111, 244]. Succeeds when grown in the shade of a north-facing wall[233]. Does not object to lime[1]. Grows well in heavy clay soils [200]. Dislikes drought. Slugs are very fond of this plant and it will probably require some protection from them[187]. The various species in this genus hybridize freely[95]. Plants can flower in three years from seed[4]. A very ornamental plant, there are many named varieties[187]. Plants resent root disturbance and are slow to re-establish when divided[244]. They are best left undisturbed for 6 - 7 years before being divided[244]. Seedling plants should be placed in their permanent positions whilst still small[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 4.2.402 Anemone canadensis

Canadian Anemone

3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anemone canadensis is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (Ift in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is poliniated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

dwatta Anthelmintic Antiaphonic Antiseptic Astringent Ophthalmic StypticThe roots and leaves are astringent and styptic[222]. The root and leaves of this plant was one of the most highly esteemed medicines of the Omaha and Ponca Indians[207]. A decoction of the root was used as an anthelmintic and to treat pain in the lumbar region[257]. An infusion of the root was used as an eye wash to treat crossed eyes, twitches and eye poisoning[257]. A wash of the pounded boiled root or of the leaves was applied externally to wounds, nosebleeds, sores etc[213, 222, 257]. The root contains anemonin, which is said to be a potent antiseptic[213]. A tea of the roots was used in the treatment of headaches and dizziness[213]. The root was eaten to clear the throat so that a person could sing well[257].

nrakta Eastern and Central N. America from Labrador to Massachusetts, Illinois and Colorado. ksacta Damp thickets, meadows, wet prairies, lake shores, streamsides, clearings and occasionally swampy areas at elevations from 200 - 2800 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1- 6 months at  $15^{\circ} \text{c}[133]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down.

nwatta Landscape Uses:Border, Woodland garden. Succeeds in ordinary garden soil but prefers a well-drained woodland soil and some shade[200]. An easily grown plant, preferring a sunny position[233]. Plants succeed in maritime gardens[233]. Hardy to at least -20°c[187]. This species is closely related to A. virginiana[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. A good woodland plant[1, 187]. Special Features:North American native, Naturalizing, Suitable for cut flowers.

### 4.2.403 Symphytum orientale

White comfrey

3 tlin 9 cyuc Ó kcak 3 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Symphytum orientale is a deciduous Perennial growing to 0.8 m (2ft 6in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista This plant contains small quantities of a toxic al-kaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used. Use topically on unbroken skin. May cause loss of appetite, abdominal pain, vomiting. Do not use with Eucalyptus. Do not combine with herbs containing pyrrolizidine alkaloids (e.g. acrimony, alpine ragwort, help, tansy ragwort) [301].

kcakta None Known. Other species in this family have some edible uses but we could find no information for Symphytum orientale.

tcanta The plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap[26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun[100]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Landscape Uses: Border, Ground cover, Specimen. One of the more attractive comfreys. A good bee plant.

dwatta None Known. Other species in this family have good medicinal properties but we could find no information for Symphytum orientale

nrakta Native to: Lebanon-Syria, Turkey, Turkey-in-Europe, Ukraine. Introduced into: Slovakia, Czech Republic, France, Great Britain, Italy. ksacta Hedgerows and copses, on lane sides, by roads and railways, on waste ground. It is often naturalised, and sometimes regenerates from seed.

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta A clump-forming, hairy, herbaceous to semievergreen perennial. Bell-shaped, white flowers in early summer. Tolerates most soils and situations but prefers a htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Marrubium vulgare is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to November, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcistă Heart rhythm, blood pressure, and blood glucose levels affected by large doses. Avoid during pregnancy and breast feeding. Diabetes mellitus patients on allopathic medication to lower blood sugar should avoid [301].

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves are used as a seasoning[27]. Bitter and pungent, they are sometimes used to flavour herb beer or liqueurs[4, 183]. Horehound ale is a fairly well-known drink made from the leaves[4, 238]. A mild pleasantly flavoured tea is made from the fresh or dried leaves[183], it is a favourite cough remedy[4, 46].

tcanta Companion Essential RepellentAn essential oil is obtained from the plant and used as a flavouring in liqueurs[46]. The plant has been used as a cure for cankerworm in trees[238]. No more details are given but it is probably a strong infusion of the flowering shoots, or the essential oil, that is used[K]. The growing plant repels flies[201].

dwatta Antidiarrhoeal Antidote Antiflatulent Antiseptic Antispasmodic Appetizer Cholagogue Diaphoretic Digestive Diuretic Emmenagogue Expectorant Hepatic Stimulant TB TonicWhite horehound is a well-known and popular herbal medicine that is often used as a domestic remedy for coughs, colds, wheeziness etc[4, 254]. The herb apparently causes the secretion of a more fluid mucous, readily cleared by coughing[254]. The leaves and young flowering stems are antiseptic, antispasmodic, cholagogue, diaphoretic, digestive, diuretic, emmenagogue, strongly expectorant, hepatic, stimulant and tonic[4, 7, 9, 21, 165, 238]. Horehound is a very valuable pectoral, expectorant and tonic that can be safely used by children as well as adults[4]. It is often made into a syrup or candy in order to disquise its very bitter flavour, though it can also be taken as a tea[4]. As a bitter tonic, it increases the appetite and supports the function of the stomach[254]. It can also act to normalize heart rhythm[254]. The plant is harvested as it comes into flower and can be used fresh or dried[238]. The root is a remedy for the bite of rattlesnakes, it is used in equal portions with Plantago lanceolata or P. major[207]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Marrubium vulgare for dyspepsia, loss of appetite (see [302] for critics of commission E).

nrakta Europe, including Britain, south and east to N. Africa, the Azores, central and western Asia. ksacta Downs, waste places and roadsides southwards from central Scotland, though perhaps only native near the south coast of England[17]

propta Seed - sow April/May or August/September in a cold frame. Germination can be slow and erratic(200). Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the following spring[K]. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta White horehound is an easily grown plant that succeeds in most well-drained soils[200], though it flourishes best in a poor dry soil[1, 4]. Another report says that the plant flourishes best where there is plenty of nitrogen in the soil[274]. It prefers neutral to alkaline soil conditions[238] and requires a warm sunny position if it is to do well[14]. Often grown in the herb garden and sometimes cultivated commercially as a medicinal herb[4, 61]. If the plant is cut back after flowering it will normally produce a second crop of leaves[238]. The fresh leaves have a pronounced musky

smell, though this is lost once the plant is dried[245]. A good bee plant[1]. White horehound is a good companion plant for growing near tomatoes[24]. The tomatoes crop for a longer period and also produce a heavier crop[201]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-11].

#### 4.2.328 Calochortus barbatus

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Calochortus barbatus is a BULB growing to 0.6 m (2ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[92, 161].

nrakta South-western N. America - Mexico ksacta Grassland, open oak and pine woods below 2,500 metres[260].

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 -6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside. Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. The bulbs can be planted straight out into their permanent positions but in areas with wet winters it might be best to store them overwinter and replant them in the spring. Stem bulbils, harvested from the stems after flowering. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a sunny position and must be kept dry over winter[1, 200]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter. It is easiest to grow in a bulb frame but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. It should not be crowded by other plants[214]. This species does well in a cold frame with the cover removed from March to October, it has been known to self-sow in such a situation[214]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in spring[133]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. Hand pollination is necessary if seed is required[1].

### 4.2.329 Pedicularis canadensis

Common Lousewort

3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pedicularis canadensis is a PERENNIAL growing to  $0.4 \,\mathrm{m}$  (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant is said to be poisonous to sheep[274]. kcakta Edible Parts: LeavesEdible Uses: Leaves cooked[105, 161, 177, 257].

dwatta Antitumor Aphrodisiac Blood tonic Cardiac Poultice StomachicThe roots are blood tonic, cardiac and stomachic[257]. A tea is used in the treatment of stomach aches, ulcers, diarrhoea, anaemia and heart troubles[222, 257]. A poultice of the root is applied to swellings, sore muscles and tumours[218, 257]. The finely grated roots were secretly added to food as an alleged aphrodisiac[222]. An infusion of the leaves has been used to procure an abortion[257]. An infusion of the fresh or dried leaves has been used to treat a sore throat[257].

nrakta Eastern N. America - Nova Scotia to Manitoba, south to northern Mexico and east to Florida. ksacta Dry woods, thickets and clearings[43, 235].

propta Seed - sow in pots of turf collected from the proximity of wild colonies or sow directly onto the sites where the plants are to remain[200]. Division of established plants might be possible in the spring. Establish the divisions near the parent plants[200]

nwatta A semi-parasitic plant, growing on grass roots. Rather difficult to establish in cultivation, it is best grown in conditions that approximate to its native habitat[200]. It requires a moist peaty soil and the presence of host grasses[1]. The plant is said to parasitize at least 80 different species in 35 different genera[274]. Requires a partially shaded to sunny site in a well-drained gritty but moist soil[200].

### 4.2.330 Geum aleppicum

Yellow Avens

3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geum aleppicum is a PERENNIAL growing to  $0.6\,\mathrm{m}$  (2ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[46, 177]. Used in spring.

dwatta Anodyne Astringent Diaphoretic Febrifuge SkinThe plant is anodyne[218]. It is used in the treatment of sores, wounds and skin diseases[218]. The root is astringent, diaphoretic and febrifuge[257]. A decoction has been used in the treatment of diarrhoea, fevers, children's coughs, sore teeth and sore throats[257].

nrakta Europe, Asia, N. America. ksacta Thickets and grassy places in lowland and low mountains of N. Japan[58].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Prefers a soil rich in organic matter[200]. Hybridizes freely with other members of this genus[200].

### 4.2.331 Convallaria keiskei

Lily Of The Valley

3 tlin 7 cyuc 1 koak 0 tcan 0 dwat 0.3 m hkuc pcimhmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Convallaria keiskei is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic

(mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista All parts of the plant are poisonous[7, 10, 19]. However, the toxic principle is very poorly absorbed when taken orally so poisoning is unlikely to occur[65].

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaThe whole plant is cooked as a potherb or put in miso soup[177, 183]. Caution is advised, see the notes above on toxicity. The flowers and flower buds are preserved in salt or mixed with leaf tea and drunk[177, 183].

tcanta Plants can be grown as a ground cover in woodland shade or in a shrubbery[200].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Highlands and mountain meadows all over Japan[58].

propta Seed - best sown as soon as it is ripe, therwise in late winter, in a cold frame[164]. Germination, particularly of stored seed can be very slow, taking 2 - 12 months or more at 15°c[164]. Sow the seed thinly so that the seedlings can be allowed to grow on undisturbed in the pot for their first year. Apply a liquid feed during the growing season to ensure that the seedlings are well fed. Divide the young plants into individual pots when they die down in late summer and grow them on in pots in a shady position in a cold frame for at least another year before planting them out into their permanent positions when they are dormant[K]. Division in September[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in almost any situation, including the dense dry shade of large trees[1, 24]. Prefers a position in semi-shade in a moderately fertile well-drained moist woodland soil[200]. Grows well in heavy clay soils. Plants are hardy to -20°c or lower[200]. A good bee plant[4]. A very ornamental plant, though it can become very invasive once it is established[200]. Plants seem to be immune to the predations of rabbits[333].

### 4.2.332 Muscari botryoides

Italian Grape Hyacinth, Common grape hyacinth, White Grape Hyacinth

3 tiin 8 cyuc 1 kcak 2 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Muscari botryoides is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: The flowers and flower buds can be pickled in vinegar[183].

tcanta Landscape Uses: Border, Container, Massing, Rock garden, Specimen, forest garden.

nrakta C. and S.E. Europe. ksacta Meadows, thickets and roadsides in Eastern N. America, where it is a garden escape[235].

propta Seed - best sown as soon as ripe in a greenhouse[200]. The seed can also be sown in early spring in a greenhouse. A good proportion of the seed usually germinates within 2 - 3 months. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first year of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in late summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of offsets in July/August after the leaves die down[1]. It can be done every other year if a quick increase is required[1]. Larger bulbs can be replanted direct into their permanent. positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out when they are dormant in late summer.

the following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta Europe - Spain to Yugoslavia. ksacta Dry turf and pastures, rubble and scree slopes, occasionally in alpine woods. Usually found in acid soils, though sometimes also found on chalky limestone or sandstone(239).

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in early summer after the plant has flowered[239]. Dig up the entire plant, divide it into 2 -3 fair-sized clumps with a spade or knife, and replant immediately[239]. Cuttings of basal shoots in late spring or early summer[238, 239]. It is best to pot them up in a cold frame until well rooted, and then plant them out into their permanent positions.

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This is an easily grown species, succeeding in most good garden soils, though it prefers a light loamy soil and limefree conditions[187, 200, 239]. It grows well in a pocket of soil amongst paving stones, so long as there is a gritty substrate[200]. Plants dislike growing under the drip from trees[200]. A very ornamental plant, there are many named varieties[200]. It is a rare and protected species in the wild[7]. Plants are intolerant of root disturbance[200].

### 4.2.400 Potentilla simplex

Old Field Cinquefoil, Common cinquefoil 3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla simplex is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August. The species is hermaphrodite (has both male and female or-

gans) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

dwatta Antiseptic Astringent DysenteryThe plant is mildly astringent and antiseptic[207]. A decoction is used as a gargle for loose teeth and spongy gums[207, 257]. An infusion of the roots has been used in the treatment of dysentery[257].

nrakta Eastern and Central N. America - Nova Scotia to North Carolina, Alabama, Minnesota and Missouri. ksacta Locally common in dry open woods, prairie hillsides, roadsides. old fields and waste places[2281.

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Plants grown in rich soils produce more foliage at the expense of flowering[200]. Hardy to about -25°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 4.2.401 Helleborus niger

Black Hellebore

3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Helleborus niger is an evergreen Perennial growing to  $0.3 \,\mathrm{m}$  (1ft) by  $0.3 \,\mathrm{m}$  (1ft in). See above for USDA hardness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower from January to February, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is polliniated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are poisonous[9, 10, 65], this poison can possibly be absorbed through the skin[76]. The fresh root can be a violent irritant to sensitive skin[244].

tcanta Miscellany ParasiticideUsed as a parasiticide against body lice, fleas etc[76]. This use is somewhat dangerous, see the notes above on toxicity. The powdered root has been used as a snuff[245]. Plants are suitable for ground cover when spaced about 45cm apart each way[208].

dwatta Anthelmintic Antiemetic Cardiac Cathartic Diuretic Emetic Emmenagogue Homeopathy Irritant Miscellany Narcotic Parasiticide PurgativeBlack hellebore is a very poisonous plant that is toxic when taken in all but the smallest doses. As such it should not be taken except under professional supervision. The plant contains cardiac glycosides which have a similar action to the foxglove (Digitalis spp) and it has been used as a heart stimulant for the elderly, though this treatment is no longer recommended[254]. The root is anthelmintic, cardiac, cathartic, diuretic, emetic, emmenagoque, irritant, violently narcotic and a drastic purgative[4]. 9, 21, 46, 240]. It is harvested in the autumn and dried for later use[4]. It has been used in the treatment of dropsy, amenorrhoea, nervous disorders and hysteria, but it is very poisonous and great care must be taken over the dosage[4]. The root is also applied externally as a local irritant[4], but even this should be done with care, see notes above on toxicity. A homeopathic remedy is made from the roots[9]. It is used in the treatment of headaches, psychic disorders, enteritis and spasms[9]

nrakta S.E. and C. Europe. ksacta Woods and thickets, mainly in mountains, on calcareous soils[50, 187]. Sometimes also found in grassland[187].

propta Seed - best sown as soon as it is ripe in a cold frame[1, 134]. Sow stored seed as early in the year as pos-

ous forests, open pine or spruce woodlands, swales, stream banks and swamps from sea level to 3500 metres[270].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame or outdoors in a moist shaded seedbed[200]. The seed has a limited viability[200], it can also be sown in spring in a cold frame but germination rates may be poor. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in late spring or early summer of the following year. Division in March or October.

nwatta Tolerates most conditions[233], but prefers a humus-rich moist soil in light shade[200, 233] doing well amongst shrubs and in light woods[1]. Also succeeds in denser shade[187]. Plants are hardy to at least -20°c[187]. A very ornamental plant[1]. Actaea rubra is part of a circumboreal complex and is very similar to the black-fruited European species A. spicata (L.) with which it is sometimes considered conspecific[270]. The western North American plants of A rubra have been called A . arguta and were distinguished on the basis of their smaller berries, more pubescent leaves, and narrow, more dissected leaflets. Those distinctions, however, are weak; specimens from the West often have fruits and leaves similar to those of plants from the East[270]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 4.2.397 Adonis amurensis

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Adonis amurensis is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from February to March, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this plant, it belongs to a genus that contains a number of poisonous plants so the following remarks are likely to apply to this species - a toxic principle is present in very small quantities in the plant. It is poorly absorbed so poisoning is unlikely.

dwatta Cardiotonic Diuretic SedativeThe root is cardiotonic[174, 218]. The whole plant is an effective diuretic and tranquilliser[218].

nrakta E. Asia - Siberia to China, Japan and Korea. ksacta Found in mountains[174]. Forests and grassy slopes in E Heilongjiang, Jilin and Liaoning provinces, China[266].

propta Seed - best sown in a cold frame as soon as it is ripe or else it can be slow to germinate[1]. Sow the seed in partial shade in rich soil in September or March[111]. When large enough to handle, prick the seedlings out into individual pots and grow the plants on for their first winter in a cold frame. Plant out in late spring or early summer. Division in early spring or in autumn. The divisions can be difficult to establish[200], so it is probably best to pot them up first and keep them in a cold frame or greenhouse until they are growing away actively.

nwatta Grows well in ordinary garden soil and in the light shade of shrubs[1, 111]. Prefers a sunny position and a humus-rich soil[111]. Prefers a moist well-drained soil in sun or semi-shade[200]. A very ornamental plant[1]. A greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Plants take about 4 years from seed to flowering[111].

## 4.2.398 Arnica angustifolia alpina

Mountain Tobacco

3 tlin 7 cyuc 0 koak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Arnica angustifolia alpina is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both

male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neural and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is toxic and should only be used for external applications to unbroken skin[172].

tcanta HairThis plant is used as a hair conditioner[172]. No further details are given.

dwatta Antiecchymotic Antiphlogistic Epilepsy Nervine Sternutatory VulneraryThe whole flowering plant is antiecchymotic, antiphlogistic, nervine, sternutatory and vulnerary[172]. This species is closely related to A. montana and is included in that species by some botanists. The medicinal uses of that plant are as follows:- Arnica has a long history of herbal use, especially as an external treatment for bruises and sprains[232, 238] - it is an ingredient of a number of proprietary preparations[238]. Internally, it has been used in the treatment of heart complaints and as a booster for the immune system[238]. Arnica increases local blood supply and accelerates healing, it is anti-inflammatory and increases the rate of absorption of internal bleeding[254]. Generally the plant is nowadays only recommended for internal use as a homeopathic medicine, principally for treating shock, injury and pain[254]. If used as a decoction or tincture it stimulates the circulation and is valuable in the treatment of angina and a weak or failing heart, but it can be toxic even at quite low doses and so is rarely used this way[254]. The flowers are the part most commonly used[4, 232], they are harvested when fully open and dried - the receptacles are sometimes removed since these are liable to be attacked by insects[4]. The root is also used, it is harvested after the leaves have died down in the autumn and dried for later use[4]. The whole plant is antiecchymotic, antiphlogistic, nervine, sternutatory, vulnerary[4, 7, 9, 46, 165]. Although a very valuable remedy, it should be used with caution. It has been known to cause contact dermatitis when used externally and collapse when taken internally [238]. Only take it internally under the supervision of a qualified practitioner. The freshly crushed flowers cause sneezing if inhaled[232]. The leaves have also been smoked as a tobacco[232], though it is unclear whether this was for medicinal reasons The whole plant, harvested when in flower, is used in homeopathic remedies[232]. It is especially useful in the treatment of traumatic injuries, sores and bruises[232]. The homeopathic dose has also been used effectively in the treatment of epilepsy and seasickness, and it might be of use as a hair growth stimulant[268].

nrakta N. Europe. N. Asia and Northern N. America. ksacta Pasture and open woodland on neutral to calcareous soils[200]. Bare rocky alpine slopes and summits[60].

propta Seed - sow early spring in a cold frame[200]. Only just cover the seed and make sure that the compost does not dry out. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Prefers a moist, well-drained humus rich soil, preferably lime-free [200]. This species is more lime tolerant than other members of the genus [200]. Prefers a mixture of sand, loam and peat [1]. Closely related to A. montana [268].

## 4.2.399 Gentiana acaulis

entiar

3 tlin 7 cyuc 0 kcak 0 tcan 3 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Gentiana acaulis is a PERENNIAL growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Anthelmintic Antiinflammatory Antiseptic Bitter Cholagogue Emmenagogue Febrifuge Refrigerant Skin Stomachic TonicAn infusion of the whole plant is used externally to lighten freckles[7]. This species is one of several species that are the source of the medicinal gentian root[4], nwatta A very easily grown plant[200], it prefers a rich open well-drained soil[1] but succeeds in any soil and situation[1, 42, 90]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°c[214]. Does very well in short grass[1], increasing freely and it can become invasive[200]. There are some named forms, selected for their ornamental value[200]. The flowers have a scent that resembles the honey-musk scent of buddleia[245]. Special Features:Attractive foliage, Naturalizing, Fragrant flowers.

## 4.2.333 Eriogonum corymbosum

Crispleaf Buckwheat, Las Vegas wild buckwheat 3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eriogonum corymbosum is an evergreen Shrub growing to 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems - cooked[46, 61, 161]. The leaves can be boiled, mixed with water and cornmeal and baked into a bread[257]. The stems are boiled, pressed into cakes then dried and eaten with salt[270].

dwatta A decoction of the leaves, taken three times a day, is a remedy for headache[257]. The var glutinosum was most probably used[270]. This variety was also used as a treatment for TB, or at least to treat coughs[270].

nrakta Western N. America - Nebraska and Kansas to New Mexico, Utah and Arizona. ksacta Sandy to gravelly or clayey flats, washes, slopes, outcrops, and cliffs, saltbush, blackbrush, and sagebrush communities, pinyon-juniper and montane conifer woodlands; 1200-2700 metres[270].

propta Seed - best sown as soon as it is ripe in the autumn in a sandy compost in a greenhouse. Sow stored seed in early spring in a warm greenhouse[1]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Division in early spring[1]. This has to be done with care because the plant resents root disturbance[200]. Try to obtain divisions from around the edges of the plants without digging up the whole clump. Tease the divisions out with as much root on them as possible and pot them up. Grow them on in light shade in the greenhouse until they are rooting well and plant them out in the summer. Cuttings of greenwood with a heel in the summer[200]. Cuttings of almost ripe shoots with a heel, July/August in a frame.

nwatta Requires a loose lean gritty well-drained soil in a very sunny position[200]. Succeeds in dry soils. Tolerates exposed positions[200]. Requires some protection from winter wet[1]. A very variable species, it has been divided into a number of distinct varieties[270]. Established plants resent root disturbance[200], though small plants can be moved successfully[270]. A slow growing plant[270]. A good bee plant[94].

## 4.2.334 Geranium erianthum

Wooly Geranium

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geranium erianthum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked. Not choice [172]. Flowers - raw [172].

dwatta Astringent Salve StypticThe whole plant, but especially the roots, is astringent, salve and styptic. It can be used as a gargle for sore throats[172].

nrakta North-western N. America to E. Asia. ksacta Subalpine meadows and scrub, also on grassy slopes near the sea[187]. Woods and meadows from low elevations to fairly high elevations in the mountains[204].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a range of soil types[200]. Plants are hardy to about -20°c[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

## 4.2.335 Dicentra spectabilis

Bleeding Heart, Japanese Bleeding Heart, Common Bleeding Heart

3 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dicentra spectabilis is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant is potentially poisonous and can also cause skin rashes[222].

kcakta Edible Parts: LeavesEdible Uses: Young leaves in spring - cooked[105, 177].

nrakta E. Asia - N. China, Japan, Korea and Siberia. Locally naturalized in Europe[50]. ksacta Woods and deep shady valleys[187].

propta Seed - best sown as soon as it is ripe in a cold frame[134]. Stored seed should be sown in early spring[175]. Germination usually takes place within 1 - 6 months at 15°c[175]. Two weeks warm stratification at 18°c followed by six weeks at 2°c can shorten up the germination time[134]. Prick out the plants into individual pots as soon as they are large enough to handle, grow them on for their first winter in a cold frame and plant them out into their permanent positions in late spring. Division in early spring[200]. Care must be taken since the plant strongly resents root disturbance[200]. Division is best carried out in late winter[188]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings 7 - 10cm long in sandy soil in a cold frame[200].

nwatta Landscape Uses:Border, Container, Foundation, Specimen, Woodland garden. Easily grown in a rich light soil[1]. Grows best in a light but good woodland soil, preferably not limy[208]. Prefers light shade and some shelter from winds[175]. Tolerates a sunny position if it is growing in a moist border but once planted the plant should not be disturbed since the roots are brittle[200]. A very ornamental plant[1], it is hardy to at least -20°c[187]. The seed is difficult to harvest, it ripens and is shed very quickly[134]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attracts birds, Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous.

## 4.2.336 Bromus thominii

Soft Brome

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Bromus thominii is a BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Seed - cooked[257]. The seed can be dried, ground into a powder then mixed with water and eaten as a gruel[257]. The seed is small and fiddly to utilize[K].

nrakta W. Europe, from Britain and France to Scandanavia. ksacta Meadows, waste places, and on dunes, shingle banks and cliffs, mainly in southern Britain[17].

propta Seed - sow spring or autumn in situ and only just cover. Germination should take place within 2 weeks. If seed is in short supply it can be surface sown in a cold frame in early spring. When large enough to handle, prick out the seedlings into individual pots and plant them out in early summer. Division in spring. Large clumps can be planted out direct into their permanent positions whilst it is best to pot up smaller clumps and grow them on in a cold frame until they are ready to be planted out

nwatta Succeeds in a sunny position in most welldrained soils[138, 200]. The plant produces open, wind pollinated flowers and also cleistogamous flowers - these do not open and are self-fertilized[17]. The report regarding edibility in [257] refers to B. hordaceus L. [17] gives this species as a synonym for B. thomasii, but only the section Holmberg.

## 4.2.337 Athyrium filix

Lady Fern, Common ladyfern, Subarctic ladyfern, Asplenium ladyfern, Southern Lady Fern, Tatting Fer

3 tlin 8 cyuc 1 kcak 2 tcan 2 dwat 0.6 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli hionli

drutta Athyrium filix-femina is a deciduous Fern growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. The seeds ripen from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semishade (light woodland). It prefers moist soil.

pcista The fresh shoots contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. Although we have found no reports for this species, a number of ferns also contain carcinogens so some caution is advisable[200].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots, harvested before they have fully unfolded, can be eaten cooked[256]. They must not be eaten raw - see the notes above on toxicity[172]. Used in spring, they are a bitter emergency food[172]. Rhizome - peeled and slow-baked[118, 257]. Reports that the root of this plant were eaten by native North American Indians are likely to be mistaken, it was probably Dryopteris expansa that was used[256].

tcanta A good ground cover plant[200], forming a slowly spreading clump[208]. The cultivar 'Minor' has a denser habit and spreads more freely, making a better cover[208].

dwatta Anthelmintic Diuretic Poultice Women's complaintsA tea of the boiled stems has been used to relieve labour pains[213, 222, 257]. The young unfurled fronds have been eaten to treat internal ailments such as cancer of the womb[257]. The roots are anthelmintic and diuretic[4, 222]. A tea of the boiled roots has been used to treat general body pains[213, 257], to stop breast pains caused by childbirth and to induce milk flow in caked breasts[222, 257]. The dried powdered root has been applied externally to heal sores[222]. 257]. A liquid extract of the root is an effective anthelmintic, though it is less powerful than the male fern, Dryopteris felixmas[4].

nrakta Throughout the N. Temperate zone, including Britain, to the mountains of India, tropical S. America. ksacta Moist sheltered woods, hedgebanks and ravines[4], usually on acidic soils but also found in drier and more open habi-

propta Spores - surface sow in a pot of sterile compost in a shady part of the greenhouse and keep moist, this is most easily done by putting the pot in a plastic bag. Pot up small clumps of the plants when they are large enough to handle and keep them moist until they are established. Plant out in late spring of the following year. Division in spring as plants come into growth. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Massing, Woodland garden. An easily grown plant[4], it is calcifuge and prefers an acid soil with a pH from 4.5 to 6.5, but it tolerates alkaline soils if plenty of leaf mould is added[200]. Grows well in heavy clay soils. Prefers a moist sheltered site with moderately high atmospheric humidity[200]. A very ornamental [1] and polymorphic species, there are many named varieties selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Naturalizing, Wetlands plant. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 4.2.338 Artemisia stelleriana

Beach Wormwood, Oldwoman, Dusty Miller 3 tlin 9 cyuc 1 kcak 3 tcan 0 dwat 0.5 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t ĥjonli

drutta Artemisia stelleriana is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some peo-

kcakta Edible Parts: Edible Uses: CondimentThe leaves are used for flavouring rice dumplings[177, 179, 183].

tcanta Plants can be grown as ground cover in a sunny position[197], they are of sprawling habit[208]. Provides shelter for beneficial invertebrates; insects and other arthropods. A specialist nectary plant [1-2]. Landscape Uses: Border, Ground cover, Massing, Seashore, Specimen. Some named forms have been selected for their ornamental value[187]. Special Features: Attractive foliage, North American native, Suitable for dried flowers.

nrakta E. Asia - Japan, Korea, Siberia. Naturalized in Britain[17]. ksacta Sand dunes and coastal cliffs, C. and N. Japan [58, 187]. Naturalized on sand near Marazion in Cornwall[1].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does

tcanta An effective, evergreen ground cover. Erosion control. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2]. Valued for its ability to thrive in shady locations, naturalize rapidly and produce a long and profuse spring bloom of bright vellow flowers [368-1]. Suitable locations include wild gardens, cottage gardens, native plant gardens (US), borders, or along streams/ponds.

nrakta Native range: northern Mexico, the eastern United States and southeastern Canada, extending from Coahuila to Quebec and Ontario. ksacta Moist but welldrained calcareous soils, wooded slopes, and rocky areas in shaded or semi-shaded locations.

propta Seed will germinate within 4 weeks if sown at 20°C/70°F. Seed requires light to germinate. Root division during winter dormancy.

nwatta Moist, well-drained soils in full sun to part shade. Blooms well in shady locations. Tolerates some soil dryness [368-1]. Bloom Notes: Blooms February to April in southerly regions, April to June in the north. Bloom Description: Yellow. Naturalize rapidly and produce a long and profuse spring bloom of bright yellow flowers [368-1]. Like many species of ragwort, the plant is toxic to many herbivorous mammals, but sheep seem more tolerant of it than are most other grazing animals. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 4.2.394 Pyrola elliptica

Waxflower Shinleaf

3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 0.2 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasilut hpa7tli frusflatprik hpa7tmwatli fyifxre7t hjonli

drutta Pyrola elliptica is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year. in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Analgesic Ophthalmic Tonic VulneraryThe leaves have analgesic properties and were used as a poultice on bruised shins and other sores and wounds[207, 222, 257]. A tea made from the whole plant was used to treat epileptic fits in babies[222, 257]. A decoction of the whole plant has been used as eye drops to treat sore eyes, sties and inflamed eyelids[257]. A tea made from the leaves was used as a gargle for sore throats and cankers in the mouth[222, 257]. A tea made from the roots is tonic[222].

nrakta Northern N. America - Newfoundland to Alaska and south to Virginia and Nebraska. ksacta Rich, mainly dry woods[222, 235].

propta Seed - the only information we have on this species is that it is difficult from seed and germinates infrequently[200]. We would suggest sowing the seed as soon as it is ripe if this is possible. Sow it into soil collected from around an established plant, only just covering the seed, and put the pot in a shady part of a cold frame. Pot up any young seedlings as soon as they are large enough to handle, once again using soil from around an established plant. Plant out into their permanent positions when the plants are large enough. You should not need to use soil from around an established plant to do this since the soil in the pot will contain the necessary micorrhiza. Division with great care in the spring[1, 111]. Pot up the divisions using some soil from around an established plant, grow on in a lightly shaded part of a greenhouse or frame and do not plant out until the plants are growing away vigorously[200].

nwatta Prefers a moist sandy woodland soil[111, 200] in a cool position with partial shade[1, 11, 200]. Requires a peaty or leafy acid soil that remains moist in the summer[200]. The flowers have a delicate sweet perfume[245]. This is a very difficult plant to grow. It requires a mycorrhizal relationship in the soil and therefore needs to be grown initially in soil collected from around an established plant[200]. It is also very difficult from seed as well as being intolerant of root disturbance which makes division difficult[1]. This species is extremely rare and endangered in the wild[200].

## 4.2.395 Mitella diphylla

Mitrewort, Twoleaf miterwort

3 tlin 7 cyuc 0 kcak 2 tcan 1 dwat 0.4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mitella diphylla is an evergreen Perennial growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta A good ground cover in moist woodland[200]. Plants form a carpet and should be spaced about 45cm apart each way[208]

dwatta Febrifuge OphthalmicAn infusion of the leaves is used to treat fevers[200]. The infusion can also be used as eye drops for sore eyes[257].

nrakta Eastern N. America - Quebec to Minnesota, North Carolina and Missouri. ksacta Rich woodlands, meadows and swamps[200, 235].

propta Seed - we have no information for this species but suggest sowing it as soon as it is ripe or in early spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in moist woodlands and in pockets in rock gardens[200]. Requires a moist humus-rich soil[208]. Self-sows when grown in a rich soil[200] and usually spreads guickly by this means [208]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 4.2.396 Actaea rubra

Red Baneberry

3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Actaea rubra is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are toxic[172], apparently acting upon the heart[212].

dwatta Analgesic Antirheumatic Appetizer Emetic Galactogogue Purgative RubefacientThe whole plant, but especially the root, is analgesic, antirheumatic, galactogogue and rubefacient[172, 257]. The plant was often used medicinally by North American Indian tribes, though modern users should be aware of the plants potential toxicity. A tea made from the root is used as an appetizer, in the treatment of stomach pains, coughs, colds, menstrual irregularities, post partum pains, to increase milk flow and as a purgative after childbirth[222, 257]. Great caution should be employed if using this plant internally, the rootstock is a violent purgative, irritant and emetic[212].

nrakta N. America - Alaska to California and eastwards to Newfoundland and Philadelphia. ksacta Moist shady areas, mostly in deciduous forests but also in mixed conifer-

The spores of this plant are dusted on wounds or inhaled to stop bleeding noses. They can also be used to absorb fluids from injured tissues[213, 218, 257]. The spores can be used as a dusting powder to prevent pills sticking together[213].

nrakta Northern N. America and E. Asia - China, Japan and Siberia, ksacta Moist woodlands[235], Rich hardwood forests and successional shrubby areas from sea level to 1600 metres[270]

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. The spores are generally produced in abundance but are difficult to grow successfully[200]. Layering of growing tips[200].

nwatta Thrives in a rough spongy peat in a shady position[1]. Requires a humid atmosphere[200]. Terrestrial members of this genus are hard to establish. The roots are delicate and liable to rot, most water being absorbed through the foliage[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Although looking more like a moss, this genus is closely related to the ferns[200].

#### 4.2.391 Dicentra eximia

Dwarf bleeding heart, turkey-corn 3 tlin 9 cyuc 0 kcak 4 tcan 0 dwat 0.4 m hkuc pcimhmim cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli hionli

drutta Dicentra eximia is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Birds, Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Fatal in large quantities. Symptoms include: trembling, staggering, vomiting, diarrhea, convulsions and labored breathing. Skin irritation after repeated contact with the cell sap is mild and short-lasting.

kcakta None Known

tcanta Groundcover: A medium density moderately good groundcover for shade and semi-shade. Colonizes very slowly through rhizomes. Wildlife Food: The nectar is sought by hummingbirds. Wildlife Habitat: Provides cover for small wildlife. Insectory: Attracts beneficial insects [318-1]. Good companion plants include; Jacobs Ladder and Wild Columbine. Cut Flowers. Ornamental: Ornamental foliage and flowers. The foliage is deeply cut and fern-like, and does not die back like the common bleeding heart. Flowers are shades of pink and white and heart shaped [318-1].

nrakta Native to the Eastern North America - Appalachian Mountains. ksacta Forest and mountain areas from New York to Georgia and Tennessee growing on forest floors, rocky woods and ledges on rocky soils in the Appalachian Mountains. Shade-loving.

propta

nwatta An herbaceous perennial growing well in semishade. USDA Hardiness Zones: 3 - 9. Soil pH: 5.5 - 7.0. Life Span: Long-Lived Perennial, Stand Persistence: Long. Form: Upright. Texture: Fine. Sun: Partial Shade, Shade. Soil Type: Loamy, Silty. Soil Moisture: Moderate. Minimum Root Depth: 6 inches (15cm). Root Type: Rhizome, Fibrous Shallow. Fungal Types: Endomycorrhizal. Seasonal Interest: Summer. Will tolerate full sun if given sufficient moisture. Requires rich well-drained soil. Flowering may stop in areas with very hot weather. Will not go dormant in midsummer like the Common Bleeding Heart as long as the soil is kept moist. Tolerant of proximity to black walnut trees. Fruit Type: Capsule. Flower Color: Pink, Red, White. Drought: Sensitive, Flood: Intolerant, Salt: Intolerant, Soil Compaction: Sensitive. Mowing: Intolerant. Cold Injury: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor, Animal Damage: Deer, Rabbits, Growing Season: Cool, Bloom Time: Late Spring - Early Fall. Fruit Time: Fall -Winter [318-1]. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown

above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

## 4.2.392 Erica tetralix

Bog Heather Crossleaf heath 3 tlin 7 cvuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc htut cyutli tcuphia7n hwicli hyishrasilut hpa7tli frusflatprik hna7tmwatli fvifxre7t hionli

drutta Erica tetralix is an evergreen Shrub growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from June to October, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime

tcanta Broom DyeStems are used for making brooms. brushes etc[109]. A vellow dve is obtained from the plant[46. 61]. Plants can be grown as a ground cover[208]. They should be clipped in the spring in order to encourage denser growth[208].

nrakta Western Europe, including Britain, from Scandanavia to Spain east to N. Germany and Poland. ksacta Bogs, wet heaths and moors, rarely on drier soils[17].

propta Seed - surface sow in a sandy compost in a cold frame in spring. Keep moist. Prick out the plants as soon as they are large enough to handle and plant them in their permanent positions when they are 5 - 8cm tall[11]. Cuttings of half-ripe wood, 3cm long taken from twiggy lateral growths near the base of the plant, July/August in a frame. Remove the leaves from the bottom part of the stem without causing any damage to the bark. The cuttings root in a few weeks if they are given some bottom heat. Plant out in spring[11]. Layering in spring or autumn. Plants can be 'dropped' and then dug up and divided about 6 - 12 months later. Dropping involves digging up the plant and then replanting it about 15 - 20cm deeper in the soil to encourage roots to form along the stems[78].

nwatta Requires a light lime-free loam[1]. A calcifuge plant, requiring a pH below 6[186]. Grows best in a poor soil[11]. Resents dry soils[1], doing well in boggy areas[186]. Prefers an open situation[1]. A good bee plant[108]. There are many named forms, selected for their ornamental value[188]. Plants in this genus are notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and

## 4.2.393 Packera obovata

Roundleaf ragwort

3 tlin 8 cyuc 0 kcak 2 tcan 0 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli ĥjonli

drutta Packera obovata is an evergreen Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers moist soil.

pcista Like many species of ragwort, the plant is toxic to many herbivorous mammals, but sheep seem more tolerant than other grazing animals.

kcakta None Known

not dry out[200]. When large enough to handle, prick the For polyculture design as well as the above-ground architecseedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about 10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted.

nwatta Requires a well-drained sandy soil and a sunny position[187]. Established plants are drought tolerant[190]. Grows well in maritime areas and in cold gardens[208, 233]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-21. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.339 Maianthemum canadense

Canada Beadruby, Canada mayflower 3 tlin 7 cyuc 1 kcak 2 tcan 1 dwat 0.1 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Maianthemum canadense is a PERENNIAL growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil

pcista There is a warning that the fruit should only be used with caution, but no more details are given[105].

kcakta Edible Parts: Fruit Leaves Root ShootsEdible Uses: Fruit[105, 161, 257]. We have no more details except a warning that the fruit should be used with caution. The fruit is about 6mm in diameter[200].

tcanta Plants can be used as ground cover in shady positions[187, 197], doing well in a wild or woodland garden[200]

dwatta Expectorant KidneyA tea made from the plant has been used in the treatment of headaches and as a kidney tonic for pregnant women[222, 257]. It is also used as a gargle for sore throats and as an expectorant[222, 257].

nrakta Eastern N. America - Labrador to Georgia, west to Tennessee and Iowa. ksacta Woods and recent clearings, often to the sub-alpine zone[43], in humus-rich slightly acid soils[200].

propta Seed - best sown quite thinly it as soon as it is ripe in a cold frame, it should germinate in the spring. Stored seed should be sown in late winter in a cold frame, it might take 18 months to germinate. Allow the seedlings to grow on in the pot for their first year, giving liquid feeds as necessary to ensure that they do not go hungry. Divide the plants into individual pots once they have died down in late summer. Grow them on in pots for another year or more until large enough to plant out[K]. Division as new growth commences in the spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a cool shady moist but not wet position[1, 187]. Plants tolerate warm summers only if the soil remains moist[200]. A mat forming plant, it can be invasive in good conditions[200]. The flowers are sweetly scented[245]. ture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 4.2.340 Ranunculus repens

Creeping Buttercup, Prairie Double-flowered Buttercup, Water Buttercup, Creeping Buttercup

3 tlin 8 cvuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ranunculus repens is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. It is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[19], the toxins being destroyed by heat or by drying[65]. The plant also has a strongly acrid juice that can cause blistering to the skin[65,

kcakta Edible Parts: Leaves RootEdible Uses: Leaves cooked and used as a pot-herb[2, 105]. A famine food, used when all else fails, and I would rather give it a miss even then[K]! See the notes above on toxicity. Root - must be dried beforehand and thoroughly cooked[118]. Personally, I would rather give this one a miss[K], see the notes above on toxicity.

dwatta Analgesic RubefacientThe entire plant is analgesic and rubefacient[257]. A poultice of the chewed leaves has been used in the treatment of sores, muscular aches and rheumatic pains[257]. Some caution is advised in the use of this plant, see the notes above on toxicity.

nrakta Europe, including Britain, from Norway south and east to Spain, through Asia to China and Japan. ksacta Wet meadows, pastures, woods, dune slacks etc[19]. A common and rampant weed, avoiding acid soils[19].

propta Seed - sow spring in a cold frame. A very common weed, it doesn't really need any help from us. Division in spring. Very easy, though probably totally unnecessary. larger divisions can be planted out direct into their permanent positions.

nwatta Landscape Uses:Ground cover, Woodland garden. Prefers a moist loamy soil on the heavy side. A rampantly spreading weed of grassland, few gardeners would want to introduce it to their land[K]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features: Attractive foliage, North American native, Invasive, Naturalizing, Wetlands plant, Extended bloom season in Zones 9A and above. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

#### 4.2.341 Veronica officinalis

Common Speedwell

211

3 tlin 7 cvuc 1 kcak 0 tcan 2 dwat 0.1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Veronica officinalis is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: TeaA bitter tangy tea is made from the fresh flowering herb or the dried leaves[2, 21, 46, 183]. The dried leaves can be added to tea 4.2.343 Anemone narcissiflora

dwatta Alterative Antipruritic Antirheumatic Astringent Diuretic Expectorant Stomachic TonicThe leaves and roots are alterative, astringent, mildly diuretic, mildly expectorant, stomachic and tonic[4, 9, 14, 21, 222]. They have been employed in the treatment of pectoral and nephritic complaints, haemorrhages, skin diseases and the treatment of wounds[4], though the plant is considered to be obsolete in modern herbalism[238]. The leaves are harvested in the summer and dried for later use[9].

nrakta Europe, including Britain, from Iceland south and east to Spain, W. Asia and the Caucasus. ksacta Heaths, moors, grassland, dry hedgebanks and coppices, often on dry

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient quantity, the seed can be sown in situ in the autumn or the spring. Division in autumn or spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. Thrives in light shade or in open sunny positions[14]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

## 4.2.342 Veronica chamaedrys

Germander Speedwell

3 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Veronica chamaedrys is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from March to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is selffertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaThe leaves are a tea substitute[177, 183].

dwatta Blood purifier Skin VulneraryThe herb is a blood purifier and vulnerary[4]. It is applied externally to skin diseases and is said to be an efficacious treatment for the itch[4]. Internally, an infusion of the leaves once had a good reputation in the treatment of coughs, asthma, catarrh etc[4].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, north and western Asia. ksacta A common plant of grassland, woods, hedges etc[1, 13, 17].

propta Seed - sow autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient quantity, the seed can be sown in situ in the autumn or the spring. Division in autumn or spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. A good bee plant[24]. A common garden weed, it grows well in a lawn[200] and can be grown in the spring meadow[24]. It is also a good plant for the flower border[1].

Narcissus-Flowered Anemone, Narcissus anemone 3 tlin 7 cvuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anemone narcissiflora is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated 4, 10, 19, 65, 270].

kcakta Edible Parts: Leaves RootEdible Uses: Leaves raw or cooked[46, 61, 177]. The leaves, together with other salad greens and oil, were beaten to a creamy consistency and frozen into an 'ice cream' [257]. Some caution is advised. see the notes above on toxicity. Root - raw[177]. The upper root ends have been used for food[257]. Some caution is advised, see the notes above on toxicity.

dwatta HaemostaticThe plant has been used as an antihaemorrhagic[270].

nrakta Northern Europe to northern Asia. And northwestern N. America. ksacta Grassy, peaty but well-drained alpine meadows, occasionally in partial shade[100, 187].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down. This plant is very slow to increase[187].

nwatta Succeeds in ordinary garden soil but prefers a rich sandy loam[1] and full sun[200]. Succeeds in full sun or part shade[187]. Plants succeed in maritime gardens[233]. Hardy to about -20°c[187]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. A very ornamental[1] and highly polymorphic plant[50, 187, 270]. There are a large number of sub-species[270].

## 4.2.344 Corema conradii

Poverty Grass, Broom crowberry

3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli nyanhjen hjonli

drutta Corema conradii is an evergreen Shrub growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required).

. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[106, 200]. The fruit is very small and dry, less than 3mm in diameter[235].

nrakta Eastern N. America - Newfoundland to Massachusetts and New Jersey, usually near the coast. ksacta Dry sandy places, pine barrens and siliceous rocks.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 5 months warm stratification followed by 3 months at 5°c. When they are large enough to handle, prick the seedlings out into individual pots and grow

When made into a tea they are used in the treatment of the season, the plant will often produce a second flush of intestinal worms[222]. The powdered leaves are sternutatory[222, 257]. An infusion of the leaves is laxative and alterative[207]. An infusion of the stems has been used as a wash in the treatment of fevers[257]. The plant contains helenalin, a compound that has shown significant anti-tumour activity[222].

nrakta Eastern N. America - Quebec to Florida, west to Manitoba and Arizona. ksacta Wet meadows and marshes[187]. Rich thickets, meadows and shores[43]. Low, moist calcareous soils in Texas[274].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed it might be worthwhile trying a sowing in mid to late spring in situ outdoors[111]. Cuttings of soft wood from the base of the plant, June/July in a frame. Basal cuttings in spring[200]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[111]. This needs to be done fairly regularly because the clumps soon become congested[233]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Landscape Uses:Border, Container, Foundation, Massing, Seashore. Grows well in ordinary garden soil[1, 111], succeeding in most conditions other than boggy soils[233]. It prefers a fertile moisture retentive soil[200] in a sunny position[108, 111]. Dislikes dry soil[200]. Plants seem to be immune to the predations of rabbits[233]. A good bee and butterfly plant[30]. A very ornamental plant[1], some named forms have been selected for their ornamental value[187]. Special Features: North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers.

## 4.2.388 Echinops ritro

Globe Thistle, Southern globethistle, Small Globe Thistle 3 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Echinops ritro is a PERENNIAL growing to 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

dwatta Antiinflammatory GalactogogueThe root is antiinflammatory and galactogogue[176]. It is used in the treatment of breast abscesses with inflammation, mastitis, lack of milk in nursing mothers and distension of the breast[176].

nrakta Central and Eastern Europe to Central Asia. ksacta Gravely places on mountain slopes at elevations of 200 - 2400 metres in Tibet[266].

propta Seed - sow early spring in a cold frame[111]. The seed usually germinates in 3 - 9 weeks at 25°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seedbed in mid spring and is then planted out into its permanent position in late summer or the autumn[111]. Division in autumn[111]. Root cuttings in the winter[200].

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Seashore, Specimen. Succeeds in a sunny position in any well drained soil of low or medium fertility[200]. Established plants are drought tolerant[190]. There are a number of named varieties, selected for their ornamental value[200]. The flowers are often used for dried flower displays[200]. If all the flowers are removed early in bloom later in the summer[200]. Special Features: Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms.

## 4.2.389 Myosotis alpestris

Alpine Forget-Me-Not, Scorpion Grass, Forget-Me-Not 3 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tcuphia7n hwicli hrasilutnyik hpa7tli priklwis hpa7tmwatli xre7t hionli

drutta Myosotis alpestris is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Astringent OphthalmicThe whole plant is astringent and ophthalmic[7]. Used as a lotion, it is an excellent remedy for many eye diseases[7]. It is also ground into a powder and applied externally to wounds, at one time the leaf juice was used to stop nose bleeds[7]. The plant is harvested in May and can be dried for later use[7].

nrakta Britain, Europe, W. Asia and N. America. ksacta Rare and local in Britain, growing in damp woodlands and meadows, usually on basic rock formations[17, 200].

propta Seed - sow outdoors in situ in late spring or early summer. Germination usually takes place within 2 - 4 weeks at 20°c. Division in spring[111]. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of young shoots, summer in a shady border[1111]

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Woodland garden. Prefers a well-drained gritty soil[245]. Plants are hardy to about -20°c[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. The flowers are deliciously fragrant. in the evening and night time though there is little or no scent in the daytime[245]. Special Features: North American native. Naturalizing, Fragrant flowers.

## 4.2.390 Lycopodium obscurum

Ground Pine. Rare clubmoss

3 tlin 7 cvuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc

pcimhmim cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Lycopodium obscurum is a FERN growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers

pcista The plant contains lycopodine, which is poisonous by paralysing the motor nerves[21, 218]. It also contains clavatine which is toxic to many mammals[218]. The spores. however, are not toxic[21].

tcanta Miscellany Mordant WeavingThe following uses are for L. clavatum. They quite possibly also apply to this species[K]. The spores are water repellent and can be used as a dusting powder to stop things sticking together [106, 171]. They are also used as a talcum powder and for dressing moulds in iron foundries[74]. They can also be used as explosives in fireworks and for artificial lightning [46, 57, 102, 171]. 213]. The plant can be used as a mordant in dyeing[172]. The stems are made into matting[46].

dwatta Analgesic Antispasmodic Diuretic Miscellany Styptic TonicThe plant is analgesic, antispasmodic, blood tonic, diuretic and tonic[218, 257]. A decoction has been used as a herbal steam in the treatment of rheumatism[257].

#### 4.2.384 Artemisia filifolia

Sand Sage, Sand sagebrush

3 tlin 7 cyuc 0 kcak 1 tcan 2 dwat 1.2 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Artemisia filifolia is a deciduous Shrub growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

tcanta MiscellanyThe leaves are very soft and have been used as a substitute for toilet paper[257]. It is sometimes used for revegetation efforts on rangeland and coal fields.

dwatta Carminative Miscellany StomachicThe plant is carminative and stomachic[61, 257]. A tea is used in the treatment of indigestion[216]. An infusion of the plant and juniper branches is used in the treatment of indigestion[257]. A strong infusion of the plant is used as a lotion on snakebites[257]. The plant is also used to treat boils[257].

nrakta Central and Southern N. America - Nebraska to Utah, Wyoming, Texas and Mexico. ksacta Sandy soils[164] in deserts[216] and dry plains[235].

propta Seed - surface sow from late winter to early summer in a greenhouse in a very free-draining soil, but make sure that the compost does not dry out. The seed usually germinates within 1 - 2 weeks in a warm greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame. Division in spring or autumn[200].

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 4.2.385 Spiraea tomentosa

Hardhack, Steeplebush

3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Spiraea tomentosa is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

dwatta Astringent Birthing aid Diuretic Dysentery TonicThe flowers give feebly the medicinal action of salicylic acid (aspirin) and are used in decoction for their diuretic and tonic effect[4]. An infusion of the flowers is used as an astringent[207]. An infusion of the leaves can be used in the treatment of dysentery[257]. An infusion of the flowers and the leaves has been used to counteract the sickness of pregnancy and also to facilitate childbirth[257]. The roots are astringent and have been used in the treatment of diarrhoeal4. 207]. An infusion of the leaves is also used[4, 213].

nrakta N. and C. Europe. Eastern N. America - Nova Scotia to Manitoba, south to Georgia and Kansas. ksacta Fields and pastures in N. America[222]. Swamps and low

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle,

and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent posi-

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. A vigorous plant, spreading by subterranean suckers and forming thickets[200]. Closely related to S. douglasii[11]. Hybridizes freely with other members of this genus[11].

## 4.2.386 Verbascum pulverulentum

Hoary Mullein, Broad-leaf mullein

3 tlin 7 cyuc 0 kcak 2 tcan 1 dwat 1.8 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hionli

drutta Verbascum pulverulentum is a BIENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The leaves contain rotenone and coumarin, though the quantities are not given[222]. Rotenone is used as an insecticide and coumarin can prevent the blood from clotting[K]. Hairs on the leaves can act as an irritant[222].

tcanta Dynamic accumulator.

dwatta VermifugeThe plant (seeds?) are used to rid the body of tapeworms[4].

nrakta Europe, including Britain, from the Netherlands south and east to Spain, Switzerland, Greece. ksacta A rare native along roadsides in Norfolk and Suffolk, a rare casual elsewhere[17].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed [200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability [200].

nwatta Succeeds in most well-drained soils, including dry ones, and prefers a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200].

### 4.2.387 Helenium autumnale

Sneezeweed, Common sneezeweed, Fall sneezeweed, Mountain sneezeweed. False Sunflower

3 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1.8 m hkuc

htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Helenium autumnale is a PERENNIAL growing to 1.8 m (6ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The plant is poisonous to ruminants[222]. Contact with the plant might cause dermatitis in sensitive peo-

tcanta InsecticideThe plant contains helenalin, a compound that has insecticidal properties, though it is also toxic to fish and worms[222].

dwatta Alterative Cancer Laxative SternutatoryThe dried nearly mature flower heads are used in a powdered form as a snuff to treat colds and headaches[207, 222, 257]. them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current year's growth, November in a frame.

nwatta Requires a light or medium lime-free soil[11. 182], succeeding in full sun or light shade[182]. Dioecious, male and female plants must be grown if seed and fruit is required[182].

## 4.2.345 Artemisia scoparia

Redstem wormwood

3 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Artemisia scoparia is a BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some peo-

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[177].

tcanta EssentialThe seed and flowering stems contain 0.75% essential oil[240].

dwatta Antibacterial Anticholesterolemic Antipyretic Antiseptic Cholagogue Diuretic VasodilatorThe plant is anticholesterolemic, antipyretic, antiseptic, cholagogue, diuretic and vasodilator[176]. It has an antibacterial action, inhibiting the growth of Staphylococcus aureus, streptococci, Bacillus dysenteriae, B. typhi, B. subtilis, Pneumococci, C. diphtheriae, mycobacterium etc[176]. It is used in the treatment of jaundice, hepatitis and inflammation of the gall bladder[176]. The plant is also used in a mixture with other herbs as a cholagogue[218].

nrakta C. Europe to W. Asia. ksacta Waste ground in C. Japan[58]

propta Seed - sow late spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 4.2.346 Calochortus uniflorus

Large-Flowered Star Tulip, Monterey mariposa lily 3 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Calochortus uniflorus is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[92, 161].

nrakta South-western N. America - Oregon to California. ksacta Low moist meadows on the eastern side of the Cascades from sea level to 200 metres[60, 270].

propta Seed - sow as soon as ripe or early spring in a cold frame in a very sharply draining medium. Stratification may be helpful. Germination usually takes place within 1 - 6 months at 15°c[138]. Leave the seedlings undisturbed for their first two years growth[138], but give them an occasional liquid feed to ensure they do not become nutrient deficient. It is quite difficult to get the seedlings through their

them on in the greenhouse for at least their first winter. Plant first period of dormancy since it is all too easy either to dry them out completely or keep them too moist when they will rot[214]. After their second year of growth, pot up the dormant bulbs in late summer and grow them on for at least another 2 years in the greenhouse before trying them outside Seedlings take about 5 - 7 years to come into flower[214]. Division of the bulbs as soon as the foliage dies down. One report says that the bulbs must be planted into their permanent positions immediately[1], whilst another says that they can be stored overwinter and replanted in the spring[138]. Stem bulbils, harvested from the stems after flowering[200]. They can be stored cool and dry then planted in pots in the cold frame in the spring.

nwatta Requires a deep very well-drained fertile sandy soil in a sunny position and must be kept dry over winter[1, 200]. This is a rather difficult plant to cultivate in Britain, it is very cold hardy but is intolerant of wetness especially in the winter[1]. Another report says that the plant requires plenty of moisture when in growth, but very dry conditions after it has flowered[245]. It is easiest to grow in a bulb frame but is worth trying outdoors at the base of a south-facing wall, especially with shrubs that like these conditions[120]. The plants should not be crowded by other plants[214]. Bulbs have succeeded in a cold frame with the cover removed from March to October[214]. Bulbs can be lifted as soon as the foliage dies down in the summer and stored overwinter in a cool dry place, replanting in spring[138]. Another report says that they should be replanted immediately[1]. Bulbs frequently divide after flowering, the bulblets taking 2 years to reach flowering size[200]. The flowers are sweetly scented[245]. Hand pollination is necessary if seed is required.

#### 4.2.347 Abies concolor

Colorado Fir. White fir

3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 45 m hkuc

pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli hjonli

drutta Abies concolor is an evergreen Tree growing to 45 m (147ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower in April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Dye WoodA tan coloured dye can be obtained from the bark[257]. Wood - very light, not strong, coarse grained, soft, not durable. Used mainly for pulp, cases etc[46, 61, 82]. It is sometimes used in framing small houses but is not strong enough to be used in larger buildings[229]. The wood lacks a distinctive odour and so does not impart a flavour to items stored in it. Thus it can be used for making tubs for storing food items[229].

dwatta Antirheumatic Pectoral Poultice TBThe pitch from the trunk has been used as an antiseptic poultice for cuts, wounds etc[257]. An infusion of the pitch, or the bark, has been used in the treatment of TB[257] An infusion of the foliage has been used in a bath for relieving rheumatism[257]. An infusion of the pitch and leaves has been used in the treatment of pulmonary complaints[257].

nrakta South-western N. America - Oregon to California, to Arizona and New Mexico, ksacta Found on a wide range of soils, but preferring moist soils with a humid climate and a long winter from 700 metres to 3,400 metres[229].

propta Seed - sow early February in a greenhouse or outdoors in March[78]. Germination is often poor, usually taking about 6 - 8 weeks[78]. Stratification is said to produce a more even germination so it is probably best to sow the seed in a cold frame as soon as it is ripe in the autumn[80, 113]. The seed remains viable for up to 5 years if it is well stored[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in pots. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Alternatively, if you have sufficient seed, it is possible to sow in an outdoor seedbed. One report says that it is best to grow

the seedlings on in the shade at a density of about 550 plants per square metre[78] whilst another report says that they are best grown on in a sunny position[80].

nwatta Landscape Uses:Christmas tree, Firewood, Pest tolerant, Screen, Specimen. Prefers a good moist but not water-logged soil[1]. Grows well in heavy clay soils. Plants are very shade tolerant but growth is slower in dense shade[81]. Intolerant of atmospheric pollution[1]. Prefers slightly acid conditions down to a pH of about 5[200]. Prefers growing on a north-facing slope[200]. Trees succeed on poor dry sites in the wild[155]. Trees are shallow rooted and therefore liable to be wind-blown in exposed sites[155]. Trees grow almost as well in S. Britain as they do in cooler areas of the country[11]. They are at their best in the Perthshire valleys of Scotland and in N.E. England, trees in the south and east of the country tend to be thin in the crown and soon lose their shape. Trees in the west grow better but also lose their shape after a while[11, 185]. New growth is from mid-May to July and trees are virtually never damaged by late frosts or aphis[1, 185]. Most trees of this species that are grown in Britain are in fact the sub-species A. concolor lowiana. (Gordon.)Lemmon. This form tends to grow better in Britain than the type. There are 2 basic forms of this sub-species, those from the north of the range are vigorous in height growth whilst the southern form is vigorous in girth growth[185]. They both have a potential for forestry use in Britain[185]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm in height. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. A very ornamental tree[1]. The crushed leaves have a strong lemony scent[185]. Special Features: Attractive foliage, North American native, Fragrant foliage, There are no flowers or blooms.

#### 4.2.348 Betula ermanii

Gold Birch

3 tlin 7 cyuc 0 kcak 3 tcan 1 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Betula ermanii is a deciduous Tree growing to 25 m (82ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta PioneerThe tree colonizes poor soils and cleared woodlands in the wild[11]. This makes it suitable for use as a pioneer species for re-establishing woodlands. It is a quite short-lived species, but grows fairly quickly and creates suitable conditions for more permanent trees to become established. Because its seedlings do not grow well in shady conditions, the birch is eventually out-competed by the other woodland trees.

dwatta Antiseborrheic VulneraryVulnerary. The bark is used to bandage wounds[61].

nrakta N.E. Asia - China, Japan. ksacta Mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position[78, 80, 134]. Spring sown seed should be surface sown in a sunny position in a cold frame[113, 134]. If the germination is poor, raising the temperature by covering the seed with glass can help[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it can be sown in an outdoor seedbed, either as soon as it is ripe or in the early spring - do not cover the spring sown seed. Grow

the plants on in the seedbed for 2 years before planting them out into their permanent positions in the winter[78, 80, 113, 134].

nwatta Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. A very polymorphic species[58], it hybridizes freely with other members of this genus[50]. The young growth in spring is subject to damage by late frosts[1]. A colonizer of poor soils and cleared woodlands, it tolerates very poor soils[11]. Trees are notably susceptible to honey fungus[200].

## 4.2.349 Magnolia acuminata

Cucumber Tree, Cucumber Magnolia 3 tlin 8 cyuc 0 keak 0 tcan 3 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Magnolia acuminata is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

tcanta Rootstock WoodThe roots are very diseaseresistant and are used as a rootstock for less vigorous species[226]. Wood - finely grained, soft, light, durable, not strong[4, 46, 61, 82, 171, 229, 235]. It weighs 29lb per cubic foot[235]. It takes a very good polish and is used for boxes, crates, flooring, cabinet making etc[4, 46, 61, 171, 229].

dwatta Antiperiodic Aromatic Diaphoretic Laxative Malaria Stimulant TonicA tea made from the bark is an tiperiodic, aromatic, mildly diaphoretic, laxative, stimulant, tonic[4, 222]. It has historically been used as a substitute for quinine in the treatment of malaria[222]. An infusion has been used in the treatment of stomach ache and cramps[257]. The bark has been chewed by people trying to break the tobacco habit[222]. A hot infusion of the bark has been snuffed to treat sinus problems and has also been held in the mouth to treat toothaches[257]. The bark is harvested in the autumn and dried for later use[238]. It does not store well so stocks should be renewed annually[238]. A tea made from the fruit is a tonic, used in the treatment of general debility and was formerly esteemed in the treatment of stomach ailments[2221.

nrakta Eastern N. America - New York to Georgia, west to Alabama and Ontario. ksacta Rich woods, especially in uplands[43]. Low mountain slopes and the rocky banks of streams[82].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200].

nwatta Landscape Uses:Border, Firewood, Pest tolerant, Aggressive surface roots possible, Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Tolerates limey soils[200] so long as they are deep and rich in humus[188]. The branches are brittle and so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. Plants are hardy to about -28°c[200]. A fairly fast-growing tree, it takes about 25 - 30 years before it first produces flowers and lives about 125 - 150 years in the wild[229]. The sub-species M. acuminata cordata begins flowering at an earlier age[245]. Good seed crops are produced about every 3 - 5 years[229]. The flowers have a delicate perfume[245]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. Special Features: North American native, Fragrant flowers, Attractive flowers or blooms.

shade[1, 200]. Prefers growing in light shade[238]. Survives but does not thrive in dry conditions[200]. Prefers growing in a bog garden or in a soil that is unlikely to dry out[200]. Plants are very cold-hardy, tolerating temperatures down to about -20°c[187]. A polymorphic species, there are several named forms[43]. The plant spreads freely at the roots and so is best grown in a large pot[4].

#### 4.2.381 Diervilla lonicera

Bush Honeysuckle, Northern bush honeysuckle 3 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Diervilla Ionicera is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

tcanta Soil stabilizationThe plants stoloniferous habit makes it useful for soil stabilization on banks and slopes[200].

dwatta Diuretic Galactogogue Laxative Narcotic OphthalmicThe leaves are diuretic[257]. A compound decoction has been used in the treatment of stomach aches[257]. This contrasts with a report that the leaves contain a narcotic principle, inducing nausea[207]. The plant is used as a gargle in catarrhal angina[207]. The root is diuretic, galactogogue, laxative and ophthalmic[257]. A cooled infusion has been used as an eyewash for sore eyes[257]. The bark is laxative and ophthalmic[257]. An infusion has been used to increase milk flow in a nursing mother and as an eyewash for sore eyes[257].

nrakta Eastern N. America - Newfoundland to Florida. ksacta Dry gravelly soils[200] in woodlands[235].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if possible, otherwise in late winter or early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers in the spring[200]. Cuttings of half-ripe wood, July/August in a frame[188]. Cuttings of mature wood, late autumn in a frame[188].

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Woodland garden. Succeeds in a moist fertile well-drained soil and is not fussy as to soil type[200]. Succeeds in full sun or partial shade[188]. Plants are hardy to about -30°c[200]. This species is a spreading suckering plant[11], it makes a useful understorey planting in woodlands[200]. Any pruning can be carried out in the winter or after flowering[188]. 2 or 3 year old stems can be removed in order to promote a more shapely bush[188]. Flowers are produced on the current seasons growth[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Attractive flowers or blooms.

## 4.2.382 Solanum carolinense

Horse Nettle, Carolina horsenettle 3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hoa7tmwatli xre7t hionli

drutta Solanum carolinense is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are potentially poisonous[222]. Fatalities have been reported with children[222].

tcanta InsecticideThe leaves have been used as an insecticide[257].

dwatta Anodyne Antispasmodic Aphrodisiac Diuretic Epilepsy PoulticeThis plant should be used with caution, see the notes above on toxicity. The berries and the root are anodyne, antispasmodic, aphrodisiac and diuretic[4, 222]. They have been used in the treatment of epilepsy[207, 222]. They have been recommended in the treatment of asthma, bronchitis and other convulsive disorders[4, 207]. The berries should be harvested when fully ripe and carefully air-dried[4]. An infusion of the seeds has been gargled as a treatment for sore throats and drunk in the treatment of goitre[257]. A tea made from the wilted leaves has been gargled in the treatment of sore throats and the tea has been drunk in the treatment of worms[222, 257]. A poultice made from the leaves has been applied to poison ivy rash[222].

nrakta South-eastern N. America - New England to Florida, west to Texas and South Dakota. ksacta Dry fields and waste ground, usually in sandy soils[4, 222, 235].

propta Seed - sow early spring in a warm greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts.

nwatta Succeeds in most soils[1].

## 4.2.383 Solidago rigida

Stiff Goldenrod, Flat Topped Goldenrod, Stiff Goldenrod 3 tiin 9 cyuc 0 kcak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hua7tmwatli xre7t hionli

drutta Solidago rigida is a PERENNIAL growing to 1.2 m (4ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Dye LatexA good quality rubber can be made from a latex that is obtained from the leaves[46, 61]. Mustard, orange and brown dyes can be obtained from the whole plant[168].

dwatta Antiseptic Astringent Cathartic Diuretic Stings StypticThe leaves and blossoms are antiseptic, astringent and styptic[4, 168]. A valuable remedy in the treatment of all kinds of haemorrhages[4]. The flowers have been ground into a lotion and used to treat bee stings[213, 257]. An oil obtained from the plant (is this an essential oil?) is diuretic[4]. The root is cathartic and diuretic[257]. A decoction of the root has been used as an enema[257]. An infusion has been used to restore the flow of urine[257]

nrakta Eastern N. America - Ontario to Saskatchewan, south to Massachusetts, Georgia, Texas and Colorado. ks-acta Dry or gravelly open woods, thickets and prairies[43].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the sumper

nwatta Landscape Uses:Border. Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. Special Features: Attractive foliage, North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms.

system[254]. It is also antibiotic and helps to relieve allergies[254]. Plants in this genus were probably the most frequently used of all North American Indian herbal remedies. They had a very wide range of applications and many of these uses have been confirmed by modern science. The plant has a general stimulatory effect on the immune system and is widely used in modern herbal treatments[222]. There has been some doubt over the ability of the body to absorb the medicinally active ingredients orally (intravenous injections being considered the only effective way to administer the plant), but recent research has demonstrated significant absorption from orally administered applications[222]. In Germany over 200 pharmaceutical preparations are made from Echinacea [222]. The roots and the whole plant are considered particularly beneficial in the treatment of sores. wounds, burns etc, possessing cortisone-like and antibacterial activity[222]. The plant was used by North American Indians as a universal application to treat the bites and stings of all types of insects[213]. An infusion of the plant was also used to treat snakebites[213]. The root is adaptogen, alterative, antiseptic, depurative, digestive, sialagogue[4, 21, 61, 165]. It is harvested in the autumn and dried for later use[238]. The plant has been used as a diaphoretic[213]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Echinacea for common cold, cough and bronchitis, fevers and cold, urinary tract infections, inflammation of the mouth and pharynx, increase resistance to infection, wounds and burns (see [302] for critics of commis-

nrakta N. America - Manitoba, Saskatchewan and North Dakota south to Texas. ksacta Gravelly, sandy, and rocky dry limestone prairies and barrens[43, 274].

propta Seed - sow March/April in a greenhouse and only just cover the seed[175, K]. Diurnal temperature fluctuations aid germination[175]. The seed usually germinates in 10 - 21 days at 25°c[175]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for the first summer. Plant them out in the late spring or early summer of the following year and give them some protection from slugs at least until they are established[K]. Division in spring or autumn[111]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings, October in a frame[200].

nwatta Prefers a deep rich loam with plenty of leafmold[1] and a sunny position[175]. Closely related to E. pallida and included in that species by some botanists[274]. Slugs love this plant[K]. USDA Hardiness Zone: Zone 3-8. AHS Heat Zone: 9-1 In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 4.2.379 Euphorbia esula

Leafy Spurge. Green spurge 3 tlin 9 cyuc 0 kcak 4 tcan 0 dwat 1 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasilutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Euphorbia esula is a PERENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista The sap contains a latex which is toxic on ingestion and highly irritant externally, causing photosensitive skin reactions and severe inflammation, especially on contact with eyes or open cuts. The toxicity can remain high even in dried plant material[200]. Prolonged and regular contact with the sap is inadvisable because of its carcinogenic nature[214].

kcakta None Known

tcanta Euphorbia esula has nutrient value similar to alfalfa (Medicago sativa L.) and crested wheatgrass (Agropyron cristatum (L.) Gaertn.) and provides nutritious forage for

sheep and goats. Potential as a whole-plant biomass as a locally grown fuel crop for home-heating purposes (Maxwell et al., 1985). A high protein feed stock for grazing sheep and goats (Fox et al., 1991; Sedivec et al., 1995). The high protein diet result in very high quality mohair in angora goats (Stoneberg, 1989). High in hydrocarbon latex - possibly a good col-hardy hydrocarbon species. Leafy spurge hay burns with 4x the energy of wheat straw [1-1]. Dynamic accumula-

dwatta None Known

nrakta Eurasia. Native to central and southern Europe, and eastward through most of Asia north of the Himalaya to Korea and eastern Siberia. Currently found worldwide with the exception of Australia and New Zealand, ksacta Found on prairies, savannas, mountain meadows, and near woodlands. It grows in fields and waste places.

propta It can grow from seed or from creeping roots. Reproduces readily like by seeds that have a high germination rate and may remain viable in the soil for at least eight

nwatta Experimental Crop Management: HayClimate: boreal to subtropical. Humidity: arid to humid. Prefers areas of full sunlight and dry soil but can tolerate a variety of habitats including temperatures as low as -45C (-49F). A deeprooted perennial plant. Roots grow twice as fast in sandy soil as in clay soil. Roots in clay soil have greater branching than those in sandy soil. High levels of soil nitrogen can reduce the biomass of leafy spurge roots and lead to greater root concentrations near the top of the soil profile (U.S. Forest Service). Especially aggressive in semi-arid situations. Adapted to a wide range of conditions, from moist to dry with annual rainfalls as low as 180mm (7"). It grows as clusters with upright stems, 0.3 to 1m tall. Cultivation: experimental. Management: hav (Describes the non-destructive management systems that are used in cultivation) [1-1].

## 4.2.380 Chelone glabra

Balmony, White turtlehead

3 tlin 7 cvuc 0 kcak 0 tcan 3 dwat 1 m hkuc

hmimhtut cyutli tcuphia7n hwicli hrasilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chelone glabra is a PERENNIAL growing to 1 m (3ft. 3in) by 0.5 m (1ft. 8in). See above for USDA hardiness. It. is hardy to UK zone 3. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Antibilious Aperient Appetizer Cathartic Cholagoque Detergent Tonic VermifugeBalmony is a very bitter herb with a tea-like flavour that acts mainly as a tonic for the liver and digestive system[238]. It has long been held in esteem in N. American folk medicine, though it has never been investigated scientifically[268]. The herb also has antidepressant and laxative effects[238]. A decoction of the whole herb is antibilious, aperient, appetizer, cathartic, cholagogue, detergent, tonic, vermifuge[4, 21, 46, 61, 165, 207, 2221. It is used internally in the treatment of consumption. debility, diseases of the liver, gallbladder problems, gallstones etc[4, 254]. It is also used to relieve nausea and vomiting, intestinal colic and to expel worms[254]. Its tonic effect upon the digestive system has made it of benefit in the treatment of anorexia nervosa[268]. Externally, it is applied as a soothing ointment to piles, inflamed tumours, irritable ulcers, inflamed breasts etc[4, 268]. The plant is harvested when in flower and is dried for later use[238].

nrakta Eastern N. America - Newfoundland to Ontario and Minnesota, south to Georgia and Missouri. ksacta Margins of swamps, wet woods and rivers[4, 43].

propta Seed - sow spring in a cold frame and keep moist. The seed germinates in 2 - 6 weeks at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame. Plant them out into their permanent positions in the spring or early summer. Division in autumn[1]. Cuttings of soft tips in summer in a sandy soil in a frame[200].

nwatta Easily grown in any ordinary soil, but it grows best in a light loam[1]. Tolerates heavy clays and light

## 4.2.350 Ostrya virginiana

Ironwood, Hophornbeam, Hop Hornbeam American, Hop Hornbeam Eastern

3 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 15 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ostrva virginiana is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta WoodWood - close-grained, very hard, very strong, durable. It weighs 51lb per cubic foot. The wood is of a very high quality but the tree is not large enough to be used commercially. It is used locally for posts, mallets, tool handles and applications where resistance to wear is essential[11, 46, 61, 82, 103, 226, 227, 229]. A very good fuel, though it is almost impossible to split[226].

dwatta Antirheumatic Astringent Blood tonic Haemostatic PectoralThe bark is astringent, blood tonic and haemostatic[257]. A decoction of the bark is used to bathe sore muscles[257]. An infusion of the bark can be held in the mouth to relieve the pain of toothache[257]. An infusion of the heartwood has been used in the treatment of lung haemorrhages, coughs and colds, catarrh and kidney problems[257]. It is also used as a herbal steam bath in the treatment of rheumatism[257].

nrakta Eastern N. America - Nova Scotia to Manitoba, Nebraska, Florida and Texas. ksacta Rich moist woods[43, 227], it is also found on dry gravelly slopes and ridges, often in the shade of oaks and other large trees[82].

propta Seed - best sown as soon as it is ripe in a cold frame, it normally germinates in spring. The germination rate is variable but usually good[78]. 'Green' seed, harvested when the embryo has fully formed but before the outer coat has dried, sown immediately in a cold frame germinates very well. Stored seed requires stratification, 3 months warm then 5 months cold usually works well but germination can take 18 months[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Street tree, Woodland garden. An easily grown plant, succeeding in most soils[11]. Thrives in any good loam, including chalk[200], it does not demand much light. Prefers a deep open loam. A rather slow-growing tree[227]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Attractive flowers or

#### 4.2.351 Salix bebbiana

Beak Willow, Bebb Willow

3 tlin 7 cvuc 0 kcak 4 tcan 2 dwat 7 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix bebbiana is a deciduous Shrub growing to 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Basketry Charcoal Fibre Pioneer WoodA pioneer species, readily invading any cleared-out area if there is sufficient moisture[229]. It is short-lived and not very shade tolerant and so, having provided good conditions for other woodland trees to become established, it is eventually outcompeted by them[K]. The pliable stems are used in basket making[226, 229]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The bark has been twisted into cord and made into strong rope, bags and dresses[257]. The bark has been used for sewing birch bark onto basket frames[257]. The wood often has diamond-shaped depressions on the bark caused by a fungus. This wood is considered to be very ornamental and is carved into canes, lamp posts and furniture[229]. The wood has also been used to make baseball bats and to make charcoal[229]. Dynamic accumulator.

dwatta Anodyne Astringent Febrifuge PoulticeA poultice of the chewed root inner bark has been applied to a deep cut[257]. The shredded inner bark has been used as sanitary napkins to 'heal a woman's insides'[257]. A poultice of the damp inner bark has been applied to the skin over a broken bone[257]. A decoction of the branches has been taken by women for several months after childbirth to increase the blood flow[257]. A poultice of the bark and sap has been applied as a wad to bleeding wounds[257]. The fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta N. America - Newfoundland to Alaska, south to California. ksacta Moist rich soils along streams, lakes and swamps, but also forming dense thickets in open meadows[229]. Found at elevations up to 3000 metres[229].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood. June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. A fast-growing but short-lived species[229]. This species is closely related to S. starkeana, differing mainly in its more vigorous habit[11]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is reauired

## 4.2.352 Salix fluviatilis

3 tlin 7 cyuc 0 kcak 3 tcan 2 dwat 7 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix fluviatilis is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Basketry Pioneer Soil stabilization StringThe peeled stems have been used in basket making[257]. The inner bark can be twisted and made into a string[257]. This plant rapidly colonizes sandbanks and wet areas near streams, lakes etc. It is therefore an extremely useful species for stabilizing banks, its network of roots holding the soil securely. It can also be used as a pioneer species to prepare the way for mature woodland. It provides good conditions for other trees to establish and is eventually out-competed by them[229]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe bark has been used in the treatment of certain fevers[257]. The fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta Western N. America - Washington and Oregon. ksacta Forms extensive thickets and rapidly colonizes sandbars along lowland ponds, lakes and streams in moist sand or gravel overladen with silt[229].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. It is a fast-growing but short-lived species in the wild[229]. The following notes are based on the general needs of the genus. Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 4.2.353 Rhamnus cathartica

Common Buckthorn

3 tlin 7 cyuc 0 kcak 0 tcan 3 dwat 6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Rhamnus cathartica is a deciduous Shrub growing to 6 m (19ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The fruit is purgative but not seriously poisonous[186]. Other parts of the plant may also be poisonous[10, 19, 76, 186]. Adverse effects: Diarrhoea, weakness. Urine may turn dark yellow or red which is harmless. Possible body potassium loss if used for more than 10 consecutive days [301].

tcanta Dye Hedge Hedge WoodA green dye is obtained from the immature fruit[46, 57, 103, 115, 171]. Mixed with gum arabic and limewater, it makes a green pigment used in watercolour painting[238]. Yellow, orange and brownish dyes can also be obtained[100]. The colours are rich but fugitive[4]. A yellow dye is obtained from the bark[61, 100, 115]. It has been used to colour paper and maps[238]. Often grown as an informal hedge, it is also amenable to trimming[21, 186, 200]. Wood - hard, handsome with a marble-like grain. Used for small turnery[46, 61, 74].

dwatta Cathartic Depurative Diuretic Laxative PurgativeBoth the bark and the fruit of common buckthorn have been used for their purgative effect upon the body, however they can be rather violent in their action and so are rarely used in human medicines[244]. The berries, harvested when fully ripe, are cathartic, depurative, diuretic, laxative and violently purgative[1, 4, 9, 19, 46, 61, 218, 238]. About 8 - 15 of the mature fruits, chewed before breakfast, are a strong and effective laxative for adults, they should not be used by children[9]. An infusion of the not quite mature fruits is gentler in its action[9]. Use with caution, in large doses the fruit can cause vomiting and violent diarrhoea[9, 21]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Rhamnus cathartica for constipation (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Fen peat, scrub, hedges, ash and oak woods, on calcareous often dry soils[17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed will require 1 - 2 months stratification at  $5^{\circ}c$  and should be sown as early in the year as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta Succeeds in any reasonably good soil[11]. Prefers a dry or moist calcareous soil[1, 4, 9] in sun or light dappled shade[200]. This species is hardy to at least -15°c[238]. Plants regenerate well after cutting or burning but young plants are rather prone to frost damage when grown in an exposed position[186]. Plants are resistant to cattle grazing but young plants can be damaged by rabbits[186]. Plants have a very shallow root system[186]. This species often bears the aecidospore stage of 'crown rust' of cats so it should not be grown near cereals[1, 186]. The species in this genus are notably resistant to honey fungus[200]. A good bee plant[4, 108] and a main food plant for the brimstone butterfly[186]. Dioecious. Male and female plants must be grown if seed is required.

## 4.2.354 Cornus alternifolia

Green Osier, Alternateleaf dogwood, Alternate Leaf Dogwood, Golden Shadows Pagoda Dogwood, Green Osi 3 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cornus alternifolia is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

tcanta Dye WoodA light to dark-brown dye is obtained from the roots with the addition of vinegar[226]. Wood heavy, hard, close grained. It is too small to be of commercial value, but is used locally for turnery[82, 229].

dwatta Anthelmintic Antiaphonic Astringent Diaphoretic Febrifuge Ophthalmic Poultice Stimulant VDGreen osier was employed medicinally by a number of native North American Indian tribes who valued it particularly for its astringent bark which was used both internally and externally to treat diarrhoea, skin problems etc[257]. It is little used in modern herbalism. The dried bark is used as an astringent, diaphoretic and stimulant[213, 257]. The inner bark was boiled and the solution used as an enema[213] and this solution was also used as a tea to reduce fevers, treat influenza, diarrhoea, headaches, voice loss etc[213, 257]. It was used as a wash for the eyes[257]. A compound infusion of the bark and roots has been used to treat childhood diseases such as measles and worms[257]. It has also been used as a wash on areas of the body affected by venereal disease[257]. A poultice of the powdered bark has been used to treat swellings, blisters etc[257].

nrakta Eastern N. America - Newfoundland to Florida, west to Manitoba and Arkansas. ksacta Dry woods and rocky slopes[43]. Rich woodlands and forest margins in moist well-drained soils[82].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood

above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

## 4.2.376 Veronicastrum virginicum

Beaumont's Root, Culver's root, Bowman's Root, Culver's Root, Black Root

3 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Veronicastrum virginicum is a PERENNIAL growing to 1.2 m (4R) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Cathartic Cholagogue Emetic Hepatic Laxative TonicBeaumont's root was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is still occasionally used in modern herbalism, mainly for its effect upon the liver and bile production. Some caution is advised, the plant is potentially toxic[222]. The root is anodyne, cathartic, emetic, hepatic, laxative and tonic[4, 46, 61, 165, 218, 222]. The fresh root is a violent cathartic and possibly emetic, the dried root is milder in its action, but less certain[4]. The root also gently excites the liver and increases the flow of bile[4, 238]. An infusion has been used in the treatment of diarrhoea, coughs, chills and fevers, and also to ease the pain of backaches [257]. A tea made from the roots is strongly laxative[213, 222]. The roots are harvested in the autumn and should be stored for at least a year before use[213].

nrakta Eastern N. America - Ontario to Manitoba, south to Massachusetts, Alabama and Texas. ksacta Meadows, rich woods, thickets and prairies[43].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient quantity the seed can be sown outdoors in situ in the autumn or the spring. Division in autumn or spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Landscape Uses:Border, Massing, Seashore, Woodland garden. Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. Prefers a sunny position[188]. Hardy to at least -20°c[187]. Some named forms have been selected for their ornamental value[200]. Special Features:North American native, Attracts butterflies, Extended bloom season in Zones 9A and above.

## 4.2.377 Bromus inermis

Smooth Brome, Pumpelly's brome 3 tlin 7 cyuc 0 kcak 2 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bromus inermis is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Soil stabilizationAn excellent plant to grow for controlling soil erosion because of its fast-growing interlocking root system[269]. It is especially valuable in semi-arregions, such as the Prairie Provinces of Canada and the Great Plains of the United States[269]. Growth starts early in

 spring with a further period of growth in early autumn under favourable moisture conditions[269].

nrakta N. Europe, eastwards to China. ksacta Not

propta Seed - sow spring in situ. The seedbed should be firm and seed should not be covered to more than 6 - 13 mm depth. Seed rates of 3.3 kilos per hectare are used when the plant is sown in a pure stand, though it is more often sown in a mixture with various legumes such as alfalfa, sweet clover, red clover or Lotus corniculatus[269]. There are approximately 300,000 seeds per kilo[269].

nwatta Best adapted to regions with moderate rainfall and moderate cool summer temperatures, it is suited to silt or clay soils and deep loams, but also does well on light sandy soils and on well-drained soils. Plants are less drought resistant than crested wheatgrass and they do not tolerate temperature extremes. Smooth brome is suited for irrigated areas but is not recommended for saline or alkali soils[269]. Smooth brome is reported to tolerate an annual precipitation of 32 to 176cm, an annual average temperature range of 4.3 to 19.9°C and a pH in the range of 4.9 to 8.2[269]. Smooth brome is also reported to tolerate alkali conditions, disease, drought, frost, fungi, grazing, mycobacterium, salt, viruses, and weeds[269].. There are a number of named varieties, selected mainly as hay and pasture crops. These cultivars are divided into two groups, northern and southern. The southern group is less cold-hardy and does not survive average winter conditions further north than southern Minnesota in N. America, the northern group is much more cold tolerant[269]. The genus Bromus contains many complex, polyploid series. Bromus inermis belongs to section Bromopsis, containing wild species with chromosome numbers ranging from 2x to 8x. Following its introduction to North America, smooth broome, an aggressive species, has tended to replace native American species of sect. Bromopsis, especially B. pumpellianus. Hybridization studies have been made between: B. inermis, 8x; B. pumpellianus, 8x; and material of the introduced B. erectus complex (6x, 8x, 10x, though the last is probably itself hybrid). An objective of these studies was to incorporate into inermis the larger seeds of pumpellianus and better seedling vigour of erectus. The three species are related, crossable and give guite fertile hybrids. Collections of B. inermis in North America show varying meiotic irregularity and aneuploidy. This is probably a result of introgression from B. pumpellianus and the B. erectus complex. Quite a high degree of meiotic irregularity may be tolerated under natural conditions in a long lived, cross-pollinated species such as B. inermis, which can spread aggressively by rhizomes[269].

#### 4.2.378 Echinacea angustifolia

Echinacea, Blacksamson echinacea, Strigose blacksamson 3 tlin 8 cyuc 0 keak 2 tean 5 dwat 1.2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Echinacea angustifolia is a PERENNIAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista possible suppression of immunity with habitual use. High doses over 1000 mg may cause dizziness. Use of herb for 10-14 days recommended followed by a short break.

tcanta Attracts butterflies and beneficial insects including parasitic Wasps. General insect (especially bees) nectar plant. Butterfly nectar plant. Shelter plant for beneficial insects. Wildlife Food – seed-eating birds - a favorite of the American Goldfinch). Pioneer Plant – helps reestablish overused or damaged land. Drought Plant – this species can tolerate prolonged dry conditions once established.

dwatta Adaptogen Alterative Antiseptic Depurative Diaphoretic Digestive Sialagogue Stings UrinaryEchinacea is one of the world's most important medicinal herbs. Research shows that it has the ability to raise the body's resistance to bacterial and viral infections by stimulating the immune

large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[2001. Very easy, larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most good garden soils[1], prefering one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but it also succeeds in partial shade[233]. Prefers a rich soil[1], but tolerates poor ones[233]. Plants are hardy to about -25°c[187]. The crushed plant has a smell like juniper berries[257]. Hybridizes freely with other members of this genus[200]. Plants need to be divided every few years, preferably in the spring, in order to keep the plant vigorous[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. Attracts butterflies and moths, it is also a good bee plant providing nectar in autumn[30].

## 4.2.374 Aconitum carmichaelii

Japanese Aconite, Carmichael's monkshood 3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aconitum carmichaelii is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 238].

dwatta Anaesthetic Analgesic Antiinflammatory Antirheumatic Cardiotonic VasodilatorA widely used herbal remedy in China, where it is cultivated for its root[218]. This is harvested in the autumn as the plant dies down and is then dried before being used. The root is anaesthetic, analgesic, anti-inflammatory, antirheumatic, cardiotonic, stimulant and vasodilator[176, 218, 238]. It is used in the treatment of shock and collapse, chronic diseases with symptoms of cold, gastralgia and rheumatic arthralgia, oedema and diarrhoea due to hypofunction of the spleen and kidney[176]. A tincture of the root is used externally in the treatment of rheumatism, arthralgis, sprains, contusions etc[283]. Use with great caution, the plant contains the toxic alkaloid aconitine and is very poisonous - should not be used internally [218] unless under the direction of a qualified practitioner [238, 283]. Overdoses lead to numbness of the tongue, lips and extremities, nausea, vomiting, irritability and coma[176].

nrakta E. Asia - C. and W. China to N. America. ksacta Forest margins, scrub, grassy slopes and mountains at elevations of 100 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the vear[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Plants will only thrive in a sunny position if the soil remains moist throughout the growing season[238]. Prefers a calcareous soil. This species is not included in the Flora of North America[270] and so it should be considered doubtful that its range includes this region. A very ornamental plant[233], there are some named forms[238]. It grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth

of nearby species, especially legumes[54]. Closely related to A. fischeri and considered to be part of that species by some botanists[1].

#### 4.2.375 Lobelia cardinalis

Cardinal Flower

3 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lobelia cardinalis is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista The plant is potentially toxic, but the degree of toxicity is unknown[222]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274]. he sap of the plant has been known to cause skin irritation[274].

dwatta Analgesic Anthelmintic Antispasmodic Emetic Epilepsy Expectorant Febrifuge Homeopathy Nervine StomachicEmetic, expectorant and nervine[4, 61]. The root is analgesic, anthelmintic, antispasmodic and stomachic[4, 61, 2571. A tea made from the roots has been used in the treatment of epilepsy, syphilis, typhoid, stomach aches, cramps, worms etc[222, 257]. A poultice of the roots has been applied to sores that are hard to heal[257]. The leaves are analgesic and febrifuge[257]. A tea made from the leaves is used in the treatment of croup, nosebleeds, colds, fevers, headaches etc[222]. A poultice of the leaves has been applied to the head to relieve the pain of headaches[257]. This species is considered to have similar medicinal activity to L. inflata, but in a milder form[222]. It was seldom if ever used[222]. The plant is used to make a homeopathic remedy[4]. The report does not say which part of the plant is used, nor what it treats.

nrakta N. America - New Brunswick to Quebec, south to Florida and Texas. ksacta Damp shores, meadows and swamps[43].

propts Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Basal cuttings in spring[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering in moist sand, it forms roots at the nodes[200].

nwatta Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. Requires a deep rich soil and plenty of moisture[1, 200]. Grows well in heavy clay soils. Succeeds in standing water though is not then so long lived[200]. Succeeds in full sun or light shade[200]. Requires protection from the wind[200]. Dormant plants are hardy to at least -25°c[187], though they can be excited into premature growth in mild winter areas and are then more susceptible to frost damage[200]. A very ornamental plant[1]. Hybridizes freely with other members of this genus. Special Features: Attracts birds, North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils and in dry soils. Succeeds in full sun or light shade[[188]. Plants are hardy to about -25°c[184]. A fast-growing but short-lived species in the wild[229], it is closely related to C. controversa[200]. This species is unusual in having alternate leaves whilst almost all other members of this genus have opposite leaves[182]. Plants have a thin bark and this makes them susceptible to forest fires[229]. There is at least one named form selected for its ornamental value[188]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Attractive flowers or blooms.

## 4.2.355 Rhamnus frangula

Alder Buckthorn

3 tlin 7 cyuc 0 kcak 3 tcan 3 dwat 5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

druttå Rhamnus frangulå is a deciduous Shrub growing to 5 m (16ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The plant is poisonous unless stored for 12 months before use[4, 19, 76]. This report is probably referring to the bark. Do not use in cases of intestinal obstruction, stenosis, atony, inflammatory colon disease, appendicitis, abdominal pain of unknown origin. Avoid long-term use. Two weeks recommended under medical supervision [301].

tcanta Charcoal Dye Hedge Hedge Nails WoodA yellow dye is obtained from the leaves and bark[4, 115]. It is much used in Russia and turns black when mixed with salts of iron[4]. A green dye is obtained from the unripe fruit[4, 115]. A blue or grey dye is obtained from the ripe berries[4, 115]. Plants can be grown as an informal (untrimmed) hedge, though they are also amenable to trimming[200]. The cultivar 'Tallhedge (syn 'Columnaris') is very suitable for this purpose[200]. The wood is used to make wooden nails, shoe lasts, veneer etc[46, 61]. It is the source of a high quality charcoal that is used by artists[4, 11, 13, 17, 100, 115, 182, 186]

dwatta Aperient Cathartic Cholagogue Laxative Purgative Tonic VermifugeAlder buckthorn has been used medicinally as a gentle laxative since at least the Middle Ages[244]. The bark contains 3 - 7% anthraguinones, these act on the wall of the colon stimulating a bowel movement approximately 8 - 12 hours after ingestion[254]. It is so gentle and effective a treatment when prescribed in the correct dosages that it is completely safe to use for children and pregnant women[244]. The bark also contains anthrones and anthranols, these induce vomiting but the severity of their effect is greatly reduced after the bark has been dried and stored for a long time[254]. The bark is harvested in early summer from the young trunk and moderately sized branches, it must then be dried and stored for at least 12 months before being used[4, 238] The inner bark is cathartic, cholagogue, laxative (the fresh bark is violently purgative), tonic, vermifuge[4, 9, 13, 21, 165]. It is taken internally as a laxative for chronic atonic constipation and is also used to treat abdominal bloating, hepatitis, cirrhosis, jaundice, and liver and gall bladder complaints[238]. It should be used with caution since excess doses or using the bark before it is cured can cause violent purging[9, 21]. Externally, the bark is used to treat gum diseases and scalp infestations[238], or as a lotion for minor skin irritations[244]. The fruit is occasionally used, it is aperient without being irritating[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Rhamnus frangula for constipation (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, the Urals and Siberia. ksacta Swamps and damp places, usually on moist heaths and damp open woods, preferring a peaty soil[9, 17, 21].

propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at about 5° and should be sown as early in the year as possible in a cold frame or outdoor seedbed[200]. Germination is usually good, at least 80% by late spring. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[41].

nwatta An easily grown plant, it succeeds in any reasonably good soil[11, 98], preferring neutral to acid conditions[238]. It grows well on damp or peaty soils[98]. Prefers a moist moderately fertile soil in sun or semi-shade[200]. Grows well in wet soils but not if they are water-logged[186]. Dislikes drought or exposure to strong winds[186]. Plants are hardy to at least -15°c[238]. Alder buckthorn is a slowgrowing plant, though it coppices well. It was at one time often grown for its wood which was used in making charcoal[186]. The plants regenerate well after forest fires or grazing[186]. Plants flower on one-year old wood and also on the current year's growth[4]. Cultivated as a medicinal plant in S. Europe[57]. Often bears the aecidospore stage of 'crown rust' of oats[1]. The species in this genus are notably resistant to honey fungus[200]. A good bee plant[4] and a main food plant for the larvae of the yellow brimstone butterfly[186]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant [2-1]

## 4.2.356 Acer pensylvanicum

Moosewood, Striped maple, Moosewood, Pennsylvania

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 4.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Acer pensylvanicum is a deciduous Tree growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

tcanta PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. The wood is light, soft, close-grained and satiny, it weighs 33lb per cubic foot[82, 235]. It is not used commercially, though it is sometimes used for fuel[226].

dwatta Antiemetic Emetic Kidney PectoralA tea made from the inner bark is used in the treatment of colds, coughs, bronchitis, kidney infections, gonorrhoea and the spitting of blood[222]. A wash is used externally on swollen limbs and as a wash for paralysis[222]. A tea made from the leaves and twigs is used to both allay and induce vomiting, depending on the dosage[222]

nrakta Eastern N. America - Nova Scotia to Georgia, west to Michigan. ksacta Moist rich woodlands, often by water, from sea level to 1,000 metres[200, 229]. Usually in the shade of other trees and occasionally forming a large part of the shrubby undergrowth[82].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the

seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Grafting is not usually advised for this species, though any cultivars can be grafted onto rootstocks of the species.

nwatta Landscape Uses:Erosion control. Of easy cultivation, it prefers a sunny position or light dappled shade and a good moist well-drained soil but succeeds on most soils, especially those on the acid side, and dislikes alkaline soils[182, 200]. Grows well in heavy clay soils. Plants are hardy to about -25°c when they are fully dormant[200]. A good tree for street planting[200]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features:North American native, Inconspicuous flowers or blooms.

## 4.2.357 Physocarpus opulifolius

Ninebark, Common ninebark, Atlantic ninebark, Ninebark 3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Physocarpus opulifolius is a deciduous Shrub growing to 3 m (9ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

pcista Large medicinal doses can be toxic[257].

dwatta Emetic Infertility Laxative Women's complaints A tea made from the inner bark is laxative and emetic(222, 257]. It is used internally to treat women's complaints, gonorrhoea, TB and to enhance fertility(222, 257]. It is also used as a wash on scrofulous glands in the neck[257]. Some caution is advised, this herb is best used only under the supervision of a qualified practitioner. See the notes above on toxicity.

nrakta Central and Eastern N. America - Quebec to South Carolina, west to Alabama, Arkansas and Minnesota. ksacta Banks of streams[222].

propta Seed - we do not have any information for this species but suggest sowing the seed as soon as it is ripe if possible in a cold frame. If sown in the spring it is likely to require a period of cold stratification. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers in the dormant season. Cuttings of greenwood, June in a closed frame[200].

nwatta Landscape Uses:Border, Foundation, Massing, Specimen. Prefers an acid soil, quickly becoming chlorotic when growing on shallow chalk[200]. Succeeds in a moist moderately fertile soil in full sun[200]. A very hardy plant, tolerating temperatures down to at least -25°c[200]. There are many named varieties, selected for their ornamental value[200]. Flowers are produced on the previous year's growth[11]. A useful plant for rough shrubberies where plants are more or less left to look after themselves[11]. Special Features:Attractive foliage, North American native, Blooms are very show.

## 4.2.358 Eupatorium capillifolium

Dogfenne

3 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Eupatorium capillifolium is a PERENNIAL growing to 3 m (9ft 10in). The species is hermaphrodite (has both male and female organs) and is pollinated by Insects.

The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Repellent StrewingThe plant is used as a strewing herb and to discourage insects[61].

dwatta StingsThe entire plant is applied externally as a remedy for the bites of reptiles and insects[61].

nrakta Eastern N. America - New Jersey to Vancouver, south to Florida. ksacta Borders of woods, clearings, fields and roadsides[43]. Disturbed areas, mainly in sandy soils in Texas[274].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta We have very little information on this species but, judging by its habitat, it should be hardy in Britain. Other members of this genus succeed in ordinary well-drained but moisture retentive garden soil in sun or part shade[200]. Plants seem to be immune to the predations of rabbits[233]. An aggressive and weedy species[43]. Special Features: North American native. Invasive.

#### **4.2.359** Rhus vernix

Poison Sumach

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 3 m hkuc htut cyutli tcuphia7n hwicli hrasilutnyik hpa7tli flatpriklwis

hpa7tmwatli nyanhjen hjonli

drutta Rhus vernix is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in July, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista This plant contains toxic substances and skin contact with it can cause severe irritation to some people[11]. The sap is extremely poisonous[11]. The sap contains 3-N pentadecycatechnol. Many people are exceedingly sensitive to this, it causes a severe spreading dermatitis. The toxins only reach the skin if the plant tissues have been damaged, but even indirect contact can cause severe problems[200].

tcanta Dye Ink Miscellany Mordant Oil Varnish WoodThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. An indelible black ink can be made from the sap[226]. A varnish is obtained from the sap, it is black, lustrous and durable[19, 82]. The final product is toxic[226]. Wood - light, soft, coarse grained[82]. It weighs 27lb per cubic foot[235].

dwatta Febrifuge Miscellany SkinPoison sumach has occasionally been used medicinally, though it is an extremely poisonous plant and great caution should be exercised. Any herbal use should only be undertaken under the supervision of a qualified practitioner. See also the notes above on toxicity. The plant has been used in the treatment of fevers, ague, ulcerated bladder, asthma and wasting diseases[257]. The plant has been used as a wash to treat foul ulcers[257].

nrakta Eastern N. America - Maine to Vermont and Ontario, south to Florida, Missouri and Louisiana. ksacta Wooded swamps, often inundated for part of the year[4, 43, 82]

propta Seed - best sown in a cold frame as soon as it is rise. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are

ing together [106, 171]. They are also used as a talcum powder and for dressing moulds in iron foundries [74]. They can also be used as explosives in fireworks and for artificial lightning [46, 57, 102, 171]. The plant can be used as a mordant in dyeing [172].

dwatta Hypnotic MiscellanyThe plant is hypnotic[192]. Chewing three stems is said to induce mild intoxication whilst eight can cause unconsciousness[192, 213].

nrakta Western N. America. ksacta Moist coniferous woods, lowland to moderate elevations in mountains.

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. The spores are generally produced in abundance but are difficult to grow successfully[200]. Layering of growing tips[200].

nwatta Thrives in a rough spongy peat in a shady position[1]. Requires a humid atmosphere[200]. Terrestrial members of this genus are hard to establish. The roots are delicate and liable to rot, most water being absorbed through the foliage[200]. There is some doubt as to the correct spelling of this species name. I have a feeling that it could be a mis-spelling of L. complanatum. Members of this genus are rarely if ever troubled by browsing deer[233]. Although looking more like a moss, this genus is closely related to the ferns[200].

#### 4.2.371 Artemisia vestita

Russian Wormwood

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 1.2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Artemisia vestita is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

dwatta Antiphlogistic FebrifugeThe plant is antiphlogistic and febrifuge[266].

nrakta E. Asia from Pakistan to China and Tibet. ksacta Hills, rocky slopes, grasslands, shrublands and outer forest margins at elevations of 2000 - 4300 metres[266].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. This species is closely related to A. sacrorum and A. gmelinii, it is often confused with those species[266]. We are not sure if this plant is annual, biennial or perennial, since various reports differ. Members of this genus are rarely if ever troubled by browsing deer[233].

## 4.2.372 Cimicifuga heracleifolia

Komarov's Bugbane 3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cimicifuga heracleifolia is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it does belong to a family that contains a number of toxic species and at least one species in this genus is said to be mildly poisonous. Some caution is therefore advised.

dwatta Analgesic Antibacterial Antipyretic Antiviral SedativeThe root is analgesic, antibacterial, antiviral, febrifuge and sedative[176, 279]. It is used internally in the treatment of common cold with headache and sore throat, measles, headache, gingivitis, stomatitis, prolapse of the rectum and uterus[176]. The root is harvested in the autumn and used fresh or dried[238]. Use with caution[176], see the notes above on toxicity.

nrakta E. Asia - Éastern Russia to Northern China. ksacta Scrub and grassy slopes from sea level to 1000 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 1 - 12 months or even longer at 15°c[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°c and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring

nwatta Prefers a moist humus rich soil and some shade[1, 200]. Succeeds in ordinary garden soil[1]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 4.2.373 Aster puniceus

Purplestem Aste

3 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1.3 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aster puniceus is a PERENNIAL growing to 1.3 m (4ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

tcanta Landscape uses: Forest garden, Cottage gardens, Water garden, Wildlife garden, Moist Prairie or Meadow, Perennial borders. Attracts wildlife: Butterfly nectar plant, Butterfly host plants.

dwatta The roots are diaphoretic, emmenagogue and febrifuge[257]. A decoction has been used in the treatment of colds, consumption, typhoid, pneumonia and fevers[257]. A decoction has been used to promote menstruation - this can lead to an abortion[257]. The decoction has also been used to restore a woman to health after giving birth[257]. The chewed root has been applied to an aching tooth to allay the pain[257].

nrakta Eastern N. America. Naturalized in several sites in northern Britain[17]. ksacta Not known

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates [134]. Germination usually takes place within 2 weeks at  $20^{\circ}$ cf 1341. When

tion is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised.

dwatta Antirheumatic Odontalgic VermifugeThe root contains 'filicin', a substance that paralyses tapeworms and other internal parasites and has been used as a worm expellent[171, 238]. It is one of the most effective treatments known for tapeworms - its use should be immediately followed by a non-oily purgative such as magnesium sulphate in order to expel the worms from the body[238]. An oily purge. such as caster oil, increases the absorption of the fern root and can be dangerous[238]. The root is harvested in the autumn and can be dried for later use, it should not be stored for longer than 12 months[238]. This remedy should be used with caution and only under the supervision of a qualified practitioner[238]. The root is toxic and the dosage is critical[238]. See also the notes above on toxicity. An infusion of the root has been used in the treatment of rheumatism[257]. A warm infusion, held in the mouth, has been used to treat toothaches[257].

nrakta N. America - Canada to Georgia and westwards to the Rockies. ksacta Damp woods and swamps[187]. Rocky, wooded slopes and ravines, edges of woods, stream banks and roadbanks, and rock walls at elevations of 50 - 1500 metres[270].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1- 3 months at  $20^{\circ}\mathrm{c}$ . Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses: Container, Ground cover, Specimen, Woodland garden. Prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position. Succeeds in full sun but grows best in a shady position with only 2 -3 hours sun per day[200]. Tolerates a pH range from 4.5 to 7[200]. Dislikes heavy clay. Prefers a good supply of water at its roots but succeeds in dry shade and tolerates drought when it is established. A very hardy plant, tolerating temperatures down to about -30°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Hybridizes in the wild with several other species[187]. Special Features: Attractive foliage, North American native, Wetlands plant, There are no flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 4.2.369 Geranium maculatum

Spotted Cranesbill, Spotted geranium, Crowfoot, Wild Geranium, Cranesbill

3 tlin 10 cyuc 0 kcak 2 tcan 3 dwat m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Geranium maculatum is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a medium rate. See above

for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Dye Miscellany TanninA brown dye is obtained from the flowers[168]. The roots and the leaves are rich in tannin[4]. Plants are suitable for ground cover when spaced about 45cm apart each way[208].

dwatta Antidiarrhoeal Antiseptic Astringent Cholera Diuretic Dysentery Kidney Miscellany Styptic TonicThe whole plant, but especially the root, is antiseptic, highly astringent. diuretic, styptic and tonic[4, 21, 102, 165, 222, 238]. An infusion of the whole plant, or of the roots alone, is used in the treatment of diarrhoea (especially in children and the elderly), dysentery, irritable bowel syndrome, cholera, kidney complaints, bleeding and a wide range of other ailments[61, 213, 254]. It is often used in combination with other herbs[238]. Externally, it is applied to purulent wounds, haemorrhoids, thrush, vaginal discharges and inflammations of the mouth[238]. The plants are rich in tannin[213], the root containing 10 - 20%[222]. The roots can be harvested in the autumn then dried and stored[213]. It is best to harvest the roots as the plant comes into flower since it is then at its most active medicinally[4]. The leaves are harvested as the plant comes into flower and are dried for later use[238].

nrakta Eastern N. America - Maine to Georgia, west to Arkansas, Kansas and Manitoba. ksacta Wet places in woods, wet rocks and in swamps[187]. Woodlands, thickets and meadows[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Massing, Woodland garden. Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200], including water-logged soils[187]. Plants are hardy to about -25°c[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-21. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 4.2.370 Lycopodium campanulatum

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Lycopodium campanulatum is a FERN. See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep wood) land) or semi-shade (light woodland). It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, a number of other members of this genus are said to be toxic and so some caution is advised.

tcanta Miscellany MordantThe spores are water repellent and can be used as a dusting powder to stop things stick-

large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. Requires a moist soil[14]. The young growth in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

## 4.2.360 Fritillaria meleagris

Snakehead Fritillary, Chequered lily, Checkered Fritillary 3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Fritillaria meleagris is a BULB growing to  $0.3\ m$  (1ft) by  $0.1\ m$  (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The bulb is poisonous[100].

dwatta The plant formerly had a reputation as a healing herb, but is not used at present[4].

nrakta Europe, including Britain, from Sweden south and west to France, Serbia and the Lower Volga. ksacta Damp meadows and pastures[17], especially on alkaline soils[90].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. Prefers a moist non-acid soil and a sunny position[17, 24, 42]. Succeeds in any soil, preferring a light soil with plenty of humus[1, 90]. Succeeds in sun or light shade[1, 90]. Grows well in short turf[108]. A very ornamental plant[1], it often self-sows when in a suitable position. Rabbits are very fond of this plant and will destroy it wholesale if given the opportunity[4]. A good plant for the spring meadow[24, 90, 134]. The flowers are very attractive to bees[108]. Plants should not be allowed to dry out in the summer[90]. Special Features: Attractive foliage, Naturalizing, Flowers have an unpleasant odor, Attractive flowers or blooms.

#### 4.2.361 Centaurea montana

Mountain Cornflower, Perennial cornflower, Mountain Bluet 3 tlin 9 cyuc 0 kcak 0 tcan 2 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Centaurea montana is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Can be used as a ground cover plant in a sunny position[188, 208].

dwatta Antitussive Astringent Diuretic Emmenagogue Ophthalmic Purgative TonicMountain cornflower is seldom used in modern herbalism, though it does still have a reputation in parts of Europe as a wash for tired eyes[268]. It is considered to be most effective on blue eyes, great plantain (Plantago majus) being used for brown eyes[268]. The dried flowers are antitussive, astringent, weakly diuretic, emmenagogue, ophthalmic, very mildly purgative and tonic[9]. An infusion can be used as a treatment for dropsy, constipation, as a mouthwash for bleeding gums and as an eye bath for conjunctivitis[9].

nrakta Europe. ksacta Mountain woodland margins and meadows[9].

propta Seed - sow March in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. The seed is best sown as soon as it is ripe in August in a greenhouse, overwintered under cover, and planted out in spring. Division in autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. This should be done at least once every three years in order to maintain the plants vigour. Basal cuttings in spring. Harvest the shoots when they are about 5 - 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container, Massing, Specimen. Succeeds in ordinary garden soil[1, 200]. Prefers a moist well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. Plants are hardy to at least -20°c[187]. A very ornamental plant[1], there are some named varieties[187]. The plants have creeping rhizomes and form spreading patches[187]. A good bee plant[108]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Invasive, Naturalizing, Suitable for cut flowers.

## 4.2.362 Filipendula rubra

Queen Of The Prairie, Meadowsweet 3 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Filipendula rubra is a PERENNIAL growing to 2.5 m (8ft) by 1.3 m (4ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Analgesic Antiinflammatory Astringent Cardiac DysenteryThe root is rich in tannin, it is used as an astringent in the treatment of diarrhoea, dysentery, bleeding etc[222]. It has also been used in the treatment of various heart complaints[257]. The plant probably contains salicylic acid, the chemical forerunner of aspirin[222]. This is anti-inflammatory and analgesic[222].

nrakta Eastern N. America - Pennsylvania to Georgia, west to Michigan and Iowa. ksacta Moist meadows and bogs[222].

propta Seed - best sown in the autumn in a cold frame [1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 -  $13^{\circ}(200)$ . When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Specimen. Requires a humus-rich moist soil in semi-shade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils[1, 17]. Does well in marshy soils[24, 200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Although the plants are perfectly hardy in Britain, they appreciate the winter protection of bracken or some similar mulch when grown in areas of prolonged frosts[200]. Plants spread fairly freely and form large clumps[233]. There is at least one named variety, selected for its ornamental value[200]. The flowers are very attractive to bees[24, 30]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, North American native, Suitable for cut flowers.

## 4.2.363 Eupatorium maculatum

Joe Pye Weed, Spotted joe pye weed 3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Eupatorium maculatum is a PERENNIAL growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta StrawThe stems have been used as straws[257]. dwatta Antirheumatic Diaphoretic Diuretic KidneyA tea made from the whole herb is diuretic[222]. It is used in the treatment of kidney complaints, painful urination, rheumatism etc[61, 222]. The leaves and stems are harvested in the summer before the flower buds open, and are dried for later use[238]. A tea made from the roots is used in the treatment of fevers, colds, kidney and liver complaints, rheumatism etc[222, 257]. It is said to have a tonic effect upon pregnant women[257] and is also said to induce sweating[222]. Externally, a decoction of the roots is used as a wash on rheumatic joints[257]. The roots are harvested in the autumn and dried for later use[238]

nrakta South-eastern and Central N. America - Newfoundland to British Columbia to Washington and New York. ksacta Damp thickets, meadows, shores etc, usually on rich or calcareous soils from Quebec and southwards[43].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Landscape Uses:Border, Erosion control, Massing, Seashore, Specimen, Woodland garden. Succeeds in ordinary garden soil that is well-drained but moisture retentive in sun or part shade[200]. This species is hardy to about -25°([187]. Plants seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, North

American native, Naturalizing, Attracts butterflies, Suitable for cut flowers.

#### 4.2.364 Rhododendron maximum

Rosebay Rhododendron, Great laurel 3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Rhododendron maximum is an evergreen Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from June to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is polliniated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The leaves are poisonous[222]. Ingestion can cause convulsions and coma[222]. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities[183].

tcanta WoodWood - fine-grained, hard, heavy, strong, rather brittle[46, 61, 82, 229]. It weighs 39lb per cubic foot[235]. Used for tool handles and as a boxwood (Buxus spp.) substitute in engraving[46, 61, 82, 229].

dwatta Analgesic Antirheumatic CardiacThe poulticed leaves are used to relieve arthritic pain, headaches etc[61, 222]. A decoction of the leaves is occasionally employed internally in domestic practice in the treatment of rheumatism[82, 257]. The leaves are taken internally in controlled dosage for the treatment of heart ailments[222]. Caution is advised, see the notes above on toxicity.

nrakta Eastern N. America - Nova Scotia and south to Georgia and Alabama. ksacta Damp places along streams, edges of bogs and ponds, woods and mountain slopes to 900 metres[43, 184], often forming impenetrable thickets[235].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in a most humus-rich lime-free soils except those of a dry arid nature or those that are heavy or clayey[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires[200]. A pH between 4.5 and 5.5 is ideal[1]. Hardy to about .30°c[184]. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. Plants form a root ball and are very tolerant of being transplanted, even when quite large, so long as the root ball is kept intact[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 4.2.365 Alchemilla mollis

Lady's-mantle

3 tlin 8 cyuc 0 kcak 3 tcan 0 dwat m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Alchemilla mollis is a deciduous Perennial growing to 0.6 m (2ft) by 0.8 m (2ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista None Known kcakta None Known tcanta A good ground cover plant. Grow as ground cover in shade or or beneath open shrubs and trees. Will self-seed into gravel or cracks between paving. Great at the front of borders, as edging for paths or massed as a ground cover. A clump-forming perennial forming dense, leafy mounds of light green leaves.

dwatta None Known. Although widely planted in herb gardens A. Mollis has no medicinal properties. The species Alchemilla xanthochlora and Alchemilla alpina are recommended.

nrakta Native to southern Europe and grown throughout the world as an ornamental. ksacta Moist meadows, open woods, pastures and also on rock ledges in mountainous ar-

propta Seed - sow spring in a cold frame. The seed usually germinates in 3 - 4 weeks at 16c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on a cold frame for their first winter, planting out in late spring or early summer. Division in spring or autumn. The divisions can be planted out direct into their permanent positions, though we find it best to pot them up and keep them in a sheltered position until they are growing away well.

nwatta An low growing herbaceous perennial plant making an excellent ground cover that grows in a clumping manner. Moist but well-drained soil in sun to partial shade. Sun exposure: Full sun, dappled shade, partial shade. Shade type: Damp. Hardiness: Hardy. Soil type: Well drained, blight, sandy, clay, heavy, moist. Soil pH:5.5 to 7.5. Hardiness Zones:3 to 8. The plant tolerates close to full shade. The Royal Horticultural Society has given it its prestigious Award of Garden Merit (AGM). Dies down completely in winter.

## 4.2.366 Delphinium menziesii

Menzies' Larkspur

3 tlin 7 cyuc 0 kcak 0 tcan 1 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Delphinium menziesii is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

pcista All parts of the plant are toxic[172]. The plant is most toxic when it is young[200].

tcanta Dye ParasiticideA parasiticide is obtained from the leaves[172]. It is quite toxic and so is for external use only. A blue dye can be obtained from the flowers[257].

dwatta Parasiticide PoulticeA poultice of the stalks and roots has been applied to sores[257].

nrakta Western N. America - British Columbia to California. ksacta Coastal bluffs and prairies to lower montane meadows[60]. Meadows and open woodlands from sea level to 1000 metres[270].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about  $3^{\circ}c[200]$ . Temperatures above  $15^{\circ}c$  inhibit germination[175]. The seed usually germinates in 2- 9 weeks at  $15^{\circ}c[175]$ . When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Prefers a rich well-drained soil[111, 200]. Dislikes water-logged soils[200]. Requires an open sunny position[188]. A greedy plant, inhibiting the growth of nearby plants, especially lequmes[54].

### 4.2.367 Silphium perfoliatum

Cup Plant, Rosinweed 3 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Silphium perfoliatum is a PERENNIAL growing to 2.5 m (8ft 2in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Alterative Antispasmodic Diaphoretic Emmenagoque Febrifuge Hepatic Pectoral Stimulant Styptic Tonic Women's complaintsCup plant was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. A decoction of the root has been used to treat the stoppage of periods, and also to treat morning sickness and to prevent the premature birth of a child[257]. In view of these conflicting uses, it is best that it is not used by pregnant women unless under the guidance of a qualified practitioner[257]. The root is alterative, antispasmodic, diaphoretic, emmenagogue, febrifuge, hepatic, stimulant, styptic and tonic. It is used in the treatment of liver and spleen disorders and has also been used to treat morning sickness[4, 61, 257]. A decoction of the root has been used internally in the treatment of back and chest pain and lung haemorrhages[257]. A decoction of the root has been used as a face wash to treat paralysis[257]. A poultice of the moistened dried root has been applied to wounds to stop the bleeding[257].

nrakta Eastern N. America - Ontario to South Dakota, south to Georgia, Missouri and Oklahoma. ksacta Rich woods, thickets, river banks and prairies[43].

propta Seed - best sown as soon as it is ripe in a green-house[200]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[188]. This is very difficult due to the deep and extensive root system.

nwatta Landscape Uses:Border, Massing, Specimen, Woodland garden. Succeeds in any ordinary garden soil[1]. Prefers a deep moisture retentive moderately fertile soil that is not too nitrogen rich, in sun or dappled shade[200]. Hardy to at least -25°c[187]. Plants have a deep and extensive root system which makes transplanting difficult. An aromatic resin exudes from the crushed leaves and stems[245]. Special Features: Attracts birds, Attractive foliage, North American native, Naturalizing, Attracts butterflies. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 4.2.368 Dryopteris marginalis

Marginal Woodfern, Leather Wood Fern

3 tlin 8 cyuc 0 kcak 0 tcan 4 dwat m hkuc

hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Dryopteris marginalis is an evergreen Fern growing to 0.8 m (2ft 7in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some cau-

then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Lavering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if re-

nwatta Dislikes calcareous soils[11]. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too water-logged[11]. Grows well in heavy clay soils. Tolerates dry soils[200]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Produces suckers quite freely, the plant forms thickets. When propagated by these suckers, the new plants can begin producing a crop of fruit in their second year[K]. The sub-species A. stolonifera micropetala was seen growing in dappled shade at Hilliers Arboretum in early April 1999. It was about 2 metres tall, suckering freely with some suckers more than 50cm from the parent plant, and flowering freely[K]. Hybridizes with A. arborea, A. bartramiana, A. laevis and A. sanguinea. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. The plant is heat tolerant in zones 8 through 1 (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

### **5.2.19** Ribes uva

Gooseberry, European gooseberry 4 tlin 8 cyuc 5 kcak 2 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Ribes uva-crispa is a deciduous Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to May, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The fresh leaves contain the toxin hydrogen cyanide, though details of quantities are not given [240]. This substance is found in several foods, including almonds. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked[1, 2, 5, 7, 61]. The fruit is often picked when

under-ripe and very firm, it has a very tart flavour at this time and is mainly used in making pies, jams etc. However, if the fruit is allowed to remain on the plant until it is fully ripe and soft it becomes quite sweet and is delicious for eating out of hand[K]. The fruit of the wild species is often less than 1cm in diameter, but named cultivars have considerably larger fruits up to 3cm in diameter[K]. Leaves- raw. The young and tender leaves can be eaten in salads[4]. Some caution is advised, see the notes above on toxicity.

tcanta Cosmetic MiscellanyThe fruit pulp is used cosmetically in face-masks for its cleansing effect on greasy skins[7]

dwatta Astringent Dysentery Laxative MiscellanyThe fruit is laxative[7]. Stewed unripe gooseberries are used as a spring tonic to cleanse the system[4]. The leaves have been used in the treatment of gravel[4]. An infusion taken before the monthly periods is said to be a useful tonic for growing girls[4]. The leaves contain tannin and have been used as an astringent to treat dysentery and wounds[7].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, Italy and the Caucasus. ksacta Woods and hedges, often by streams[17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood. 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth. November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11, 200]. Growth is often poor in light soils, whilst heavy soils encourage soft growth and excess vigour[200]. Prefers a pH in the range 6 to 6.5[200], though it can grow well in more acid or alkaline soils[K]. It is important to add plenty of humus to chalky soil[K]. Plants are guite tolerant of shade though do not fruit so well in such a position[11]. They can be grown against east or north facing walls[37]. The fruit of plants on north facing walls will ripen later, thus extending the fruiting season, though yields will be lower[K]. Plants dislike very hot weather[37]. Dormant plants are hardy to about -20°c[200]. but the flowers and young fruits are susceptible to frost damage Plants are very susceptible to potash deficiency[1], especially when grown on alkaline soils[K]. Gooseberries are commonly cultivated in temperate regions for their edible fruit. there are many named varieties[183, 200]. Birds love the fruit and so some protection is often required, especially if the fruit is being grown to full ripeness[K]. Plants grow best in cool moist climates such as N. Europe[200]. Plants fruit best on one and two year old wood so any pruning should be to encourage vigorous new shoots[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days) For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

## 5.2.20 Daucus carota sativus

4 tlin 10 cyuc 5 kcak 4 tcan 3 dwat 1.2 m hkuc

drutta Echinops latifolius is a PERENNIAL growing to The species is hermaphrodite (has both male and female or-0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

dwatta Antiinflammatory GalactogogueThe root is antiinflammatory and galactogogue[176]. It is used in the treatment of breast abscesses with inflammation, mastitis, lack of milk in nursing mothers and distension of the breast[176].

nrakta E. Asia - China, Siberia, Mongolia, ksacta Grassland and open forests at elevations of 100 - 2200 metres[266].

propta Seed - sow early spring in a cold frame[111]. The seed usually germinates in 3 - 9 weeks at 25°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seedbed in mid spring and is then planted out into its permanent position in late summer or the autumn[111]. Division in autumn[111]. Root cuttings in the winter[200]

nwatta Succeeds in a sunny position in any well drained soil of low or medium fertility[200]. Established plants are drought tolerant[190]. The flowers are often used for dried flower displays[200]. If all the flowers are removed early in the season, the plant will often produce a second flush of bloom later in the summer[200].

## 4.2.422 Primula auricula

3 tlin 7 cvuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc hmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Primula auricula is a PERENNIAL growing to 0.2 m (Oft 8in) by 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

tcanta When growing in the right conditions this species and its cultivars make a good ground cover[208]. They are best spaced about 30cm apart each way[208].

dwatta AntitussiveThe leaves are used as a remedy for coughs[4]. Used in the treatment of headaches[61].

nrakta Europe - Alps and Carpathian mountains. ksacta Rock crevices or wet alpine grassland[50].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in early spring in a cold frame. Germination is inhibited by temperatures above 20°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn.

nwatta Prefers a freely-draining moderately fertile humus-rich sandy loam[200]. Prefers an alkaline soil[188]. Grows well in heavy clay soils[208]. Dislikes dry soils[200]. Requires some shelter from the summer sun[1, 200]. Grows well in the shade of a north wall but does not like growing under trees[208]. A very ornamental and polymorphic species[1]. The flowers are sweetly honey-scented[245].

## 4.2.423 Symphytum grandiflorum

Ground Cover Comfrey, Comfrey 3 tlin 9 cyuc 0 kcak 4 tcan 0 dwat 0.4 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Symphytum grandiflorum is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from June to July. gans) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista No reports of toxicity have been seen for this species, but the following reports have been seen for S. officinale. This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

tcanta A very good ground cover plant[188, 208]. It spreads rapidly to form a good carpet, rooting as it spreads, and should be spaced about 60cm apart each way[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Landscape Uses:Border, Container, Ground cover, Specimen, Woodland Forest Garden. Shelter for insects, nectary, Green mulch. Notable Products: Sheen and chicken food

nrakta Europe - the Caucasus. Naturalized in Britain. ksacta Not infrequently naturalized in hedges and woods in S. England and the Midlands[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Grows well under trees[208]. There are some named varieties, selected for their ornamental value[200]. Plants can be invasive, often spreading freely by means of self-sown seed[200]. The root system is very deep and difficult to eradicate, even small fragments of root left in the soil can produce new plants. Special Features: Attractive foliage, Fragrant foliage, Invasive, Naturalizing. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 4 tlin

## **5.1 bwon**

#### 5.1.1 Hippophae rhamnoides turkestanica

Sea Buckthorn

tfo2n 4 tlin 7 cyuc 5 kcak 5 tcan 5 dwat 6 m hkuc htut cyutli hgatkyuctcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Hippophae rhamnoides turkestanica is a deciduous Shrub growing to 6 m (19ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in April, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Some reports suggest that the fruit is poisonous[13, 100], whilst it may be very acid it is most definitely not poisonous[65]. Avoid during pregnancy.

kcakta Edible Parts: FruitEdible Üses: Fruit - raw or cooked. Very rich in vitamin C (120mg per 100g)[74] and vitamin A[183], but too acid when raw for most peoples tastes[11, 158]. Used for making fruit juice, it is high in vitamins and has an attractive aroma[141]. It is being increasingly used in making fruit juices, especially when mixed with other fruits, because of its reputed health benefits[214]. The fruits of some species and cultivars (not specified) contain up to 9.2% oil[214]. The fruit is very freely borne along the stems[K] and is about 6 - 8mm in diameter[200]. The fruit becomes less acid after a frost or if cooked[74]. The fruit is ripe from late September and usually hangs on the plants all winter if not eaten by the birds. It is best used before any frosts since the taste and quality of frosted berries quickly deteriorates[214].

tcanta Charcoal Dve Fuel Soil stabilization WoodVerv tolerant of maritime exposure[29, 49, 75, 182], it can be used as a shelter hedge. It dislikes much trimming[75]. A very thorny plant, it quickly makes an impenetrable barrier. Sea buckthorn has an extensive root system and suckers vigorously and so has been used in soil conservation schemes, especially on sandy soils. The fibrous and suckering root system acts to bind the sand[186, 244]. Because the plant grows quickly, even in very exposed conditions, and also adds nitrogen to the soil, it can be used as a pioneer species to help the re-establishment of woodland in difficult areas. Because the plant is very light-demanding it will eventually be out-competed by the woodland trees and so will not outstay its welcome[K]. The seeds contain 12 - 13% of a slowdrying oil[240]. The vitamin-rich fruit juice is used cosmetically in face-masks etc[9]. A yellow dye is obtained from the fruit[74]. A yellow dye is obtained from the stems, root and foliage[4]. A blackish-brown dye is obtained from the young leaves and shoots[74]. Wood - tough, hard, very durable, finegrained. Used for fine carpentry, turning etc[46, 61, 74]. The wood is also used for fuel and charcoal[146].

dwatta Astringent Cancer Cardiac Eczema Poultice Tonic Vermifuge Vitamin CThe twigs and leaves contain 4 - 5% tannin[240]. They are astringent and vermifuge[7, 100]. The tender branches and leaves contain bio-active substances which are used to produce an oil that is quite distinct from the oil produced from the fruit. This oil is used as an ointment for treating burns[214]. A high-quality medicinal oil is made from the fruit and used in the treatment of cardiac disorders, it is also said to be particularly effective when applied to the skin to heal burns, eczema and radiation injury, and is taken internally in the treatment of stomach and intestinal diseases[214]. The fruit is used as a tonic[9]. The freshly-pressed juice is used in the treatment of colds, febrile conditions, exhaustion etc[9]. The fruit is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Himalayas in the higher Tibetan plateau. ksacta Uper subalpine to lower alpine zones.

propta Seed - sow spring in a sunny position in a cold frame[78]. Germination is usually quick and good although 3 months cold stratification may improve the germination rate. Alternatively the seed can be sown in a cold frame as soon as it is ripe in the autumn. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a greenhouse for their first winter. Plant out in late

spring into their permanent positions. Male seedlings, in spring, have very prominent axillary buds whilst females are clear and smooth at this time[78]. Cuttings of half-ripe wood, June/July in a frame[200]. Difficult[113]. This is the easiest method of vegetative propagation[214]. Cuttings of mature wood in autumn[200]. Difficult[113]. The cuttings should be taken at the end of autumn or very early in the spring before the buds burst. Store them in sand and peat until April, cut into 7 - 9cm lengths and plant them in a plastic tent with bottom heat[214]. Rooting should take place within 2 months and they can be put in their permanent positions in the autumn[214]. Division of suckers in the winter. They can be planted out direct into their permanent positions and usually establish well and quickly[K]. Layering in autumn[200].

nwatta Landscape Uses:Border, Seashore, Specimen. Succeeds in most soils[200], including poor ones[186], so long as they are not too dry[182, 200]. Grows well by water and in fairly wet soils[182]. Established plants are very drought resistant[186]. Requires a sunny position[3], seedlings failing to grow in a shady position and mature shrubs quickly dying if overshadowed by taller plants[186]. Does well in very sandy soils[1, 186]. Plants are very tolerant of maritime exposure[75], though they are fairly slow growing[75]. Although usually found near the coast in the wild, they thrive when grown inland[11] and are hardy to about -25°c[184]. A very ornamental plant[1, 11], it is occasionally cultivated, especially in N. Europe, for its edible fruit[183]. Members of this genus are attracting considerable interest from breeding institutes for their nutrient-rich fruits that can promote the general health of the body (see edible and medicinal uses below)[214]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[113, 186, 200]. Plants produce abundant suckers, especially when grown on sandy soils[186]. Dioecious. Male and female plants must be grown if seed is required. The sexes of plants cannot be distinguished before flowering, but on flowering plants the buds of male plants in winter are conical and conspicuous whilst female buds are smaller and rounded[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Naturalizing, Inconspicuous flowers or blooms.

#### 5.1.2 Apios fortunei

Hodo, Hodoimo

tfo2n 4 tlin 9 cyuc 5 kcak 3 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Apios fortunei is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Tuber - raw or cooked[105, 177]. It has a delicious flavour somewhat like sweet potatoes when roasted[179]. The tuber can also be dried and ground into a powder. The tuber contains about 4.2% protein, 0.2% fat, 18.3% starch, 6% other carbohydrate, 1.3% ash[179].

dwatta TonicThe root is tonic[218].

nrakta E. Asia - China, Japan. ksacta Woods and thickets, 600 - 1000 metres in W. China[109].

propta Seed - pre-soak for 3 hours in tepid water and sow February/March in a cold frame. The seed usually germinates in 1 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for their first winter, planting them out in late spring or early summer. Division can be carried out at almost any time of the year, though spring is probably the best time. Simply dig up the roots, harvest the tubers and replant them where you want the plants to grow. It is also possible to harvest the tuber in winter, store them in a cool fairly dry but frost-free place over the winter and then plant them out in the spring. The

soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 34, 101, 257]. Large sweet and juicy with a fine flavour[11, 183]. The fruit is about 20mm in diameter[200]. tcanta DyeA purple to dull blue dye is obtained from the

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta The origin of this plant is uncertain. ksacta Not

known in a truly wild situation. propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in son or semi-shade[1, 11, 200]. This species is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. The plant produces apomictic flowers, these produce fruit and viable seed without fertilization, each seedling is a genetic copy of the parent[200]. Sometimes cultivated for its edible fruit, it is a very vigorous and productive plant[3]. There is at least one named variety. Oregon Cutleaf Thornless' is high yielding with good flavoured fruits and no prickles on the stems, thus making it easier to harvest[17]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.17 Rubus idaeus

Raspberry, American red raspberry, Grayleaf red raspberry 4 tlin 8 cyuc 5 kcak 3 tcan 3 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rubus idaeus is a deciduous Shrub growing to 2 m (6ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf from April to November, in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female or gans) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Root Shoots StemEdible Uses: Coffee TeaFruit - raw or cooked[2, 5, 7, 61]. Delicious when eaten out of hand, the fruit is also used in pies, preserves etc[183]. Root - cooked. The root, which should be neither too young nor too old, requires a lot of boiling[7]. Young shoots - peeled and eaten raw or cooked like asparagus[172]. They are harvested as they emerge through the ground in the spring and whilst they are still tender. A herb tea is made from the dried leaves[21, 46, 183]. Another report says that a type of tea made from raspberry and blackberry leaves is an excellent coffee substitute[7].

tcanta Cosmetic Dye PaperLandscape Uses:Erosion control, Foundation, Ground cover, Massing, Rock garden, Seashore. Its in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Attracts butterflies, Inconspicuous flowers or blooms. A purple to dull blue dye is obtained from the fruit[168]. A fibre obtained from the stems is used in making paper[189]. The stems are harvested in the summer after the fruit has been eaten, the leaves are removed and the stems are steamed until the fibres can be stripped. The fibres are cooked for 2 hours with Iye and then hand beaten with mallets or ball milled for 3 hours. The paper is light brown in colour[189]. A decongestant face-mask made from the fruit is used cosmetically to soothe reddened skin[7].

dwatta Antiinflammatory Astringent Birthing aid Cardiac Decongestant OxytoxicAntiemetic[13, 165]. The leaves and roots are anti-inflammatory, astringent, decongestant, ophthalmic, oxytocic and stimulant[4, 13, 165, 222, 254]. A tea made from them is used in the treatment of diarrhoea, as a tonic for the uterus to strengthen pregnant women, and as an aid in childbirth[4, 222, 257]. The tea has also been shown as effective in relieving painful menstrual cramps[222]. The active ingredients both stimulate and relax the uterus[222]. They can be used during the last three months of pregnancy and during childbirth, but should not be used earlier[238]. Externally, the leaves and roots are used as a gargle to treat tonsillitis and mouth inflammations, as a poultice and wash to treat sores, conjunctivitis, minor wounds, burns and varicose ulcers[238, 257]. The leaves are harvested in the sumer and dried for later use[9]. The fruit is antiscorbutic and diuretic[7]. Fresh raspberry juice, mixed with a little honey, makes an excellent refrigerant beverage to be taken in the heat of a fever[21]. Made into a syrup, it is said to have a beneficial effect on the heart[21].

nrakta Europe, including Britain, from Iceland south and east to Spain and temperate Asia. ksacta Moist neglected land, hedgerows and woodland edges[7, 11, 244].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200]. nwatta Prefers a good deep well-drained loamy soil on

the acid side[1, 34]. Dislikes very heavy soils[1, 200], light soils[4] and alkaline soils[200]. Prefers an open position but tolerates some shade[1]. Plants crop less well when grown in the shade of trees though they do well in the open on a northfacing slope[200]. Requires a position sheltered from strong winds[200]. Prefers a pH between 6 and 6.5[200]. Raspberries are frequently cultivated in temperate regions of the world, both in the garden and commercially, for their edible fruit. There are many named varieties able to supply fresh fruit from mid-summer to the autumn[1, 200]. High costs of picking the fruit means that little is actually sold fresh, most of the commercially cultivated crops either being used for preserves or grown for the 'Pick Your Own' trade. All the cultivars are self-fertile[200]. This species has biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. It is best not to grow raspberries near blackberries or potatoes[18]. PlanFor polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2]. Heat zone: 9-1.

## 5.2.18 Amelanchier stolonifera

Quebec Berry, Running serviceberry 4 tlin 8 cyuc 5 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli frusflatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier stolonifera is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[3, 101, 105]. Sweet and juicy with a good flavour that has a hint of apple[1, 11, 183, K]. The plant usually yields very well in Britain and the well-flavoured fruit means that it has excellent potential as a commercial crop[K] The fruit is rich in iron and copper[226].

dwatta TonicThe root bark has been used as a tonic[257].

nrakta Eastern N. America ksacta Dry acid rocky or sandy open habitats[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and

the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Prefers an acid or neutral soil. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A suckering plant, the suckers are formed very close to the original stem so the plant forms a gradually expanding clump[K]. Plants growing at Hilliers Arboretum in Hampshire were 4 metres tall in early April 1999, they were suckering quite freely in a tight clump and flowering very freely[K]. This species is closely related to A. laevis[11]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

## 5.2.15 Chenopodium spp.

Perennial quinoa

4 tlin 10 cyuc 5 kcak 2 tcan 3 dwat 2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwissliphsom hpa7tmwatli hionli

drutta Chenopodium spp. is a PERENNIAL growing to 2 m (6ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid, very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Edible portion: Leaves, Seeds, Vegetable. Seed - cooked[1, 2, 4, 27, 57, 97]. A pleasant mild flavour, the seed can absorb the flavour of other foods that are cooked with it and so it can be used in a wide variety of ways[K]. The protein is good quality because of its amino acid balance. It has 2-6% more protein and better amino acid balance than wheat. It should be thoroughly soaked and rinsed to remove a coating of saponins on the seed surface. The seed can be used in all the ways that rice is used, as a savoury or sweet dish. It can also be ground into a powder and used as a porridge[37, 183]. The seed can also be sprouted and used in salads[183] though many people find the sprouted seed unpleas-

ant[ K ]. The seed contains a very high quality protein that is rich in the amino acids lysine, methionine and cystine, it has the same biological value as milk[ 196 ]. The seed contains about 38% carbohydrate, 19% protein, 5% fat, 5% sugar[ 171 ]. Leaves - raw or cooked[ 2 , 4 , 37 , 57 ]. The young leaves are cooked like spinach[ 183 ]. It is best not to eat large quantities of the raw leaves, see the notes above on toxicity.

tcanta Gold/green dyes can be obtained from the whole plant [168]. Saponins on the seed can be used as a bird and insect deterrent by spraying them on growing plants [141]. The saponins are obtained by saving the soak-water used when preparing the seed for eating. The spray remains effective for a few weeks or until washed off by rain K I.

dwatta Some medical properties. See individual plants for example: Chenopodium album, Chenopodium ambrosioides, Chenopodium ambrosioides anthelminticum

nrakta Chenopodium is a genus of numerous species of perennial or annual herbaceous flowering plants known as the goosefoots, which occur almost anywhere in the world including Africa, Australasia, North America, Europe, and Oceania, (even, apparently in Antarctica). ksacta Varied depending on species.

propta Seed - sow April in situ. The seed can either be sown broadcast or in rows about 25cm apart, thinning the plants to about every 10cm. Germination is rapid, even in fairly dry conditions. Be careful not to weed out the seedlings because they look very similar to some common garden weeds[K].

nwatta Hypothetical Crop Management: StandardClimate: cold temperate to subtropical, tropical highlands, Humidity: humid. A cultivated food crop. A plant of higher elevations in the tropics, it has also been successfully grown in the temperate and subtropical zones. Plants tolerate light frosts at any stage in their development except when flowering[ 57, 196 ]. An easily grown plant, it requires a rich moist well-drained soil and a warm position if it is to do really well. but it also succeeds in less than optimum conditions 27, 37 1. Tolerates a pH range from 6 to 8.5 and moderate soil salinity[ 196 ]. Plants are quite wind resistant[ K ]. Plants are drought tolerant once they are established[ 196 ]. The plant is day-length sensitive and many varieties fail to flower properly away from equatorial regions, however those varieties coming from the south of its range in Chile are more likely to do well in Britain[ 196 ]. Different cultivars take from 90 220 days from seed sowing to harvest 196 l. Yields as high as 5 tonnes per hectare have been recorded in the Andes, which compares favourably with wheat in that area [196]. Young plants look remarkably like the common garden weed fat hen (Chenopodium album). Be careful not to weed the seedlings out in error K ]. The seed is not attacked by birds because it has a coating of bitter tasting saponins[ 141 , K ]. These saponins are very easily removed by soaking the seed overnight and then thoroughly rinsing it until there is no sign of any soapiness in the water. The seed itself is very easy to harvest by hand on a small scale and is usually ripe in August. Cut down the plants when the first ripe seeds are falling easily from the flower head, lay out the stems on a sheet in a warm dry position for a few days and then simply beat the stems against a wall or some other surface, the seed will fall out easily if it is fully ripe and then merely requires winnowing to get rid of the chaff. Carbon Farming Solutions - Cultivation: hypothetical. Management: standard (Describes the non-destructive management systems that are used in culti-

## 5.2.16 Rubus laciniatus

Oregon Cut-Leaf Blackberry, Cutleaf blackberry 4 tlin 8 cyuc 5 kcak 1 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rubus laciniatus is a deciduous Shrub growing to 2.5 m (8ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline)

tubers lose moisture rapidly once they have been harvested, so make sure that you store them in a damp medium such as leafmold.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Prefers a light rich soil and a sunny position[1, 27]. Another report says that it prefers light dappled shade[200]. Tolerates acid soils[160]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is tuberous with swollen potato-like roots [1-2].

## 5.1.3 Amphicarpaea bracteata

Hog Peanut, American hogpeanut tfo2n 4 tlin 9 cyuc 5 kcak 3 tcan 1 dwat 1.5 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Amphicarpaea bracteata is a PERENNIAL CLIMBER growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from May to October, in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Root SeedEdible Uses: Seed - raw or cooked[2, 161]. Two types of seed are produced - flowers produced near the ground produce a pod that buries itself just below soil level. These pods contain a single seed are up to 15mm in diameter which can be used as a peanut substitute. They can be harvested throughout the winter and can be eaten raw or cooked[2, 63, 95, 161]. They are sweet and delicious raw with a taste that is more like shelled garden beans than peanuts[183]. Yields are rather low, and it can be a fiddle finding the seeds, but they do make a very pleasant and nutritious snack[K]. Other flowers higher up the plant produce seed pods that do not bury themselves. The seeds in these pods are much smaller and are usually cooked before being eaten[95, 183]. They can be used in all the same ways as lentils and are a good source of protein[K]. The overall crop of these seeds is rather low and they are also fiddly to harvest[K], Root - cooked[177, 257]. The root is peeled. boiled and then eaten[257]. Fleshy and nutritious according to one report[200], whilst another says that the root is too small to be of much importance in the diet[257]. Our plants have only produced small and stringy roots[K].

tcanta Nitrogen Fixer.

dwatta An infusion of the root has been used in the treatment of diarrhoea[257]. Externally, the root has been applied to bites from rattlesnakes[257]. A poultice of the pulverized leaves has been applied with any salve to swellings[257].

nrakta Eastern N. America - New Brunswick to Florida, west to Manitoba and Louisiana. ksacta Cool damp woodlands[43, 200]

propta Seed - pre-soak for 12 hours in warm water and then sow in spring in a semi-shaded position in a greenhouse. Germination usually takes place within a few weeks. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter, planting them out in late spring or early summer. Division. We have been unable to divide this plant because it only makes a small taproot. However, many of the seeds are produced under the ground and these can be harvested like tubers and potted up to make more plants.

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Understory legume Historic Crop Management:

Fodder Management: Standard Staple Crop: ProteinReguires a moist humus-rich soil in a shady position[200]. The young shoots in spring can be damaged by late frosts[K]. The hog peanut has occasionally been cultivated for its edible seed which has been used as a peanut substitute[183]. Yields at present, however, are rather low[K]. Two types of blossom are produced by the plant - those produced from the leaf axils mostly abort but a few seeds are produced[95]. Solitary, inconspicuous cleistogamous flowers are produced on threadlike stems near the root and, after flowering, the developing seedpods bury themselves into the soil in a manner similar to peanuts[95, 274]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A self-seeding plant [1-2]. Growth habit is herbaceous. Growth habit is a single or multiple shooting vine from a crown [1-2]. The root pattern is fibrous dividing into a large number of fine roots

#### 5.1.4 Psoralea esculenta

Breadroot, Large Indian breadroot tfo2n 4 tlin 8 cyuc 5 kcak 3 tcan 1 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Psoralea esculenta is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista This species contains furanocoumarins, these substances can cause photosensitivity in some people[65].

kcakta Edible Parts: Oil RootEdible Uses: OilRoot-raw or cooked[2, 4, 46, 57, 161]. It can also be dried for later use[183]. The dried root can be ground into a powder and used with cereals in making cakes, porridges etc[183]. Starchy and glutinous, the raw root is said to have a sweetish turnip-like taste[183]. The plant is best harvested as the tops die down at the end of the growing season[85]. This food is a staple and also considered to be a luxury item by many native North American Indian tribes[2, 61]. The root contains about 70% starch, 9% protein and 5% sugars[95].

tcanta Oil Soil stabilizationThe plant is a good soil stabilizer in its natural environment[200].

dwatta Pectoral Poultice StomachicAn infusion of the dried roots has been used in the treatment of gastro-enteritis, sore throats and chest problems[257]. The roots have been chewed by children as a treatment for bowel complaints[257]. A poultice of the chewed roots has been applied to sprains and fractures[257].

nrakta N. America - Manitoba to North Dakota and Wisconsin, south to Missouri and Texas. ksacta Rocky woods and prairies, on calcareous soils[43].

propta Pre-soak the seed for 24 hours in warm water and then sow in early to mid spring in a greenhouse. Either sow the seed in individual pots or pot up the young seedlings as soon as possible in order to avoid root disturbance. Grow them on in the pots until planting out in their final positions. It is usually impossible to transplant this species without fatal damage to the root[200]. Division in spring. With great care since the plant resents root disturbance. It is virtually impossible to divide this species successfully[200].

nwatta Succeeds in an ordinary garden soil[1]. Requires a well-drained soil in a sunny position[200]. Plants are very intolerant of root disturbance, they are best planted out into their permanent positions whilst still small[200]. This plant has been recommended for improvement through breeding and selection for its edible root[183]. It was sent to Europe around the year 1800 as a potential food crop but was not well received[213]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is

utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

## 5.1.5 Elaeagnus orientalis

Trebizond Date

tfo2n 4 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 12 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Elaeagnus orientalis is a deciduous Shrub growing to  $12\ m$  (39ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[3, 105]. Sweet and mealy but of better quality than the closely related E. angustifolia[183]. Eaten fresh or made into sherbet and preserves. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The oval fruit is about 10mm long and contains a single large seed[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

tcanta Hedge HedgePlants can be grown as a hedge in exposed positions, tolerating maritime exposure.

dwatta CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers [214].

nrakta W. Asia. ksacta By streams and on river banks, to elevations of 3000 metres in Turkev[93].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate in late winter or early spring, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, October/November in a frame[200]. The cuttings are rather slow and difficult to root, leave them for 12 months[113]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils that are well-drained[11. 200]. Prefers a soil that is only moderately fertile, succeeding in very poor soils and in dry soils[11, 200]. Established plants are very drought resistant[1]. Prefers a light sandy loam and a sunny position[11, 200]. Dislikes shallow chalk soils[98]. Very closely related to E. angustifolia and often considered to be no more than a sub-species of it[183], it does not flower so freely in Britain as that species[11]. This species is notably resistant to honey fungus[88, 200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. The flowers are very fragrant and are rich in nectar[183], they are much visited by bees. Occasionally cultivated for its edible fruit, there are some named varieties[183]. The fruit used to

be commonly sold in the markets of Iran and Turkey but is rarely found there nowadays[183].

#### 5.1.6 Medicago sativa

Alfalfa, Yellow alfalfa

tfo2n 4 tlin 8 cyuc 4 kcak 4 tcan 3 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Medicago sativa is a PERENNIAL growing to 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is polinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant contains saponin-like substances[222]. Eating large quantities of the leaves may cause the breakdown of red blood cells[222]. However, although they are potentially harmful, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite hitter and can be found in many common foods such as some beans. Thorough cooking, and perhaps changing the cooking water once, will normally remove most of them from the food. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Alfalfa sprouts (and especially the seeds) contain canavanine. Recent reports suggest that ingestion of this substance can cause the recurrence of systemic lupus erythematosus (an ulcerous disease of the skin) in patients where the disease had become dormant[222]. The FDA advises that children, the elderly and people with compromised immune systems should avoid eating alfalfa sprouts due to bacterial contamination. Avoid during pregnancy and lactation. Avoid for people with hormone sensitive cancer. Avoid for people with gout (due to purines). Possible antagonize the anticoagulant effect of warfarin (due to vit K) and interfere with the immunosuppressant effect of corticosteroids [301].

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Oil TeaLeaves and young shoots - raw or cooked[2, 8, 52, 145]. The leaves can also be dried for later use[55]. Very rich in vitamins[183], especially A, B and C[201], they are also a good source of protein[206]. The leaves are a rich source of vitamin K[213]. A very nutritious food in moderation, though it can trigger attacks in patients with systemic lupus erythematosus and large quantities can affect liver function and cause photosensitization[238]. A nutritional analysis is available[218]. The seed is commonly used as a sprouted seed which is added to salads[2, 20, 52], used in sandwiches etc or cooked in soups[183]. The seed is soaked in warm water for 12 hours, then kept moist in a container in a warm place to sprout. It is ready in about 4 - 6 days[244]. The seeds can also be ground into a powder and used as a mush, or mixed with cereal flours for making a nutritionally improved bread etc[183, 213, 244]. Seed yields average around 186 - 280 kilos per hectare[269]. An appetite-stimulating tea is made from the leaves[21, 55], it has a flavour somewhat reminiscent of boiled socks[144] and is slightly laxative[159].

tcanta Biomass Companion Dye Green manure Hedge Hedge Oil PaperOften grown as a green manure. It is a bit slow to establish in its first year so is generally only recommended for positions where it can remain for 2 or more years. Alfalfa is very vigorous from its second year, producing a huge bulk of material that can be cut down 2 or 3 times during the season[20, 87]. Plants are very deep rooting, descending 6 metres or more into the soil[200], and are able to fix large quantities of atmospheric nitrogen, this makes them one of the very best green manures. Plants are rather intolerant of competition from grass etc. however, and there is the drawback of needing to leave them in the soil for more than 2 years to fully achieve their potential[K]. Alfalfa is a potenially excellent source of biomass. It is possible to produce more than 2 tonnes of protein from the leaves (suitable for human use) per hectare per year. In addition, the plant residues remaining could be used to produce the equivalent

susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

#### 5.2.13 Dioscorea batatas

Chinese Yam

4 tlin 11 cyuc 5 kcak 3 tcan 5 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Dioscorea batatas is a PERENNIAL growing to 3 m (9ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Edible species of Dioscorea have opposite leaves whilst poisonous species have alternate leaves[174].

kcakta Edible Parts: Fruit RootEdible Uses: Tuber cooked[1, 46, 61, 105]. A floury texture[27] with a very pleasant flavour that is rather like a potato[K]. The tubers can be boiled, baked, fried, mashed, grated and added to soups[183]. They store well and for a long time[27, 37] and can also be left in the ground and harvested as required in the winter[K]. This is a top quality root crop, very suitable for use as a staple food[K]. An arrowroot can be extracted from the root[46], though this is not as good at binding other foods as the starch from D. japonica[183]. The root contains about 20% starch. 75% water, 0.1% vitamin B1, 10 - 15 mg% vitamin C[174]. Fruit. A starchy flavour, it is said to be very good for the health[206]. We wonder if this report is referring to the tubercles[K]. We've heard the aerial tubers can be eaten and are very tasty. Carbon Farming - Staple Crop: basic starch.

dwatta Anthelmintic Antidote Contraceptive Digestive Miscellany Vitamin CThe Chinese yam, called Shan Yao in Chinese herbalism, is a sweet soothing herb that stimulates the stomach and spleen and has a tonic effect on the lungs and kidneys[238]. The tuber contains allantoin, a cellproliferant that speeds the healing process[238]. The root is an ingredient of "The herb of eight ingredients", traditionally prescribed in Chinese herbalism to treat hyperthyroidism, nephritis and diabetes[254]. The tuber is anthelmintic, digestive and gently tonic[116, 147, 218, 254]. It is used internally in the treatment of tiredness, weight loss, poor appetite, poor digestion, chronic diarrhoea, asthma, dry coughs, frequent or uncontrollable urination, diabetes and emotional instability[238]. It is applied externally to ulcers, boils and abscesses[218, 238]. The tubers are harvested in the autumn and can be used raw or baked[238]. The leaf juice is used to treat snakebites and scorpion stings[218]. The roots of most, if not all, members of this genus, contains diosgenin[222, 240]. This is widely used in modern medicine in order to manufacture progesterone and other steroid drugs. These are used as contraceptives and in the treatment of various disorders of the genitary organs as well as in a host of other diseases such as asthma and arthritis[222].

nrakta Temperate E. Asia, though the exact range is not known. ksacta Found in an apparently wild situation in valleys and on the slopes of hills in China[147]. Prefers sunny slopes in the wild[254].

propta Seed - sow March to April in a sunny position in a warm greenhouse and only just cover. It germinates in 1 3 weeks at 20°c[175]. Prick out the seedlings as soon as they are large enough to handle and grow on in a greenhouse for their first year. Plant out in late spring as the plant comes into new growth. Basal stem cuttings in the summer[37]. Division in the dormant season, never when in growth[1]. The plant will often produce a number of shoots, the top 5 - 10 cm of the root below each shoot can be potted up to form a new

plant whilst the lower part of the root can be eaten[K]. Tubercles (baby tubers) are formed in the leaf axils. These are harvested in late summer and early autumn when about the size of a pea and coming away easily from the plant. They should be potted up immediately in individual pots in an unheated greenhouse or cold frame, covering them with about 10mm of soil. Protect them from mice etc and keep the soil moist but not wet. They should come into growth in the spring, plant them out in early summer when in active growth[K].

nwatta Management: Standard Minor Global Crop Staple Crop: Basic StarchAn easily grown plant, succeeding in a fertile well-drained soil in a sunny position or light shade[27, 37, 200], though it is best in full sun[160]. Plants are hardy to at least -18°c[160]. This species of yam is much cultivated in China for its edible root which can be up to 1 metre long[1]. It has a great potential to be a commercial crop in Britain, though a satisfactory method of harvesting the root needs to be found[K]. Plants take 3 -4 years to reach full maturity[160], though one year roots of well grown plants can weigh more than 500g. There are many cultivated forms with different root shapes in China and Japan[174]. The yam is a climbing plant that supports itself by twining around the branches of other plants[219]. It can be grown successfully into small bushes or, perhaps simpler when being grown as a root crop, it can be grown up a frame in a similar manner to growing runner beans[K]. Plants produce tubercles (small tubers that are formed in the leaf axils of the stems), and can be propagated by this means[K]. The small white flowers have a pleasant scent of cinnamon[219]. There is some confusion over the correct name for this species. One report says that D. batatas is an invalid name that is often erroneously applied to two distinct species D. opposita and D. japonica[218]. The Flora of China accepts D. batatas as a synonym for D. polystachya[266]. Dioecious. Male and female plants must be grown if seed is required. Carbon Farming - Cultivation: regional crop. Management: standard. The plant is heat tolerant in zones 10 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is a tap root similar to a carrot going directly down [1-2]

## 5.2.14 Amelanchier confusa

4 tlin 8 cyuc 5 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hionli

drutta Amelanchier confusa is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: We have no records for this species, but the fruit is almost certainly edible both raw and cooked[K]. It is 7 - 9mm in diameter[200]. The fruit is rich in iron and copper[226].

nrakta Europe - S. Sweden. ksacta This species is only known from plants naturalised in Sweden, its origin is uncertain[11, 200]

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in

flour when making dumplings[183]. The stems are reported to contain 4.8 g protein, 0.8 g fat, 90.0 g total carbohydrate, 41.2 g fiber, and 4.4 g ash[269]. Seed - raw or cooked[257]. It can be ground into a powder and used as a flour[57, 62, 102, 106]. The seed is rather small and difficult to remove from the husk but it is said to be very nutritious[183]. A sugar is extracted from the stalks or wounded stems[2, 5, 62, 95]. A sweet liquorice-like taste[95], it can be eaten raw or cooked[62]. The stems can be boiled in water and then the water boiled off in order to obtain the sugar[178]. A sugary gum that exudes from the stems can be rolled into balls and eaten as sweets[183]. A powder extracted from the dried stems can be moistened and roasted like marshmallow[62, 95, 102, 183].

tcanta Alcohol Basketry Biomass Broom Cork Dye Fencing Fertilizer Fibre Fodder Fuel Furniture Green manure Insulation Miscellany Paper Pencil Soil stabilization String Teeth Thatching WeavingThe common reed can provide a large quantity of biomass and this is used in a wide variety of ways as listed below. Annual yields of 40 - 63 tonnes per hectare have been reported[269]. The plant is also converted into alcohol (for use as a fuel), is burnt as a fuel and is made into fertilizer[238]. The plant is rich in pentosans and may be used for the production of furfural - the nodes and sheaths yield 6.6% whilst the underground parts over 13% of furfural[269]. The pentosan content increases throughout the growing period and is maximum in the mature reed[269]. The reed can be used also for the preparation of absolute alcohol, feed yeast and lactic acid[269]. The stems are useful in the production of homogeneous boards[269]. They can also be processed into a fine fibrous material suitable as a filler in upholstery[269]. The stems have many uses. They are used for thatching roofs[1, 46, 74, 106]. It can last for 100 years[169]. The stems and leaves are also used for building dwellings, lattices, fences, arrows by Indians, and for weaving mats, carrying nets, basket making, insulation, fuel, as a cork substitute etc[13, 74, 99, 102, 115, 257, 269]. The stem contains over 50 percent cellulose and is useful in the manufacture of pulps for rayon and paper[269]. The fibre from the leaves and stems is used for making paper[189]. The fibre is 0.8 - 3.0 mm long and 5.0 - 30.5 mm in diameter. The stems and leaves are harvested in the summer, cut into usable pieces and soaked for 24 hours in clear water. They are then cooked for 2 hours with lve and beaten in a blender. The fibre makes a khaki paper[189]. A fibre obtained from the plant is used for making string[95, 106]. The flowering stalks yield a fibre suitable for rope making[269]. The leaves are used in basket making and for weaving mats etc[169, 238]. A light green dye is obtained from the flowers[6, 115]. Freshly cut shoots are a good green manure[74] (Does this man as a soil mulch?[K]). The inflorescences are used as brooms[74]. The plant can be used as a cork substitute[74]. No further details. The plant is mixed with mud to make a plaster for walls[145]. Pens for writing on parchment were cut and fashioned from the thin stems of this reed[269], whilst the stems were also used as a linear measuring device[269]. The plant has a very vigorous and running rootstock, it is useful for binding the soil along the sides of streams etc[115]. It is planted for flood control since it stablizes the banks and gradually builds up soil depth, thus raising the level of the bank.

dwatta Antiasthmatic Antidiarrhoeal Antidote Antiemetic Antipyretic Antitussive Cholera Depurative Diuretic Febrifuge Febrifuge Lithontripic Miscellany Odontalgic Refrigerant Sedative Sialagogue Skin Stomachic Styptic UrinaryThe leaves are used in the treatment of bronchitis and cholera, the ash of the leaves is applied to foul sores[218]. A decoction of the flowers is used in the treatment of cholera and food poisoning[218]. The ashes are styptic[218]. The stem is antidote, antiemetic, antipyretic and refrigerant[218]. The root is antiasthmatic, antiemetic, antipyretic, antitussive, depurative, diuretic, febrifuge, lithontripic, sedative, sialogogue and stomachic[147, 176, 218, 2381. It is taken internally in the treatment of diarrhoea. fevers, vomiting, coughs with thick dark phlegm, lung abscesses, urinary tract infections and food poisoning (especially from sea foods)[238, 257]. Externally, it is mixed with gypsum and used to treat halitosis and toothache[238]. The root is harvested in the autumn and juiced or dried for use in decoctions[238].

nrakta Cosmopolitan, in most regions of the world, including Britain, but absent from the Amazon Basin. ksacta Shallow water and wet soil, avoiding extremely poor soils and

very acid habitats[17].

propta Seed - surface sow in spring in a light position. Keep the soil moist by emmersing the pot in 3cm of water. Germination usually takes place quite quickly. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in spring. Very simple, any part of the root that has a growth bud will grow into a new plant. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Fodder: Bank Industrial Crop: Biomass Minor Global CropA very easily grown plant that thrives in deep moisture retentive soils such as marshes and swamps, whilst it also grows well along the sides of streams, lakes and ponds, in shallow water, ditches and wet wastelands[162, 200, 269]. Plants are tolerant of moderately saline water[169, 269]. The plant is reported to tolerate an annual precipitation in the range of 31 to 241cm, an annual temperature in the range of 6.6 to 26.6°C and a pH of 4.8 to 8.2[269]. Plants are hardy to about -20°c[200]. This species is very fast growing with a very vigorous and invasive running rootstock that can be 10 metres or more long, it can form very large stands in wetlands[200, 238, 260]. Difficult to eradicate once established, it is unsuitable for planting into small spaces[200, 238, 269]. The flowering heads are often used in dried flower arrangements[238]. There are some named forms, selected for their ornamental value[238].

## 5.2.12 Rubus phoenicolasius

Japanese Wineberry, Wine raspberry 4 tlin 8 cyuc 5 koak 1 toan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rubus phoenicolasius is a deciduous Shrub growing to 3 m (9ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 2, 3, 34]. Sweet and juicy[11], A raspberry-type fruit, it is smaller than a raspberry, contains rather a lot of seeds and is not quite such a flavourful fruit, but it makes very nice eating all the same[K]. After flowering, the fruit is enclosed in its calyx until just before it is ripe, this prevents maggots etc getting into the fruit[K]. The fruit is about 20mm in diameter[2001].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta E. Asia - N. China, Japan, Korea. Occasionally naturalized in Britain [17]. ksacta Waste places and clearings in lowland and mountains all over Japan [58]. Roadsides and montane valleys at low to medium elevations in China [266].

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month at 3°c if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200], preferring light shade[202]. Plants are not too happy when grown in windy situations[K]. Hardy to about -18°c[202]. Some damage may be caused at this temperature but plants usually recover well[202]. A very ornamental plant, its red stems adding colour to the winter garden[1], it is sometimes cultivated for its edible fruit[1, 61]. There is at least one named variety, 'Bella di Tokyo' has small tasty red fruits[183]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[2001, Plants in this genus are notably

of about 10 barrels of oil per year[269]. A yellow dye is obtained from the seed[269]. The fibre of the plant has been used in making paper[269]. The seed yields about 8.5 · 11% of a drying oil. It is used in paints, varnish etc[46, 57, 61, 269]. The plant can be grown as a low dividing hedge in the vegetable garden[52, 2061. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anodyne Antibacterial Antiscorbutic Aperient Diuretic Emetic Febrifuge Haemostatic Hypoglycaemic Nutritive Stimulant TonicAlfalfa leaves, either fresh or dried, have traditionally been used as a nutritive tonic to stimulate the appetite and promote weight gain[222]. The plant has an oestrogenic action and could prove useful in treating problems related to menstruation and the menopause[254]. Some caution is advised in the use of this plant, however. It should not be prescribed to people with auto-immune diseases such as rheumatoid arthritis[238]. See also the notes above on toxicity. The plant is antiscorbutic, aperient, diuretic, oxytocic. haemostatic. nutritive. stimulant and tonic[55, 165, 218]. The expressed juice is emetic and is also anodyne in the treatment of gravel[218]. The plant is taken internally for debility in convalescence or anaemia, haemorrhage, menopausal complaints, pre-menstrual tension, fibroids etc[238]. A poultice of the heated leaves has been applied to the ear in the treatment of earache[257]. The leaves can be used fresh or dried[238]. The leaves are rich in vitamin K which is used medicinally to encourage the clotting of blood[213]. This is valuable in the treatment of jaundice[213]. The plant is grown commercially as a source of chlorophyll and carotene, both of which have proven health benefits[222]. The leaves also contain the anti-oxidant tricin[222]. The root is febrifuge and is also prescribed in cases of highly coloured urine[218]. Extracts of the plant are antibacterial[218]. Used for asthma, diabetes, gastrointestinal disorders (anti-ulcer) [301].

nrakta Europe - Mediterranean. More or less naturalized in Britain[17]. ksacta Waste ground, avoiding acid soils[17].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. The seed can also be sown in situ in autumn[52]. Seed can be obtained that has been inoculated with Rhizobium bacteria, enabling the plant to succeed in soils where the bacteria is not already present.

nwatta Global Crop Management: Hay Staple Crop: ProteinAlfalfa is a very versatile plant that can adapt to a wide range of climatic conditions from cold temperate to warm sub-tropical.[269]. It succeeds on a wide variety of soils[52, 269], but thrives best on a rich, friable, well-drained loamy soil with loose topsoil supplied with lime[269]. It does not tolerate waterlogging and fails to grow on acid soils[269]. Grows well on light soils[206]. The plant has a deep taproot and, once established tolerates drought and extremely dry conditions[52, 269]. Prefers a neutral fertile soil[87] but succeeds in relatively poor soils so long as the appropriate Rhizobium bacteria is present[200]. A good bee plant[46] and a food plant for many caterpillars[30]. Alfalfa is a very deep rooting plant, bringing up nutrients from deep in the soil and making them available for other plants with shallower root systems. It is a good companion plant for growing near fruit trees and grape vines so long as it is in a reasonably sunny position, but it does not grow well with onions or other members of the Allium genus[201]. Growing alfalfa encourages the growth of dandelions[201]. Alfalfa has long been cultivated for its edible seed, which can be sprouted and eaten in salads. It is also grown as a green manure and soil restorer. There are many named varieties[183]. Botanists divide the species into a number of sub-species - these are briefly described below:- M. sativa caerulea (Less. ex Ledeb.)Schmalh. This sub-species is likely to be of value in breeding programmes for giving cold tolerance, drought resistance and salt tolerance to alfalfa. M. sativa falcata (L.)Arcang. This sub-species is likely to be of value in breeding programmes for giving cold tolerance, drought and disease resistance plus salt and water-logging tolerance to alfalfa. M. sativa sativa. The commonly cultivated form of alfalfa. M. sativa varia (Martyn.)Arcang. This sub-species is likely to be of value in breeding programmes for giving cold tolerance, drought resistance and high yields to alfalfa. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be

used by other plants growing nearby[200]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 5.1.7 Desmanthus illinoensis

Prairie Mimosa, Illinois bundleflower tfo2n 4 tlin 8 cyuc 4 kcak 1 tcan 1 dwat 1.3 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Desmanthus illinoensis is a PERENNIAL growing to 1.3 m (4ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. Rich in protein but without much flavour[183]. The seed-pods are about 25mm long and contain 3 - 5 small seeds[235]. They are freely borne in the plants native environment, but will have to be very freely produced in this country if it is to be a worthwhile croof KI.

tcanta Root bark of D. illinoensis has been found to contain N,N-DMT, NMT, N-hydroxy-N-methyltryptamine, 2-hydroxy-N-methyltryptamine, and gramine (toxic). The root bark is mixed with a native source of beta-Carbolines to produce a hallucinogenic drink called prairiehuasca, which is an analog of the shamanic brew ayahuasca.

dwatta Antipruritic OphthalmicA leaf tea has been used in the treatment of itchy skin[222, 257]. Five seeds have been placed in the eye at night and washed out in the morning to treat trachoma[257].

nrakta N. America - Ohio to N. Dakota, New Mexico to Mississippi. ksacta Prairies, river banks and fields[222, 235]. Ditches, stream bottoms, fields, roadsides and low areas, often on clay soils[274].

propta Seed - pre-soak for 12 hours in warm water and then sow in a cold frame in the spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in early summer. If you have sufficient seed then it is probably worthwhile sowing some in situ in mid to late spring.

nwatta Agroforestry Services: Nitrogen Management: Standard Staple Crop: Protein Under DevelopmentReguires a moist but well-drained soil in full sun[200]. Plants are often found growing in clay soils in the wild[274]. Suitable for the wild garden or other naturalistic plantings[200]. In favourable situations this plant can self-sow to the point of nuisance[200]. This plant is being evaluated by the Land Institute of Salina, Kansas, as an edible legume for growing with perennial grains in a non-tillage permaculture system[183]. It is certainly worthy of more attention in this country, though the small seed size mitigates against its use[K]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.8 Psoralea hypogaea

Small Indian Breadroot

tfo2n 4 tlin 8 cvuc 4 kcak 0 tcan 0 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Psoralea hypogaea is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no specific mention of toxicity for this species has been found, at least some members of this genus contain furanocoumarins, these substances can cause photosensitivity in some people[65].

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[2, 62, 85, 161, 257]. Rich in starch[105]. The root can also be dried, ground into a powder and used in soups or with cereals for making bread etc[161]. The root is up to 60mm long and 15mm thick[60]. The root was an important food source fr the native North American Indians[274].

tcanta Soil stabilizationThe plant is a good soil stabilizer in its natural environment[200].

nrakta Western N. America - Great Plains, east to Nebraska and south to Oklahoma. ksacta Rocky or sandy prairies, bluffs and stream valleys[228].

propta Pre-soak the seed for 24 hours in warm water and then sow in early to mid spring in a greenhouse. Either sow the seed in individual pots or pot up the young seedlings as soon as possible in order to avoid root disturbance. Grow them on in the pots until planting out in their final positions. It is usually impossible to transplant this species without fatal damage to the root[200]. Division in spring. With great care since the plant resents root disturbance. It is virtually impossible to divide this species successfully[200].

nwatta Succeeds in an ordinary garden soil[1]. Requires a well-drained soil in a sunny position[200]. Plants are very intolerant of root disturbance, they are best planted out into their permanent positions whilst still small[200]. Some botanists have reclassified the plant and now call it Pediomelum hypogaeum[274]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 5.1.9 Vicia faba major

Broad Bean, Fava Bean

tfo2n 4 tlin 10 cvuc 4 kcak 3 tcan 1 dwat m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hjonli

drutta Vicia faba major is a ANNUAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen, Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Although often used as an edible seed, there are reports that eating the seed of this plant can cause the disease 'Favism' in susceptible people[7, 76]. Inhaling the pollen can also cause the disease [7, 218]. Favism, which is a severe haemolytic anaemia due to an inherited enzymatic deficiency[218], only occurs in cases of excessive consumption of the raw seed (no more details are given[K]) and when the person is genetically inclined towards the disease[7, 213]. About 1% of Caucasians and 15% of Negroids are susceptible to the disease[218].

kcakta Edible Parts: Leaves SeedEdible Uses: Immature seed - raw or cooked. Broad bean seeds are very nutritious and are frequently used as items of food. The seeds can be

eaten raw when they are small and tender, as they grow older they can be cooked as a vegetable [2, 7, 16, 132, 183]. They have a very pleasant floury taste[K]. There are some potential problems to the use of these seeds if they are consumed in large quantities[7] - see the notes above on toxicity. Mature seeds can be eaten cooked as a vegetable or added to soups etc[2, 7, 16, 183]. They are best soaked for 12 - 24 hours prior to cooking in order to soften them and reduce the cooking time[K]. They will also become more nutritious this way[K]. The flavour is mild and pleasant with a floury texture[K]. They can also be dried and ground into a flour for use in making bread etc with cereal flours[183]. The seed can also be fermented to make tempeh'[183]. Made into a paste, they can be used as a sandwich filling[299]. The seed can be sprouted before being cooked[183]. Popped seeds can be salted and eaten as a snack or roasted like peanuts[183 ]. Young pods - cooked and eaten as a vegetable 183 ]. They quickly become fibrous as they grow larger[183], and also develop a hairy coating inside the pods that can become unpleasant as the pods get larger[K]. Young leaves - cooked. They are very nutritious and can be used like spinach[105, 183 1.

tcanta Fibre Soap makingAgroforestry Uses: The stems and leaves are sometimes used as a green manure[299]. Broad beans grow well with carrots, cauliflowers, beet, cucumber, cabbages, leeks, celeriac, corn and potatoes, but is inhibited by onions, garlic and shallots[18, 20]. Other Uses: A fibre is obtained from the stems. The burnt stems are rich in potassium and can be used in making soap. The dried stems can be burnt as a fuel[299].

dwatta DiureticThe seedpods are diuretic and lithon-

nrakta Long cultivated for its seed, the original habitat is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in succession from late winter until early summer. Germination should take place in about 7 - 10 days. The earlier sowings should be of suitably hardy varieties such as the 'Longpods' whilst later sowings can be of the tastier varieties such as the 'Windsors'. By making fresh sowings every 3 weeks you will have a continuous supply of fresh young seeds from early summer until early autumn. If you want to grow the beans to maturity then the seed needs to be sown by the middle of spring. You may need to protect the seed from the ravages of mice. Another sowing can be made in middle to late autumn. This has to be timed according to the area where the plants are being grown. The idea is that the plants will make some growth in the autumn and be perhaps 15 - 20cm tall by the time the colder part of winter sets in. As long as the winter is not too severe, the plants should stand well and will grow away rapidly in the spring to produce an earlier crop. The plants will also be less likely to be attacked by blackfly. Make sure you choose a suitably hardy variety for this sowing.

nwatta Broad beans originated in warm temperate areas and can be cultivated from the cold temperate zone to the subtropics, and also at higher elevations from 1,300 - 3,800 metres in the tropics. It may flower well in the lowland tropics, but usually does not produce pods[299

- ]. The ideal temperature range in the growing season is between 18 - 27°c, at higher temperatures the flowers are often aborted[200
- ]. The plant requires an annual rainfall of 700 -1,000mm, of which more than 60% should occur during the growing period[299
- ]. Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[1
- l. Grows well in heavy clay soils. Dislikes dry conditions according to some reports[87
- 200 ], whilst another says that it is drought tolerant once established[132
  - ]. Prefers a pH in the range 5.5 to 7[200
- There are two main forms of this species small seeded forms that are more commonly grown for feeding livestock and as a green manure, and larger seeded forms that are usually grown for human food. Of the larger seeded forms there are two main types:- 'Longpod' beans are the more hardy and can be sown in the autumn in cool temperate areas. 'Windsor' beans, which are considered to be finer

propta Seed - best sown as soon as it is harvested in exquisite sweet flavour, usually with a very soft flesh, whilst autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

Coppice Management: Standard Staple Crop: ProteinoilLandscape Uses:Container, Standard, Specimen, An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Succeeds in a pH range 4.5 to 8.5, but prefers a range of 5 to 7[200]. Plants are fairly wind tolerant[1, 11]. A very hardy plant, succeeding in all areas of Britain[200]. The flowers, however, are produced in late winter and early spring and can be damaged by heavy frosts at this time[200]. A parent, together with C. maxima, of many cultivated forms of filberts and cob nuts. There are many named varieties[11]. Plants are self-fertile but a more certain crop is obtained if more than one cultivar is grown[200]. The main difference between cob nuts and filberts is that the husk of a filbert is longer than the seed and often completely encloses it, whilst the husk on a cob nut is shorter than the seed[200]. Squirrels are a major pest of this plant, often decimating the crop of nuts[200]. Often grown as a coppiced shrub in woodlands, the stems have a variety of uses[23, 67, 186]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. A food plant for the caterpillars of many lepidoptera species[30]. Special Features: Not North American native. Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

## 5.2.10 Pyrus communis sativa

4 tlin 8 cyuc 5 kcak 3 tcan 0 dwat 5 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Pyrus communis sativa is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The flavour ranges from rather harsh and astringent (cultivars used for making alcoholic drinks) through to soft, sweet and very juicy. The best dessert fruits have an cooking varieties have harder less sweet flesh[K].

tcanta Dye WoodA yellow-tan dye is obtained from the leaves[106, 115]. Wood - heavy, tough, durable, fine grained, hard. Used by cabinet and instrument makers[11, 61, 100, 149]. When covered with black varnish it is an excellent ebony substitute[74].

nrakta A garden cultivar, probably derived from P. communis, P. cordata and P. nivalis[11]. ksacta Not known in the

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratifinwatta Global Crop Industrial Crop: Biomass Managementation at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year. The seed of pear cultivars will not usually breed true to type.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils[200]. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile, though plants can become chlorotic on very alkaline soils[200]. Established plants are drought tolerant[200]. Very hardy, tolerating temperatures down to below -15°c[200]. Widely cultivated for its edible fruit in temperate areas, there are many named varieties that can provide fruit from late July to April or May of the following year. This is the collective name for all the pear cultivars that have been derived from P. communis, probably through hybridization with P. cordata and P. nivalis. Where space is at a premium, or at the limits of their climatic range, pears can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall but, because of their relatively early flowering, they are not really suitable for north or east facing walls[219]. Most cultivars are not self-fertile and a number of cultivars have incompatible pollen, so care must be taken to ensure the provision of a suitable pollen partner[200]. Trees grow less well in grass, root secretions from the grass inhibiting the root growth of the pear[201]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil reguirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## **5.2.11** Phragmites australis

Common Reed, American common reed, Hybrid common reed, European common reed, Subtropical common re 4 tlin 10 cyuc 5 kcak 4 tcan 2 dwat 3.6 m hkuc

hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hionli

drutta Phragmites australis is a PERENNIAL growing to 3.6 m (11ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves Root Seed Shoots StemEdible Uses: Condiment Drink SweetenerRoot - raw or cooked like potatoes[2, 13, 74, 102, 106, 183]. It contains up to 5% sugar. The flavour and texture are best when the root is young and still growing[144]. It can be dried, ground coarsely and used as a porridge[12, 46, 62]. In Russia they are harvested and processed into starch[269]. Young shoots raw or cooked[61, 62, 102, 179]. They are best if used before the leaves form, when they are really delicious[144]. They can be used like bamboo shoots[183]. The partly unfolded leaves can be used as a potherb and the Japanese dry young leaves, grind them into a powder and mix them with cereal

but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to at least -18°c[202]. A very variable species, it has been divided up into several different species by some botanists[82]. The sub-species C. pedicellata gloriosa. Sarg. has larger fruits than the type[11]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A user in Poland says that Crataegus pedicellata exists in the wild in Eastern Poland and can support winter temperatures at least until

## 5.2.8 Amelanchier x grandiflora

Apple Serviceberry

4 tlin 7 cyuc 5 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier x grandiflora is a deciduous Shrub growing to 6 m (19ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[200]. Sweet and succulent with a flavour of apples[K], they can also be dried for later use[183]. The fruit is rich in iron and copper[226]. It is up to 10mm in diameter[200].

nrakta A hybrid of garden origin, A. arborea x A. laevis. ksacta Not known in the wild.

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if reauired.

nwatta Landscape Uses: Firewood, Specimen, Woodland garden. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Prefers an acid or neutral soil. Plants are hardy to about -25°c[184]. This species does not produce suckers[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. This species is occasionally cultivated for its edible fruits, there are some named varieties[200]. The fruit is freely produced in Britain[184]. Considerable confusion has existed between this species. A. arborea, A. canadensis, A. lamarckii and A. laevis, see [11 and 200] for the latest (1991) classification. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. Special Features: Not North American native, Attracts butterflies. Blooms are very showy.

#### 5.2.9 Corvlus avellana

Common Hazel, Common filbert, European Filbert, Harry Lauder's Walking Stick, Corkscrew Hazel, Hazel 4 tlin 8 cyuc 5 keak 5 tcan 2 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli dyat hjonli

drutta Corylus avellana is a deciduous Tree growing to 6 m (19ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from January to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil Oil SeedEdible Uses: Milk Oil OilSeed - raw or roasted and used in breads, cakes, biscuits, sweets etc[2, 5, 9, 12, 13, 34, 183]. An excellent nut for raw eating[K]. They can also be liquidized and used as a plant milk[183]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. A clear yellow edible oil is obtained from the seed[7, 9, 183]. It is used in salad dressings, baking etc.

tcanta Basketry Charcoal Cosmetic Hedge Hedge Miscellany Oil Oil Plant support Polish Tannin WoodThe seed contains up to 65% of a non-drying oil, used in paints, cosmetics etc[13, 46, 57, 132]. The whole seed can be used to polish and oil wood[6]. It is very easy to apply and produces a nice finish[K]. The finely ground seeds are used as an ingredient of face masks in cosmetics[7]. Plants can be grown as a tall hedge[29]. They need to be left untrimmed or only lightly trimmed if seed is required[29]. The bark and leaves are a source of tannin[7]. Wood - soft, easy to split, not very durable, beautifully veined. Used for inlay work, small items of furniture, hurdles, wattles, basketry, pea sticks etc[7, 13, 23, 46, 61, 63, 66, 125]. The twigs are used as dowsing rods by water diviners[11]. The wood also yields a good quality charcoal, used by artists[63, 101].

dwatta Anthelmintic Astringent Diaphoretic Febrifuge Miscellany Nutritive Stomachic TonicThe bark, leaves, catkins and fruits are sometimes used medicinally[7]. They are astringent, diaphoretic, febrifuge, nutritive and odontalgic[7]. The seed is stomachic and tonic[240]. The oil has a very gentle but constant and effective action in cases of infection with threadworm or pinworm in babies and young children[7].

nrakta Europe, including Britain, from Norway to Spain and east to W. Asia. ksacta Woods and hedgerows, especially on the slopes of hills, often on calcareous soils[7, 17].

flavoured, are less tolerant of the cold and so are best sown in spring[132]

]. Autumn sown varieties are more susceptible to 'chocolate spot' fungus, this problem can be alleviated by the addition of potash to the soil[87]

1. Black fly can be a major problem. Autumn sown crops are less likely to be affected. Pinching out the soft tips of the plants, one they are tall enough and are beginning to flower, can reduce the problem since the blackfly always start on the soft shoots and then spread to the older stems. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby(200

]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

## 5.1.10 Caragana brevispina

Long-Stalked Pea-shrub

tfo2n 4 tlin 9 cyuc 4 kcak 3 tcan 1 dwat 2.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Caragana brevispina is a deciduous Shrub growing to 2.5 m (8ft) by 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Reports that this plant contains toxins have not been substantiated[65]. The occurrence of cystine in the seeds is doubtful[65].

kcakta Edible Parts: Leaves SeedEdible Uses: Seed cooked[160]. Small but produced in abundance. The seed of a plant seen at the Royal Horticultural Gardens, Wisley in Surrey in September 1993 was about twice the size of C. arborescens but it had a distinctly bitter taste[K]. High in protein, it has been recommended as an emergency food for humans. Young buds - cooked as a green vegetable[272].

tcanta Hedge Hedge Soil stabilization WoodPlants can be grown as a hedge, they are very spiny and provide an impenetrable barrier. The extensive root system of this plant makes it useful for planting to control soil erosion. Woodhard, close grained[146]. An important fuel wood for people living at high elevations[272].

dwatta A decoction of the plant is taken in the treatment of aching joints[272].

nrakta E. Asia - N.W. Himalayas.. ksacta Higher forests, in the undergrowth of fir and oak forests or in open glades on dry ridges from 1500 - 2700 metres[146].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It susually germinates in 2 weeks[K]. Stored seed should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen then scarify it and re-soak for another 12 hours before sowning[138]. Germination usually takes place within 2 - 3 weeks at 20°c[138]. Good percentage[11]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[113]. Layering in spring.

nwatta Succeeds in most well-drained soils, but prefers full sun and a light sandy dry or well-drained soil[1, 11, 200]. Does not require a rich soil[11], succeeding on marginal land[160]. Succeeds in acid or alkaline soils[160]. Established plants are drought resistant[160]. This species is hardy to at least -20°c[184], it prefers a continental climate with hot summers and cold winters so it does not grow so well in the milder western half of Britain[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmo-

spheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.11 Hedysarum occidentale

Liquorice Root, Western sweetvetch

tfo2n 4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 0.1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hedysarum occidentale is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[212]. Long and sweet with a liquorice-like flavour[183]. Used in the spring it is crisp and juicy' but it becomes tough and woody as the season advances.

nrakta Western N. America - Montana to Washington, south to Utah and Colorado. ksacta Dry and often rocky soils of open areas, from the plains to about 2,600 metres[212].

propta Seed - sow in a cold frame as soon as it is ripe or in the spring[200]. Stored seed should be pre-soaded for 24 hours in warm water. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Great care is needed since the plant dislikes root disturbance[200].

nwatta Easily grown in ordinary garden soil in a sunny position, preferring a deep well-drained sandy loam[1, 200]. Plants strongly resent root disturbance and should be placed in their permanent positions as soon as possible[1]. This species is closely related to H. boreale[212]. Does well in the rock garden or border[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 5.1.12 Robinia pseudoacacia

Black Locust, Yellow Locust

tfo2n 4 tlin 9 cyuc 3 kcak 4 tcan 2 dwat 25 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Robinia pseudoacacia is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June, and the seeds ripen from November to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista All parts of the plant (except the flowers) and especially the bark, should be considered to be toxic[4, 65, 76]. The toxins are destroyed by heat[65].

kcakta Edible Parts: Flowers Oil Seed SeedpodEdible Uses: Condiment Drink OilSeed - cooked[2, 55, 61]. Oily[161]. They are boiled and used like peas[183]. After boiling the seeds lose their acid taste[213]. The seed is about 4mm long and is produced in pods up to 10cm long that contain 4 - 8 seeds[82]. A nutritional analysis is available[218]. Young seedpods - cooked[105]. The pods contain a sweetish pulp that is safe to eat and is relished by small children[201]. (This report is quite probably mistaken, having been confused with the honey locust, Gleditsia spp[K].) A strong, narcotic and intoxicating drink is made from the skin of the fruit[13]. Piperonal is extracted from the plant, it is used as a vanilla substitute[105]. No further details. All the above entries should be treated with some caution, see the notes at the top of the page regarding toxicity. Flowers

- cooked. A fragrant aroma, they are used in making jams and pancakes[7, 183]. They can also be made into a pleasant drink[183].

tcanta Dye Essential Fibre Fodder Fuel Oil Soil stabilization WoodAgroforestry Uses: This species has been widely planted for shelterbelts and windbreaks, and is also used to produce woody biomass for energy production[1050]. It suckers freely, especially if coppiced, and can be used for stabilizing banks etc[200, 226]. It is used in restoration and rehabilitation projects because its extensive root system holds and stabilizes the soil surface, it sprouts vigorously and prolifically, it increases soil fertility through nitrogen fixation. and it forms a leaf litter that protects the soil. Its main use has been in the rehabilitation of former surface mine sites and for erosion control, but it is also used to rehabilitate contaminated soils, depleted soils, gravel pits, and logged areas, and to stabilize railroad embankments and highway edges[1050]. The plant is often found as a pioneer on old fields, burned areas, and lands strip-mined for coal[418]. The leaves are rich in tannin and other substances which inhibit the growth of other plants[13]. The flowers are a rich source of nectar. Honey produced from this nectar is considered to be of high quality and fetches a price premium. Other Uses: A drying oil is obtained from the seed[2, 7]. An essential oil is obtained from the flowers. Highly valued, it is used in perfumery[7, 57, 100]. A yellow dye is obtained from the bark[223]. Robinetin is a strong dyestuff yielding with different mordants different shades similar to those obtained with fisetin, quercetin, and myricetin; with aluminum mordant, it dyes cotton to a brown-orange shade[269]. The bark contains tannin, but not in sufficient quantity for utilization[223 l. On a 10% moisture basis, the bark contains 7.2% tannin and the heartwood of young trees 5.7%[223]. The bark is used to make paper and is a substitute for silk and wool[13 ]. The wood is close-grained, exceedingly hard, heavy, very strong (due to a high lignin content), resists shock and is very durable in contact with the soil. It weighs 45lb per cubic foot. It does not shrink much when drying. The wood is used in shipbuilding and for making fence posts, tree nails, flooring, furniture, woodenware etc[4, 7, 11, 13, 46, 61, 82, 149] , 171 , 227 , 418 , 1050 ]. The wood of Robinia pseudoacacia var. rectissima, the so called 'Long Island' or 'Shipmast' locust, has a greater resistance to decay and wood borers, outlasting other locust posts and stakes by 50 - 100%[269]. A very good fuel[82, 418], but it should be used with caution because it flares up and projects sparks[226]. The wood is also used for making charcoal[418]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antispasmodic Antiviral Aromatic Cancer Cholagogue Diuretic Emetic Emollient Febrifuge Laxative Narcotic Purgative TonicFebrifuge[13, 46]. The flowers are antispasmodic, aromatic, diuretic, emollient and laxative[218]. They are cooked and eaten for the treatment of eye ailments[218]. The flower is said to contain the antitumor compound benzoaldehyde[269]. The inner bark and the root bark are emetic, purgative and tonic[4, 7, 218, 257]. The root bark has been chewed to induce vomiting, or held in the mouth to allay toothache[222, 257], though it is rarely if ever prescribed as a therapeutic agent in Britain[4]. The fruit is narcotic[13]. This probably refers to the seedpod. The leaves are cholagogue and emetic[7]. The leaf juice inhibits viruses[218].

nrakta Eastern N. America - Appalachian and Ozark mountain ranges. Naturalized in Britain[17]. ksacta Woods and thickets[43], especially in deep well-drained calcareous soils[149]

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. Other reports say that the seed can be sown in an outdoor seedbed in spring[78, 98]. The seed stores for over 10 years[113]. Suckers taken during the dormant season

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppic Management: Standard Minor Global Crop Other Systems: SRCLandscape Uses: Erosion control, Firewood, Aggressive surface roots

possible. Succeeds in any well-drained soil, preferring one that is not too rich[1, 200]. Succeeds in dry barren sites, tolerating drought and atmospheric pollution [60, 200]. Succeeds in a hot dry position. The plant is reported to tolerate an annual precipitation in the range of 61 to 191cm, an annual temperature in the range of 7.6 to 20.3°C and a pH of 6.0 to 7.0[269]. A fast-growing tree for the first 30 years of its life[188, 269], it can begin to flower when only 6 years old, though 10 - 12 years is more normal[229]. The flowers are a rich source of nectar and are very fragrant[82] with a vanillalike scent[245]. The branches are brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. The plants sucker freely and often form dense thickets, the suckers have vicious thorns[226]. There are some named varieties selected for their ornamental value[188], some of these are thornless[226]. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. The leaves are rich in tannin and other substances which inhibit the growth of other plants[13]. A very greedy tree, tending to impoverish the soil[13]. (Although a legume, I believe it does not fix atmospheric nitrogen[K]) A very good bee plant[7, 13, 20, 201]. This species is notably resistant to honey fungus[88, 200]. Special Features: North American native, Invasive, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Fragrant flowers, Blooms are very showy. The plant is heat tolerant in zones 9 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 5.1.13 Lespedeza bicolor

Lespedeza, Shrub lespedeza

tfo2n 4 tlin 8 cyuc 3 kcak 4 tcan 0 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lespedeza bicolor is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from August to September, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves Oil Seed StemEdible Uses: Oil TeaYoung leaves and stems - cooked[105, 177, 179, 183]. Flowers - cooked[177, 183]. Seed - cooked[105, 177, 179]. Occasionally boiled and eaten with rice[183]. The leaves are used as a tea substitute[177, 183, 266].

tcanta Basketry Fodder Oil Shelterbelt Soil stabilization. The seed oil is used as a lubricant[266]. The branchletsare used for making baskets[266]. Because this species tolerates arid soils, it is grown as a windbreak, and for sand stabilization, and soil conservation[266].

nrakta E. Asia - China, Japan, Korea, Manchuria. ksacta Grassy places and thickets in lowland all over Japan[58]. Mountain slopes, forest margins, roadsides, thickets and forests at elevations of 150 - 1000 metres[266].

propta Pre-soak the seed for 24 hours in warm water and then sow it in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in

Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[1, 11] and a sheltered position[200]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but it is apt to become chlorotic if too much is present[1]. Prefers a pH between 6 and 6.5[200]. The plum is widely cultivated for its edible fruit in temperate zones, there are many named varieties able to supply fresh fruits from late July to November or December[183]. Many cultivars are fully selffertile, though some are partially self-sterile and others require cross-pollination[200]. Where space is at a premium, or at the limits of their climatic range, plums can be grown against a wall. Most cultivars will grow well against a sunny south or west facing wall, whilst an east facing wall will suit some of the tougher cultivars, a north facing wall is not really suitable[219]. This species is probably a hybrid of ancient origin between P. spinosa and P. cerasifera, coupled with chromosome doubling[17]. It does not cross-pollinate with the Japanese plum, P. salicina[200]. Prefers growing in a continental climate, mild winters tend to encourage earlier flowering with a greater risk of frost damage to the blossom. In Britain the best fruits are produced away from the western side of the country. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface. The root pattern is suckering with new plants from runners away from the plant [2-1].

## 5.2.6 Rubus procerus

Himalayan Giant Blackberry 4 tlin 8 cyuc 5 kcak 1 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rubus procerus is a deciduous Shrub growing to 10 m (32ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, cakes etc[3, 105, 183]. The fruit can also be dried for later use[183]. Very large for a blackberry[50, 183] with a very pleasant rich flavour when fully ripe[K].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta C. Europe. ksacta Not known

propta Seed requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. A form of this species, known as 'Himalayan giant', is commonly cultivated in temperate zones for its edible fruit[50]. Although a blackberry, the stems are often perennial and can fruit for more than one year[50]. This name may be wrongly applied. According to the new RHS Dictionary of Gardening, the correct name for the 'Himalayan Giant' blackberry is R. procerus. P.J.Muell., the name R. discolor is misapplied. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.7 Crataegus pedicellata

Scarlet Haw. Scarlet hawthorn

4 tlin 8 cyuc 5 kcak 2 tcan 2 dwat 7 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus pedicellata is a deciduous Shrub growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. A very variable species, especially in its fruit which ranges considerable in size and quality[K]. Up to 10mm long and pear shaped, the flesh is sweet but dry and mealy[200]. Another report says that the fruit is up to 20mm in diameter[235] and we have often seen fruits this size, or even a bit larger[K]. We find the fruits of the best forms to have an excellent flavour and juicy texture when fully ripe, but with a hint of bitterness before then[K]. They are one of the later members of this genus to ripen their fruit[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Northeastern N. America - Connecticut to Ontario, Illinois and Pennsylvania. Naturalized in Britain. ksacta Self-sown in hedges and rough ground in south-eastern England

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed

shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

## 5.2.4 Actinidia arguta

4 tlin 8 cvuc 5 kcak 2 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia arguta is a deciduous Climber growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from May to November, in flower from June to July, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit SapEdible Uses: Fruit - raw, cooked or dried for later use[1, 3, 61, 105]. Sweeter than A. deliciosa, the kiwi fruit[183], the skin is smooth and can be eaten with the fruit[K]. The fruit contains up to 5 times the vitamin C content of blackcurrants[74]. Highly esteemed according to one report[151] whilst another says that they are insipid[11]. The fruits are greenish-yellow or purple-red when mature and are about 2 to 3cm long[198, 266]. They contain a number of small seeds, but these are easily eaten with the fruit[K]. The plant is rich in sap and this can be tapped and drunk in the spring[105, 177, 183].

nrakta E. Asia - China, Japan ksacta Climbing up trees in woodland, mountain forests, thickets, streamsides and moist places at elevations of 700 - 3600 metres[11, 198,266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, so they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood. October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Tolerates acid and moderately alkaline soils[202]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. A very hardy plant, tolerating temperatures down to -30°c or more, but the young spring growth is susceptible to frost damage[160]. Some cultivars are said to tolerate temperatures down to about -50°c when fully dormant[160]. This species is often cultivated for its edible fruit and it is increasingly being seen as having potential in Britain. There are some named varieties[183]. Plants are usually dioecious but the cultivar 'Issai' is self-fertile[200]. A polymorphic species[74]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. Plants only flower when grown in warm climates[202]. This species flowers well in gardens in the south and west of Britain[219], the small flowers being sweetly scented[245]. This is a climbing plant, supporting itself by twining around branches etc[200]. Male and female plants must usually be grown if seed is required. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the

above-ground architecture (form - tree, shrub etc. and size number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

## 5.2.5 Prunus domestica

Plum, European plum

4 tlin 9 cyuc 5 kcak 3 tcan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Prunus domestica is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from July to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: Flowers Fruit Oil Oil SeedEdible Uses: Gum Oil Oil TeaFruit - raw or cooked[1, 2, 7, 46]. The fruit varies considerably from cultivar to cultivar but it is generally somewhat mealy, soft and juicy with a delicious flavour ranging from very sweet to acid[K]. The more acid fruits are usually only used for cooking purposes[K]. The fruit varies widely in size according to cultivar but can be 8cm long and contains a single large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible gum is obtained from points of damage on the trunk[64]. The seed contains about 20% of an edible semi-drying oil[4, 57]. It has an agreeable almond smell and flavour[4]. The flowers are eaten. They are used as a garnish for salads and ice cream or brewed into a tea[183].

tcanta Adhesive Dye Gum Oil Oil WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. A vellow dve is obtained from the bark[115]. A gum obtained from points of damage along the stem can be used as an adhesive [64]. The ground up seeds are used cosmetically in the production of facemasks for dry skin[7]. A semi-drying oil is obtained from the seed[64]. No details of its uses. Wood - hard, compact. Used for musical instruments[115].

dwatta Febrifuge Laxative StomachicThe dried fruit, known as prunes, is a safe and effective laxative and is also stomachic[4, 7, 21, 238]. The bark is sometimes used as a febrifuge[7]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocvanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration. improves digestion and gives a sense of well-being[238].

nrakta Europe to W. Asia. Naturalized in Britain. A hybrid P. spinosa x P. cerasifera divaricata. ksacta Found in hedges in Britain[17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in individual pots in a frame. It can be difficult to get the cuttings through their first winter, it is best to plunge the pots in a bed of ashes in a sheltered border outdoors[78].

nwatta Agroforestry Services: Nitrogen Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: Fodder Minor Global CropEasily grown in a well-drained light loam in full sun[1, 182]. Succeeds in light shade and in dry soils[266]. The top growth is not very cold tolerant, although the rootstock is hardy to about -25°c. Plants are usually cut back to the ground in all but very mild winters, though they generally resprout well from the base in the following spring and flower in late summer[182]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc., and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown

## 5.1.14 Vicia sativa

Winter Tares, Garden vetch, Subterranean vetch tfo2n 4 tlin 8 cvuc 3 kcak 3 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia sativa is a ANNUAL CLIMBER growing to 1.2 m (4ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista There is some evidence that the seed may be toxic but this has only been shown under laboratory conditions, there are no recorded cases of poisoning by this plant in Britain[76].

kcakta Edible Parts: Leaves SeedEdible Uses: TeaSeed cooked[22, 74]. Not very palatable nor very digestible but it is very nutritious[2, 115]. The seed can be dried, ground into a powder and mixed with cereal flour to make bread, biscuits, cakes etc[183]. The beans compliment the protein in the cereal making it more complete[K]. Some caution is advised, see the notes above on toxicity. Leaves, young shoots and young pods - cooked[105, 177, 183]. The leaves are a tea substitute[183].

tcanta Green manureA very valuable green manure crop, it can be sown in spring or as late as October. A deep rooted and fast growing plant, it is winter hardy, an effective weed suppresser, produces a good bulk and fixes a large amount of nitrogen[87]. Dynamic accumulator.

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Hedges and grassy places, avoiding acid soils or shady positions[17].

propta Pre-soak the seed for 24 hours in warm water and sow in situ from late winter to early summer and again in the autumn

nwatta Succeeds in any well-drained soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. The subspecies V. sativa leucosperma. Ser. is the form usually grown for food[74]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.15 Ceanothus americanus

New Jersey Tea, Wild Snowball tfo2n 4 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ceanothus americanus is a deciduous Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: Edible Uses: TeaA refreshing and stimulating tea is made from the dried leaves, it is a good substitute for china tea though it does not contain caffeine[2, 21, 43, 46, 95, 159, 161, 183]. The leaves are gathered when the plant is in full bloom and are dried in the shade[183].

tcanta Dye SoapA green dye is obtained from the flowers[168]. A cinnamon-coloured dve is obtained from the whole plant[4]. A red dye is obtained from the root[95, 159]. The flowers are rich in saponins, when crushed and mixed with water they produce an excellent lather which is an effective and gentle soap[168, 169]. They can be used as a body wash (simply rub the wet blossoms over the body) or to clean clothes[K]. The flowers were much used by the North American Indians as a body wash, especially by the women in preparation for marriage, and they leave the skin smelling fragrantly of the flowers[K].

dwatta Antispasmodic Astringent Dysentery Expectorant Haemostatic Hypotensive Sedative VDThe roots and root bark of New Jersey tea was used extensively by the North American Indians to treat fevers and problems of the mucous membranes such as catarrh and sore throats[254]. Current day usage of the roots concentrates on their astringent, expectorant and antispasmodic actions and they are employed in the treatment of complaints such as asthma. bronchitis and coughs[254]. The roots and root-bark are antispasmodic, antisyphilitic, strongly astringent (they contain 8% tannin), expectorant, haemostatic and sedative[21, 222]. They have a stimulatory effect on the lymphatic system[238], whilst an alkaloid in the roots is mildly hypotensive[222]. The plant is used internally in the treatment of bronchial complaints including asthma and whooping cough, dysentery, sore throats, tonsillitis, haemorrhoids etc[4, 222, 238]. A decoction of the bark is used as a skin wash for cancer and venereal sores[213]. The powdered bark has been used to dust the sores[213]. The roots are unearthed and partially harvested in the autumn or spring when their red colour is at its deepest. They are dried for later use[238].

nrakta Eastern N. America - Maine to Florida, west to Oklahoma and Minnesota, ksacta Dry woods and on grayelly banks[21, 43], often on sandstone or limestone bluffs[159].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place in 1 - 2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200].

July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Landscape Uses:Border, Erosion control, Ground cover, Hedge, Massing, Rock garden. Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. Another report says that it dislikes alkaline soils, though succeeds in poor dry conditions[238]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Any pruning is best carried out in the spring[219]. Fast growing, it flowers well when young, often in its second year from seed[11]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212]. Special Features: North American native, Naturalizing, Attracts butterflies, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

# 5.1.16 Comptonia peregrina asplenifolia

Sweet Fern

tfo<br/>2n 4 tlin 8 cyuc 3 kcak 3 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli h<br/>gatkyuctcup hwicli hyishrasjlut hpa7tli frusflat hpa7tmwatli hjonli

drutta Comptonia peregrina asplenifolia is a deciduous Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from March to April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Condiment TeaThe young fruits are eaten as a pleasant nibble[55, 62, 183]. The aromatic leaves, fresh or dried, are used to make a palatable tea[55, 62, 102, 183]. The leaves are also used as a seasoning[183].

tcanta Incense Lining Parasiticide RepellentThe leaves are used as a lining in baskets etc in order to preserve the fruit[55]. The crushed leaves repel insects[102]. They can be thrown onto a camp fire to keep mosquitoes away[257]. The dried leaves have been burnt as an incense[257].

dwatta Astringent Blood purifier Expectorant Febrifuge Odontalgic Parasiticide Poultice TonicSweet fern was employed medicinally by several native North American Indian tribes who used it especially as a poultice to treat a variety of complaints[257]. It is still used for most of the same purposes in modern herbalism. The leaves are astringent blood purifier, expectorant and tonic[21, 62, 222, 257]. A tea made from the leaves and flowering tops is used as a remedy for diarrhoea, headache, fevers, catarrh, vomiting of blood, rheumatism etc[213, 222, 257]. The infusion has also been used to treat ringworm[257]. The leaves have also been used

as a poultice for toothaches, sprains etc[238, 257]. A cold water infusion of the leaves has been used externally to counter the effect of poison ivy[213, 222, 257] and to bathe stings, minor haemorrhages etc[238]. The leaves are harvested in early summer and dried for later use[238].

nrakta Eastern N. America. ksacta Dry, sterile, sandy to rocky soils in pinelands or pine barrens, clearings, pastures or edges of woodlots from sea level to 1800 metres[43, 270].

propta Seed - it has a very tough seed coat and also contains germination inhibitors and so is very difficult to germinate[113]. It is probably best to harvest the seed 'green' (after the seed has fully developed but before it dries on the plant) and sow immediately in a cold frame. If the seed has been stored then soaking in hot water for 24 hours will leach out some of the inhibitors and also help to soften the seed coat. Scarification will also help as will a period of cold stratification. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out into their permanent positions in late spring or early summer[K]. Root cuttings, 4cm long December in a frame[78, 113]. Plant the root horizontally. High percentage[78]. Suckers removed in the dormant season and potted up or planted into their permanent positions[200]. Plants can be difficult to move successfully[238]. Layering in spring[238].

nwatta Requires a peaty or light loam lime-free soil[11, 182, 200]. Requires an acid well-drained soil of low to medium fertility in partial shade but tolerates full sun if the soil does not dry out in the summer[200]. Tolerates dry sandy soils when grown in the shade[200]. A very ornamental plant[1], it is hardy to at least -25°c[184, 200]. This form is probably no more than a phenotypic variant of the species that is found growing in harsh conditions[200]. The crushed leaves are very aromatic[182], their scent is most noticeable in the early morning and the evening[238]. The scent increases when the leaves are dried[245]. This species is somewhat intolerant of root disturbance and should be planted out into its permanent position whilst small[238]. Suckering freely[184], this plant is well suited to clothing banks on soils of low fertility[200]. It has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.17 Vicia sativa leucosperma

Winter Tares

tfo2n 4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia sativa leucosperma is a ANNUAL CLIMBER growing to 1.2 m (4ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista There is some evidence that the seed may be toxic but this has only been shown under laboratory conditions, there are no recorded cases of poisoning by this plant in Britain[76].

kcakta Edible Parts: Leaves SeedEdible Uses: TeaSeed cooked[22, 74]. Not very palatable nor very digestible but it is very nutritious[2, 115]. The seed can be dried, ground into a powder and mixed with cereal flour to make bread, biscuits, cakes etc[183]. The beans compliment the protein in the cereal making it more complete[K]. Some caution is advised, see the notes above on toxicity. Leaves, young shoots and young pods - cooked[105, 177, 183]. The leaves are a tea substitute[183].

tcanta Green manureA very valuable green manure crop, it can be sown in spring or as late as October. A deep rooted and fast growing plant, it is winter hardy, an effective weed suppresser, produces a good bulk and fixes a large the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Very tolerant of maritime exposure and of trimming, it can be grown as a shelterbelt tree or hedge in maritime areas[11, 29, 49, 75]. Wood - strong, hard, durable. Used for furniture[46, 61, 89]. It makes a good charcoal[89] and a good fuel, burning well even if green[146]. The bark is a source of tannin[146]. Heat Zone: 9-2.

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe - Mediterranean. Occasionally naturalized in Britain in S. England[17]. ksacta Arid places, maquis, woods and hills on limestone[89].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Fodder: Mast Industrial Crop: nin Management: Standard Other Systems: hesa Regional Crop Staple Crop: Balanced carbPrefers a good deep fertile loam which can be on the stiff side[11]. Thrives on shallow chalky soils[188]. Succeeds in all soils except those that are cold and poorly drained[98]. Grows well in sandy soils[188]. Young plants tolerate reasonable levels of side shade[200]. Very resistant to maritime exposure[11, 49, 75]. A very ornamental tree[1] but it is quite slow-growing[75]. Transplants badly unless moved regularly and this should be done as growth commences in late May or in September[11]. Fruits very freely in Britain[K]. The seed ripens in its first year[200]. The sub-species Q. ilex ballota is cultivated for its sweet-tasting edible seed in Portugal and Spain[K]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. Special Features: Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

## 5.2.3 Diospyros virginiana

American Persimmon, Common persimmon, Persimmon 4 tlin 8 cyuc 5 kcak 3 tcan 1 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Diospyros virginiana is a deciduous Tree growing to 20 m (65f.7 in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects, wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: Coffee Oil Sweetener TeaFruit - raw, cooked or dried and used in breads, cakes, pies, puddings etc[46, 183]. About the size of a plum, the fruit has an exquisitely rich flavour when it is

fully ripe (and almost at the point of going bad) but it is very harsh and astringent before then [2, 3, 171, K]. The fruit may not ripen properly in a cool summer, though if it is frosted it normally develops a very good flavour[K]. The fruit can also be harvested in the autumn, preferably after a frost, and bletted. (This is a process where the fruit is kept in a cool place and only eaten when it is very soft and almost at the point of going rotten). Much of the fruit on trees in a relatively sunny position at Kew after a relatively warm summer in 1996 was still not fully ripe, though it was very nearly so and ripened well off the tree[K]. The fruit can also be dried and used in bread, cakes etc. The fruit is up to 4.5cm in diameter[200]. Molasses can be made from the fruit pulp[183]. An oil obtained from the seeds is said to taste like peanut oil[222]. A tea is made from the dried leaves [102]. It is high in vitamin C and has a pleasant flavour somewhat like sassafras[21, 183]. The roasted seed is used as a coffee substitute[177, 183].

tcanta Oil Soil stabilization WoodCan be used as a rootstock for D. kaki[46]. Wood - strong, hard, heavy, finegrained, elastic, resistant to wear. A valuable wood, it is used for making wooden ware, turnery etc[46, 82, 149, 171]. It is used especially for making handles for golf clubs[149].

dwatta Antiscorbutic Astringent Vitamin C WartsA decoction of the boiled fruit was used to treat bloody stools[213]. (This probably refers to the unripe fruit, which is very astringent[K]). The leaves are rich in vitamin C and are used as an antiscorbutic[213]. A decoction of the inner-bark is highly astringent[149, 222]. It has been used as a mouth rinse in the treatment of thrush and sore throats[213, 222]. Used externally as a wash for warts or cancers[222].

nrakta Eastern N. America - New England to Florida, west to Texas and Kansas. ksacta Dry woods, old fields and clearings[43], on light well-drained sandy soils[82]. Found on most soil types from sands to shales and mud bottomlands[149].

propta Seed - best sown in a cold frame as soon as it is ripe[113, 200]. Stored seed requires cold-stratification and should be sown as early in the year as possible[78]. It usually germinates in 1 - 6 months at 15°c[175]. Pot up the young seedlings as soon as they are large enough to handle into fairly deep pots and plant them out in early summer. Give the plants some protection from winter cold for their first winter or two outdoors. Cuttings of half-ripe wood, July/August in a frame[200]. Layering in spring[200].

nwatta Requires a good deep loamy soil in sun or light shade[200]. If being grown for its fruit, the tree requires a warm, sunny, sheltered position[K]. It dislikes very acid or wet and poorly drained soils[200]. Plants are somewhat tender when young[11], though dormant mature trees are hardy to about -35°c[160]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Dioecious, but the female tree can produce seedless fruits in the absence of a pollinator[1]. It is likely that unfertilized fruits are more astringent than fertilized fruits since this is the case with D. kaki[K]. Trees can start producing fruit when only a few years old, a specimen seen at Kew Botanical gardens in autumn 1996 was only 1.5 metres tall and was bearing a very large crop of fruit[K]. This species is occasionally cultivated for its edible fruit, there are several named varieties[82, 183]. 'Dooley' grows well near the northern limits of persimmon culture[183]. 'Geneva Red' also grows well at the northern limits of persimmon culture. The fruit is medium to large[183]. 'Meader' grows well in cooler areas, it is self-fertile[183]. Plants have a long tap root and are difficult to transplant[149, 200], it is best to plant them out in their permanent position as soon as possible and to give protection overwinter for the first year or two[K]. The ssp. D. virginiana platycarpa has sweet succulent flesh, it grows wild from Missouri to Arkansas[82]. Special Features: Attracts birds, North American native, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the conditions, and a somewhat acidic infertile soil where there is reduced competition from other kinds of ground vegetation [1-6]. Bloom Color: Yellow. Bloom Time: May to Sep. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

#### 5.1.67 Baptisia bracteata

Plains Wild Indigo, Longbract wild indigo, False Indigo, Cream Wild Indigo

tfo2n 4 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.7 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Baptisia bracteata is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The plant is potentially toxic[222].

dwatta Alterative AstringentAn ointment made from the ground seeds is applied to the stomach in the treatment of colic[222]. A tea made from the roots is used in the treatment of typhoid and scarlet fever[222]. The leaves are astringent and are applied externally to wounds etc[222]. Recent research suggests that the plant can stimulate the immune

nrakta Eastern N. America - Arkansas, Texas and Nebraska to Minnesota. ksacta Dry soils[222] on prairies[235]. Sandy open woods, prairies, pastures and roadsides in Texas[274].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed should be pre-soaked for 24 hours in warm water and then sown in a cold frame in late winter or early spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer or following spring. Division in spring[188]. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Landscape Uses:Border, Ground cover, Seashore. Prefers a deep, well-drained neutral to slightly acid soil in full sun[188, 200]. Grows freely in a loamy soil[1]. Succeeds in a hot dry position. Succeeds in a rich moist soil in sun or light shade [187]. Hardy to about -20°c[187]. Plants have a very deep root system and dislike root disturbance, they should be left alone once they are established[188, 233]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Attractive foliage. North American native, Naturalizing, Attractive flowers or blooms

## mran

## 5.2.1 Corvlus hybrids

Hybrid and Neohybrids, Hazel, Filbert 4 tlin 9 cyuc 5 kcak 5 tcan 2 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli hjonli

drutta Corylus hybrids is a deciduous Shrub growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista None Known

kcakta Carbon Farming Solutions - Staple Crop: proteinoil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world). Hazelnuts are among the best perennial protein and oil staple crops for temperate and boreal climates. Hybrids and neohybrid hazels are of increasing importance [1-1].

tcanta Carbon Farming Solutions - Other Systems: woody agriculture. See individual species.

dwatta See individual species.

nrakta Hybrid ksacta Native to the temperate Northern Hemisphere. See individual species.

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta Climate: boreal to warm temperate, Mediterranean. Humidity: semi-arid to humid. Carbon Farming Solutions - Cultivation: new crop. Management: standard, coppice (Describes the non-destructive management systems that are used in cultivation) [1-1].

#### 5.2.2 Ouercus ilex

Holly Oak, Evergreen Oak 4 tlin 10 cyuc 5 kcak 3 tcan 2 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli

drutta Quercus ilex is an evergreen Tree growing to 25 m (82ft) by 20 m (65ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: Coffee OilSeed - raw or cooked[1, 2, 46, 61]. It can be sweet or bitter[K]. The seed is up to 3cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed from some trees contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute. An edible oil is obtained from the seed[183]. One reader noted the Q. suber population of the Mamora forest in Morocco contains only sweet acorns and can be eaten raw, it has a similar taste to raw chestnuts. The skin removes quite easyl Quercus ilex also exists with tannin-free acorns in the moroccan forests, the locals say around 20 percent are sweet.

tcanta Fodder Fuel Hedge Hedge Oil Repellent Shelterbelt Tannin WoodLandscape Uses: Specimen, Street tree. A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When amount of nitrogen[87].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Hedges and grassy places, avoiding acid soils or shady positions[17].

propta Pre-soak the seed for 24 hours in warm water and sow in situ from late winter to early summer and again in the

nwatta Succeeds in any well-drained soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. This subspecies is the form usually grown for food[74]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.18 Vicia faba equina

Horsebean

tfo2n 4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia faba equina is a ANNUAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although often used as an edible seed, there is a report that eating the seed of this plant can cause the disease 'Favism' in susceptible people[76]. Favism only occurs in cases of excessive consumption of the seed (no more details are given[K]) and when the person is genetically inclined towards the disease[213].

kcakta Edible Parts: Leaves SeedEdible Uses: Seed raw or cooked[27, 61]. It can be eaten before it is fully ripe in the same way as broad beans, the fully ripe seed requires overnight soaking to soften it before it is cooked. Leaves cooked[105]. Used like spinach.

tcanta Fibre Green manure Soap makingA good green manure crop, sown in autumn or spring. Relatively fast growing, producing a good bulk and fixing nitrogen[87]. The upright growth is not a very good weed suppresser though. A fibre is obtained from the stems. The burnt stems are rich in potassium and can be used in making soap.

nrakta Long cultivated for its seed, the original habitat 5.1.20 Lupinus nootkatensis is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[1]. Grows well in heavy clay soils. Dislikes dry conditions[57]. Sometimes cultivated for its edible seed, more commonly as a green manure crop[87]. There are 2 main types, 'daffa' beans are the more hardy and can be sown in the autumn, whilst 'tic' beans are best sown in spring. The autumn sown varieties are more susceptible to 'chocolate spot' fungus (which can be remedied by the addition of potash to the soil) but are more likely to escape damage from aphis[87]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

## 5.1.19 Vicia faba minuta

Tick Bean

tfo2n 4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia faba minuta is a ANNUAL growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although often used as an edible seed, there is a report that eating the seed of this plant can cause the disease 'Favism' in susceptible people[76]. Favism only occurs in cases of excessive consumption of the seed (no more details are given[K]) and when the person is genetically inclined towards the disease[213].

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[27, 61]. It can be eaten before it is fully ripe in the same way as broad beans, the fully ripe seed requires overnight soaking to soften it before it is cooked. Leaves cooked[105]. Used like spinach.

tcanta Fibre Green manure Soap makingA good green manure crop, it is best sown in the spring. Relatively fast growing, producing a good bulk and fixing nitrogen[87]. The upright growth is not a very good weed suppresser though. A fibre is obtained from the stems. The burnt stems are rich in potassium and can be used in making soap.

nrakta Long cultivated for its seed, the original habitat is obscure. ksacta Not known in a truly wild situation.

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[1]. Grows well in heavy clay soils. Dislikes dry conditions[57]. Sometimes cultivated for its edible seed, though more commonly as a green manure crop[87]. Tick beans are not as winterhardy as other forms of this species and so are best sown in the spring. The autumn sown varieties are more susceptible to 'chocolate spot' fungus (which can be remedied by the addition of potash to the soil) but are more likely to escape damage from aphis[87]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

Blue Lupine, Nootka lupine

tfo2n 4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 0.7 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hionli

drutta Lupinus nootkatensis is a PERENNIAL growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed of many lupin species contain bittertasting toxic alkaloids, though there are often sweet varieties within that species that are completely wholesome[65, 76]. Taste is a very clear indicator. These toxic alkaloids can be leeched out of the seed by soaking it overnight and discarding the soak water. It may also be necessary to change the water once during cooking. Fungal toxins also readily invade the crushed seed and can cause chronic illness[65].

kcakta Edible Parts: Root Seed SeedpodEdible Uses: Seed - cooked[105]. Used as a protein-rich vegetable or savoury dish in any of the ways that cooked beans are used, they can also be roasted or ground into a powder. If the seed is bitter this is due to the presence of toxic alkaloids and the seed should be thoroughly leached before being cooked[2, 105]. Root - raw or cooked[256, 257]. Peeled and then eaten raw or boiled[257]. The roots are harvested in the spring and are then roasted before being eaten[256]. The roasted root can be dried, ground into a flour and then stored for later use. The raw root should not be eaten since they contain toxic alkaloids and will cause a drunken-like state if eaten in excess, but the cooked root is safe to eat[256, 257]. Seedpods - cooked[105].

tcanta Ornamental. Nitrogen fixer. Dynamic accumula-

nrakta North-western N. America to N. Asia. Naturalized in Britain. ksacta Roadsides and open banks[43]. Shingle banks in rivers in Scotland[187].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a greenhouse. Germination should take place within a couple of weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. It should also be possible to sow the seed outdoors in situ in the middle of spring. It might be necessary to protect this sowing from mice. Division in early March[1]. Difficult. Basal cuttings in April[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, succeeding in any moderately good soil in a sunny position[200]. This species is very susceptible to slug damage, the plant has been cultivated as an ornamental, but has virtually died out in the garden though it grows well in the wild in Scotland[187]. Closely related to L. perennis[200] and possibly no more than a subspecies of it[50], the uses listed below are for L. perennis but it is assumed that they also apply to this species [X]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.21 Hedvsarum alpinum

Alpine Sweetvetch

tfo2n 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Hedysarum alpinum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Please read The New Yorker link in the Reader Comments below

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[61, 177]. A carrot-like flavour[105]. The root can be harvested from autumn until spring, it tastes best after some frosts[172]. Possibly toxic. \*\* Please read The New Yorker link in the Reader Comments below

nrakta N. America. to N. Asia. ksacta Calcareous rocks and gravelly soils, north to Alaska[43]. Swampy meadows and swamps in China[266].

propta Seed - sow in a cold frame as soon as it is ripe or in the spring[200]. Stored seed should be pre-soaked for 24 hours in warm water. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Great care is needed since the plant dislikes root disturbance[200].

nwatta Easily grown in ordinary garden soil in a sunny position, preferring a deep well-drained sandy loam[1, 200]. Plants strongly resent root disturbance and should be placed in their permanent positions as soon as possible[1]. The var. H. alpinum americanum. Michx. is used for food[61, 177]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## are then roasted before being eaten[256]. The roasted root 5.1.22 Hedysarum hedysaroides

Alpine French Honeysuckle

tfo2n 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.4 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Hedysarum hedysaroides is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked. Sweet and highly nutritious. Harvested from late autumn to spring, it is sweetened by frost[172].

nrakta S. and C. Europe, Arctic Russia and Western N. America. ksacta Gravel river bars, roadsides, rocky hills and meadows, 1200 - 2500 metres in the Alps[172, 187].

propta Seed - sow in a cold frame as soon as it is ripe or in the spring[200]. Stored seed should be pre-soaked for 24 hours in warm water. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Great care is needed since the plant dislikes root disturbance[200].

nwatta Easily grown in ordinary garden soil that is moist in summer[187] and a sunny position[1], preferring a deep well-drained sandy loam[1, 200]. This species is hardy to about -20°c[187]. Plants strongly resent root disturbance and should be placed in their permanent positions as soon spossible[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.23 Lupinus perennis

Sundial Lupine

252

tfo2n 4 tlin 8 cyuc 3 kcak 3 tcan 1 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lupinus perennis is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The seed of many lupin species contain bittertasting toxic alkaloids, though there are often sweet varieties within that species that are completely wholesome[65, 76]. Taste is a very clear indicator. These toxic alkaloids can be leeched out of the seed by soaking it overnight and discarding the soak water. It may also be necessary to change the water once during cooking. Fungal toxins also readily invade the crushed seed and can cause chronic illness[65].

kcakta Edible Parts: Seed SeedpodEdible Uses: Seed - cooked[105]. Used as a protein-rich vegetable or savoury dish in any of the ways that cooked beans are used, they can also be roasted or ground into a powder. The seed has a bitter flavour due to the presence of toxic alkaloids, it should be thoroughly leached before being cooked[2, 105]. Seedpods - cooked[105].

tcanta Nitrogen fixer. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch

dwatta Antiemetic HaemostaticA cold tea made from the leaves has been used to treat nausea and internal haemorrhages[222, 257].

nrakta Eastern N. America - Maine and Ontario, west to Minnesota and south to Florida. ksacta Grassy places in dry sandy soils[187].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a greenhouse. Germination should take place within a couple of weeks. When they are mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The whole plant contains a toxic glycoside called coronillin[9, 13, 19, 65]. It is one of the most toxic plants growing in Britain[9].

tcanta Insecticide Oil Soil stabilizationCan be used as an insecticide[153]. No more details are given. A good ground cover and soil stabilizer for sunny banks and slopes[200, 208]. It grows rampantly and should not be grown with plants less than 1.8 metres tall[208].

dwatta Cardiotonic Emetic SalveThe whole plant, used either fresh or dried is a cardiotonic[9, 13]. It should be used with extreme caution, see the notes above on toxicity[9]. A decoction of the bark has been used as an emetic[257]. The crushed plant has been rubbed on rheumatic joints and cramps[257].

nrakta Europe. Naturalized in Britain[17]. ksacta Dry grassy places, railway embankments, roadsides etc[9].

propta Seed - best sown in situ as soon as it is ripe. The seed usually germinates in the autumn. Stored seed can be pre-soaked for 12 hours in warm water and then sown in situ in April[111]. Cuttings of half-ripe shoots with a heel, June/July in a frame. Can also be taken in spring[111]. Division in March[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Landscape Uses:Erosion control, Ground cover. Prefers an open well-drained calcareous soil in a sunny position[1, 13, 111]. Tolerates poor soils[200]. Tolerates a pH in the range 4.8 to 7.2. A food plant for the caterpillars of many lepidoptera species[30]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Attractive foliage, Invasive, Naturalizing.

## 5.1.64 Genista germanica

tfo2n 4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Genista germanica is a deciduous Shrub growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Dye MiscellanyA yellow dye is obtained from the plant[61].

dwatta MiscellanyFormerly cultivated as a medicinal plant[1]. No further details.

nrakta C. and W. Europe. ksacta Thickets, poor pastures and heaths[100].

propta The seed requires a period of cold stratification and is best sown autumn in a cold frame. Pre-soak stored seed for 24 hours in warm water and sow February in a cold frame. Good germination[78]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Cuttings of half-ripe wood, 5-10 cm with a heel, July/August in a frame. Roots are formed in the spring[11]. Cuttings of ripe wood, 5-10 cm with a heel, September/October in a frame. Good percentage. Plant out the following autumn[78].

nwatta Easily grown in a light well-drained soil in a sunny position[1]. Plants grow very rank in rich soils[11]. Prefers a rather dry soil[11]. Succeeds in acid or basic soils[200]. Plants resent root disturbance and should be placed in their permanent positions as soon as possible[11]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.65 Amorpha nana

Dwarf Indigobush, Dwarf false indigo, Dwarf Indigo tfo2n 4 tlin 8 cyuc 0 kcak 2 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Amorpha nana is a deciduous Shrub growing to 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

tcanta Insecticide Soil stabilizationThe resinous pustules on some species yield the insecticide 'amorpha' [200]. The plant has a strong spreading root system and this makes it useful for controlling soil erosion [200].

dwatta ExpectorantThe plant has been used as a snuff in the treatment of catarrh[257].

nrakta Western N. America - Minnesota to the Rocky Mountains. ksacta Dry prairies in S. Manitoba[204].

propta Seed - presoak for 12 hours in warm water and sow early spring in a greenhouse[78, 133]. The seed usually germinates in 1 - 2 months at 20°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, June/July in a frame. High percentage[78]. Cuttings of mature wood of the current seasons growth, autumn, in a sheltered position outdoors. Takes 12 months[78]. Suckers in spring just before new growth begins[200]. Layering in spring .

nwatta Landscape Uses: Erosion control. Prefers a light well-drained sandy soil in sun or light shade[200]. Fairly wind-resistant[200]. A very hardy plant, tolerating temperatures down to about -25c[200]. Plants resent root disturbance, they should be planted out into their final positions whilst small[133]. Plants are said to be immune to insect pests[200]. Flowers are produced on the current season's growth[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Invasive, Naturalizing. Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

## 5.1.66 Stylosanthes biflora

Sidebeak pencilflower

tfo2n 4 tlin 8 cyuc 0 kcak 2 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Stylosanthes biflora is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known

kcakta None Known

tcanta Nitrogen fixer. Invertebrates shelter: beneficial for insects and other arthropods [1-2]. The foliage is highly palatable to hoofed mammalian herbivores (Banta and Thro, 1995).

nrakta Native to the Southeastern United States ksacta Rocky open woods, glades, prairies, usually on acid substrates

propta Seed

269

nwatta Prefers full or partial sun, mesic (environment or habitat containing a moderate amount of moisture) to dry

nwatta Prefers a deep, well-drained neutral to slightly acid soil in full sun[188, 200]. Grows freely in a loamy soil[1]. Plants are hardy to about  $-20^{\circ}\mathrm{c}[187]$ . Some modern works treat this species as a variety of B. alba, naming it Baptisia alba macrophylla. Somewhat shy flowering in British gardens[1]. Plants have a very deep root system and dislike root disturbance, they should be left alone once they are established[188, 233]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.60 Lathyrus pratensis

Meadow Vetchling

tfo2n 4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1.2 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Lathyrus pratensis is a PERENNIAL growing to U.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista Although no records of toxicity have been found for this plant, the seed of some species in this genus contain a toxic amino acid that can cause a severe disease of the nervous system known as 'lathyrism' if they are eaten in large amounts (although small quantities are said to be nutritious)[65, 76]. Great caution is advised.

tcanta RepellentThe plant is said to repel mice.

dwatta ResolventThe seeds are used as a resolvent in Spain[240].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, Siberia and the Himalayas. ksacta Grassland, scrub and hedgerows, avoiding acid soils[17, 50]

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should be taken[200].

nwatta An easily grown plant, succeeding in any moderately good garden soil but preferring a position in full sun[200]. Succeeds on wet soils. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.61 Caragana gerardiana

tfo2n 4 tlin 8 cyuc 0 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Caragana gerardiana is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Hedge HedgePlants can be grown as a low impenetrable hedge. They are viciously spiny[200].

nrakta E. Asia - North-western Himalayas to southern Tibet at elevations up to 3,900 metres. ksacta Found at elevations of 3700 - 4100 metres in Xizang Province in China.

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It usually germinates in 2 weeks[K]. Stored seed should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen

then scarify it and re-soak for another 12 hours before sowing [138]. Gernination usually takes place within 2 - 3 weeks at 20°c [138]. Good percentage [11]. As soon as they are large enough to handle, prick the seed lings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame [113]. Layering in spring.

nwatta Prefers full sun and a light sandy dry or well-drained soil in a hot position[11, 182, 200]. Does not require a rich soil, succeeding on marginal land[11, 200]. Plants often do not flower well in British gardens, due in large degree to our lack of summer sun[182]. This species prefers a continental climate with hot summers and cold winters, it does not grow well in areas with mild damp winters[11, 200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.62 Desmodium paniculatum

Panicled tick trefoil

tfo2n 4 tlin 10 cyuc 0 kcak 3 tcan 0 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Desmodium paniculatum is an evergreen Perennial growing to 1 m (3ft 3in) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista None Known

kcakta None Known

tcanta FodderCarbon Farming Solutions - Agroforestry Services: nitrogen, understory legume. Fodder: bank, pasture (Agroforestry is a land use management system in which trees or shrubs are grown around or among crops or pastureland). Attracts bees and attracts birds.

dwatta None Known

nrakta Native to eastern and southern North America ksacta Moist to dry (chiefly oak) forests and savannas, clearings, shores, ravines; prairies, sandy hillsides and banks. Forest edges, forests, woodlands.

propta Seed germinates quickly (3-4 days) without scarification.

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Understory legume Fodder: Bank Fodder: Pasture Management: Fodder Wild CropClimate: cold to warm temperate. Humidity: semi-arid to humid. Prefers partial sun, mesic to dry-mesic conditions, and sandy or rocky soil. Light preferences: part-sun, part-shade. Low to medium water usage with a dry to moist soil. Soil type: acid and neutral and an average to poor loam, clay, or sand. Carbon Farming Solutions - Cultivation: wild. Management: fodder (Describes the non-destructive management systems that are used in cultivation) [1-1].

## 5.1.63 Coronilla varia

Crown Vetch

tfo2n 4 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Coronilla varia is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to November, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH:

large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. It should also be possible to sow the seed outdoors in situ in the middle of spring. It might be necessary to protect this sowing from mice. Division in early March[1]. Difficult. Basal cuttings in April[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer

nwatta An easily grown plant, succeeding in any moderately good soil in a sunny position[200]. Grows well in a poor sandy soil[187]. Requires an acid to neutral soil[200]. Plants are hardy to about -25°c[187]. This species is very susceptible to slug damage. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface

## 5.1.24 Trifolium repens

White Clover, Dutch Clover, Purple Dutch Clover, Shamrock, White Clover

tfo2n 4 tlin 8 cyuc 3 kcak 4 tcan 2 dwat 0.1 m hkuc htut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hoa7tmwatli xre7t hionli

drutta Trifolium repens is an evergreen Perennial growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant has been known to cause problems for grazing animals, though this has never happened in Britain[76]. The problem may be associated with the climate in which the plant is growing[76]. The species is polymorphic for cyanogenic glycosides[218]. The leaves and flowers of certain cyanogenic phenotypes contain a glycoside which releases cyanide on contact with the enzyme linamarase[218].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Condiment TeaLeaves - raw or cooked as a potherb[13, 94, 183]. The young leaves are harvested before the plant comes into flower and are used in salads, soups etc[9]. They can also be used as a vegetable, cooked like spinach[9]. The leaves are best cooked[172]. Flowers and seed pods are dried, ground into powder and used as a flour or sprinkled on cooked foods such as boiled rice[183]. Very wholesome and nutritious[115]. The young flowers can also be used in salads[144, 172, 183]. Root - cooked[172, 177]. The dried leaves impart a vanilla flavour to cakes etc[172]. Dried flowering heads are a tea substitute.

tcanta Fodder Green manureThe plant makes a good green manure, it is useful for over-wintering, especially in a mixture with Lolium perenne[87]. Produces a good bulk. It is a host to 'clover rot' however, so should not be used too frequently[87]. It can be undersown with cereals or with tomatoes in a greenhouse (sow the seed before planting the tomatoes)[87]. Fairly deep rooting but not very fast growing[87].

A good fast ground-cover plant for a sunny position[87]. Nectary. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form used as fertilizer or to improve mulch.

dwatta Antirheumatic Antiscrophulatic Depurative Detergent Ophthalmic TonicThe plant is antirheumatic, antiscrophulatic, depurative, detergent and tonic[218]. An infusion has been used in the treatment of coughs, colds, fevers and leucorrhoea[257]. A tincture of the leaves is applied as an ointment to gout[218]. An infusion of the flowers has been used as an evewash[257].

nrakta Europe, including Britain, from Norwat south and east to N. Africa, north and western Asia. ksacta Grassland and lawns, preferring a calcareous clay soil[9, 17].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. If the seed is in short supply it might be better to sow it in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. Division in spring[238].

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Understory legume Fodder: Pasture Global Crop Management: Fodder Management: Hay Staple Crop: ProteinLandscape Uses: Ground cover. Succeeds in a moist, well-drained circum-neutral soil in full sun, preferring a sweet calcareous clay soil. Succeeds in poor soils. A very important food plant for the caterpillars of many butterfly and moth species[30] it is also a good bee plant[54]. A good companion plant in the lawn, tolerating trampling[18, 54], but it dislikes growing with henbane or members of the buttercup family[18]. It grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. Polymorphic, there are many subspecies and varieties. Some varieties have also been selected for use in lawn mixes[183]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercups growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201]. Special Features:Not North American native, Invasive. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 5.1.25 Sophora japonica

Japanese Pagoda Tree, Scholar Tree tfo2n 4 tlin 9 cyuc 2 kcak 2 tcan 3 dwat 20 m hkuc htut cyutli hgattcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sophora japonica is a deciduous Tree growing to 20 m (65ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in September, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The plant contains cytosine, which resembles nicotine and is similarly toxic[238].

kcakta Edible Parts: Flowers LeavesEdible Uses: Rutin TeaYoung leaves and flowers - cooked[177, 183]. The leaves need to be cooked in three lots of water in order to remove the bitterness[179]. This will also remove most of the vitamins and minerals[K]. The leaves are a rich source of rutin, they contain much more than the usual commercial source, buckwheat (Fagopyrum esculentum)[174]. The ovaries, before the flowers open, contain up to 40% rutin[218]. A tea can be made from the young leaves and flowers[183]. An edible starch is obtained from the seed[183].

tcanta Dye WoodA yellow dye is obtained from the seedpods and the flowers[46, 61, 109, 178]. It is green when mixed with indigo[151]. Wood - tough, light, strong, of superior quality. Used in carpentry[109, 174].

dwatta Abortifacient Antibacterial Anticholesterolemic Antidiarrhoeal Antiinflammatory Antispasmodic Diuretic Emetic Emollient Epilepsy Febrifuge Hypotensive Purgative Skin Styptic TonicThis species is commonly used in Chinese medicine and is considered to be one of the 50 fundamental herbs[218]. It came second in a study of 250 potential antifertility agents[218]. Diuretic, emollient, febrifuge. tonic[11, 147, 174, 178]. The flowers and flower buds are antibacterial, anticholesterolemic, anti-inflammatory, antispasmodic, haemostatic and hypotensive[11, 147, 174, 176, 178, 218, 238, 279]. The ovaries, especially just before the plant flowers, are a rich source of rutin and this is a valuable hypotensive agent[218]. The buds, flowers and pods are concocted and used in the treatment of a variety of ailments[218] including internal haemorrhages, poor peripheral circulation, internal worms etc[238]. This remedy should not be prescribed for pregnant women[238]. The seedpods are abortifacient[218]. The seed is emetic and haemostatic[218]. It is used in the treatment of haemorrhoids, haematuria, uterine bleeding, constipation, stuffy sensation in the chest, dizziness, red eyes, headache and hypertension[176]. It should be used with caution since it is toxic[218]. The leaves are laxative[218]. They are used in the treatment of epilepsy and convulsions[218]. A decoction of the stems is used in the treatment of piles, sore eyes and skin problems[218].

nrakta E. Asia - N. China, Japan, Korea. ksacta Open country between 300 and 1000 metres in W. China[109].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Pre-soak stored seed for 12 hours in hot (not boiling) water and sow in late winter in a greenhouse[78]. Prick out the seedlings as soon as they are large enough to handle into individual pots in the greenhouse, and grow them on for 2 years under protected conditions. Plant them out into their permanent positions in early summer of their third year. Cuttings of young shoots with a heel, July/August in a frame[11]. Air-layering[200].

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen, Street tree. Succeeds in a well-drained moderately fertile soil in full sun[200]. Tolerates poor soils, atmospheric pollution, heat and, once established, drought[200]. Hardy to about -25° when mature, but it can be damaged by severe frosts when it is young[200]. A very ornamental[1] and fast growing tree[200], it grows best in hot summers[188]. It grows best in the warmer areas of the country where the wood will be more readily ripened and better able to withstand winter cold[219]. Trees take 30 years to come into flower from seed.[200], but they do not often ripen their seed in Britain[11]. Cultivated in China for the rutin contained in its leaves and ovaries[218]. Plants should be containergrown and planted out whilst young, older plants do not transplant well[219]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native. Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-

ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

## 5.1.26 Ceanothus fendleri

Fendler's Ceanothus tfo2n 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ceanothus fendleri is a deciduous Shrub growing to 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Inner barkEdible Uses: TeaFruit[105, 155, 161, 177]. Used for food in New Mexico[183]. The berries are sweetened with sugar and used as food[257].. The fruit is about 5mm wide[200]. Strips of the inner bark can be eaten in the summer[257]. The leaves are used as a substitute for tea[183].

tcanta Dye SoapA green dye is obtained from the flowers[168]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[155, 168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K].

dwatta SedativeThe plant is sedative[155]. An infusion has been used to treat nervousness and a poultice of the plants also used for this purpose[257]. The leaves have been chewed to treat a sore mouth[257].

nrakta Western N. America - S. Dakota to Wyoming and Utah, south to Mexico, ksacta Most situations other than deserts, but especially in pine forests in the southern Rockies. 1500 - 3000 metres[11, 155].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place in 1 - 2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel. October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. One of the hardiest members of this genus, it succeeds outdoors in many areas of the country[11]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Any pruning is best carried out in the spring[219]. Fast growing, it flowers well when young, often in its second year from seed[11]. Hybridizes freely with other members of this genus[200]. Some members of this

clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground

## 5.1.57 Colutea arborescens

Bladder Senna

tfo2n 4 tlin 8 cyuc 0 kcak 4 tcan 2 dwat 3.6 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Colutea arborescens is a deciduous Shrub growing to 3.6 m (11ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The seed is poisonous[9, 65].

tcanta Hedge Hedge Soil stabilizationThe plants have an extensive root system and are used to stabilize banks and prevent soil erosion[200]. Can be grown as a hedge[200].

dwatta Diuretic Emetic PurgativeThe leaves are diuretic and purgative[4, 9]. The leaves are sometimes used as a substitute for senna as a laxative, though they are much milder in their action[4]. The plant is rather unreliable when used medicinally so is rarely employed in herbalism[9]. The seeds are emetic[4]. They are also toxic[9].

nrakta S. Europe - Mediterranean. Naturalized in Britain[17]. ksacta Open woods, roadsides, railway banks etc[9], often on calcareous soils[89].

propta Seed - pre-soak for 24 hours in hot water and sow late winter in a greenhouse[113]. Scarification can help speed up the germination process[164]. Germination can be slow and erratic[200], though treated seed usually germinates in 1 - 3 months at 20°c[164]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings are not very long-lived[78].

nwatta An easily grown plant, it tolerates most soil conditions other than a water-logged soil[11]. Prefers a position in full sun but tolerates light shade[11]. Grows well on dry sunny banks[1, 182]. Dislikes strong winds, though another report in the same book says that it tolerates salt-laden winds[200]. In our experience the plants are very subject to wind-rock when grown in a windy site[K]. Tolerates atmospheric pollution[182, 200]. A fast growing plant, thriving on poor soils[182, 200]. Plants are hardy to about -20°c[184, 200]. Slugs love the young seedlings[K]. Flowers are produced on the current season's growth[182, 200]. These flowers are very attractive to bees[108]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 8 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the

and root pattern is also useful and given here if available. A habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

#### 5.1.58 Robinia fertilis

Bristly Locust

tfo2n 4 tlin 8 cyuc 0 kcak 0 tcan 0 dwat 2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Robinia fertilis is a deciduous Shrub growing to 2 m (6ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

tcanta Soil stabilizationPlants produce an extensive suckering root system and can be used for soil stabilization on banks etc.

nrakta South-eastern N. America, ksacta Dry woodland and hillside scrub.

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. The seed remains viable for over 10 years in normal storage[113]. Suckers taken during the dormant

nwatta Succeeds in any soil, preferring one that is not too rich[1, 200]. Requires a well-drained soil, succeeding on dry barren sites[200]. Plants are tolerant of drought and atmospheric pollution[200]. The branches are brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. Plants sucker freely, the suckers have vicious thorns. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. Hardy to at least -20°c. This species is very closely allied to R. hispida and scarcely merits specific rank. A very greedy tree, tending to impoverish the soil. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 5.1.59 Baptisia lactea

tfo2n 4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Baptisia lactea is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista The plant is potentially toxic[222].

dwatta Cathartic Emetic LaxativeCathartic, emetic, laxative[61]

nrakta South-eastern N. America ksacta Sandy pine woods, prairies and river banks[1, 43].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed should be pre-soaked for 24 hours in warm water and then sown in a cold frame in late winter or early spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer or following spring. Division in spring[188]. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.1.54 Lespedeza maximowiczii

tfo2n 4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lespedeza maximowiczii is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta BroomThe twigs are used in making brooms[151]. Nitrogen Fixer.

nrakta E. Asia - China, Japan, Korea. ksacta Rocky places along rivers[58]. Mountain slopes and forests below 1000 metres in Anhui, Henan and Zhejiang Provinces, China[266].

propta Pre-soak the seed for 24 hours in warm water and then sow it in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in individual pots in a frame. It can be difficult to get the cuttings through their first winter, it is best to plunge the pots in a bed of ashes in a sheltered border outdoors[78].

nwatta Easily grown in a light loam in full sun[1]. The top growth is not very cold tolerant, although the rootstock is considerably hardier. Plants are usually cut back to the ground in all but very mild winters, though they generally resprout well from the base in the following spring and flower in late summer[182]. Closely related to L. buergeri[58]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.55 Laburnum alpinum

Scotch Laburnum, Alpine Bea Tree, Alpine Golden Chain Tree

tfo2n 4 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 5 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Laburnum alpinum is a deciduous Tree growing to 5 m (16ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, and especially the seed, are poisonous[1, 61].

tcanta Miscellany WoodWood - hard. It is highly esteemed by turners[7] and is used for making musical instruments[245].

dwatta Cholagogue Miscellany PurgativeThe leaves are cholagogue and purgative[7]. The leaves have a similar effect to tobacco and have thus been used in treating nicotinism[7]. The plant is very poisonous and should not be used internally without expert supervision[7].

nrakta C. and S. Europe. Naturalized in Northern Britain. ksacta Stony hillsides[200] of mountain woodlands[7].

propta Seed - best sown as soon as it is ripe in a greenhouse or cold frame[200]. Germination is usually very quick and good[78]. Prick out indoor-sown seedlings into individual pots when they are large enough to handle and plant them out in the summer. Another option is to pre-soak the stored seed for 12 hours in warm water and sow in an outdoor seed bed in early spring. These plants an be allowed to grow on in the seedbed for two years before planting them out in the winter. Cuttings of mature wood in late winter planted in the open ground[200].

nwatta Landscape Uses: Espalier, Specimen, A very tolerant and easily grown plant, it succeeds in almost any soil or situation[1] so long as it is not water-logged[11]. It grows well in heavy clay soils and in poor shallow limestone soils[245]. Succeeds in cold exposed situations and tolerates industrial pollution[200]. This species is closely related to L. anagyroides[11]. There are some named varieties, selected for their ornamental value[11]. The flowers have a delicious vanilla scent[245]. Plants can be successfully transplanted even when quite large[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, All or parts of this plant are poisonous, Blooms are very showy.

## 5.1.56 Robinia hispida

Bristly locust, Rose-acacia, or Moss locust tfo2n 4 tlin 8 cyuc 0 kcak 3 tcan 1 dwat 3.5 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli priklwisslin hpa7tmwatli hionli

drutta Robinia hispida is a deciduous Shrub growing to 3.5 m (11ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Birds, Insects. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist

pcista All parts of this plant are poisonous. kcakta None Known

tcanta HedgeNitrogen fixer. Excellent flowers and foliage. Specimen or screen. Good plant for stabilizing embankments and slopes and for planting in poor, dry soils. Interesting informal hedge. Food and shelter for beneficials including shelter for lacewings and parasitoid wasps. Humingbird nectar plant and bird shelter [1-2].

dwatta Native American Tribe: The Cherokee had several uses for the plant including: Root bark chewed as an emetic. Beaten root held on tooth for toothache. Infusion given to cows as a 'tonic' (brit.org).

nrakta Native Range: Central and eastern United States ksacta Thin upland woodlands, woodland edges, thickets, fence rows, roadside embankments, banks of drainage canals, vacant lots, and overgrown waste areas.

propta Species are raised from seed. While cuttings will strike, the cultivars are usually grafted onto seedling stocks to ensure superior root systems.

nwatta Å shrub or small tree which grows in dry woods and slopes. It has been reported to have occasionally escaped from cultivation. Grow in average, dry to medium moisture, well-drained soil in full sun. Prefers organically rich soils, but tolerates poor, dry soils. Flower: Showy. Bloom: Rosy pink to purplish-red. Bloom Time: May. Fruit: Showy. Tolerate: Deer, Drought, Erosion, Dry Soil, Shallow-Rocky Soil. As robinias have brittle branches that can be easily damaged by strong winds, it may be necessary to plant them in a protected spot. Otherwise, these are hardy, easily cultivated trees that will thrive in any bright position with moist well-drained soil. They can be pruned when young to establish a strongly branched structure. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit

genus have a symbiotic relationship with certain soil microorganisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212].

#### 5.1.27 Ceanothus velutinus

Sticky Laurel, Snowbrush ceanothus, Hooker's ceanothus tfo2n 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ceanothus velutinus is an evergreen Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[177, 183].

tcanta Baby care Dye Insecticide SoapA green dye is obtained from the flowers[168]. A poultice of the dried powdered leaves has been used as a baby powder for treating nappy rash etc[257]. Smoke from burning the plant has been used as an insecticide to kill bedbugs[257]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169, 212]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K].

dwatta Analgesic Antirheumatic Eczema Febrifuge Poultice SkinThe leaves are febrifuge[257]. An infusion has been used in the treatment of coughs and fevers[257]. A decoction of the leaves and stems has been used both internally and externally in the treatment of dull pains, rheumatism etc[257]. The leaves contain saponins and have been used as a skin wash that is also deodorant and can destroy some parasites[257, K]. The wash is beneficial in treating sores, eczema, nappy rash etc[257].

nrakta Western N. America - British Columbia to Colorado and California. ksacta Moist soils of hills and mountains to 2,600 metres[212]. It often occurs in draws and on the open face of hills, becoming rapidly established on burntover mountain slopes[212].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place within 1 -2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. It then reguires a period of chilling below 5°c for up to 84 days before it will germinate[214]. Seeds have considerable longevity, some that have been in the soil for 200 years or more have germinated[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node [200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are guite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. One report says that this species is hardy to zone 5 (tolerating temperatures down to about -20°c)[200] whilst another says that it needs the protection of a wall

when grown outdoors in Britain[1]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Plants flower on the previous year's growth, if any pruning is necessary it is best carried out immediately after flowering has finished[200, 219]. Constant pruning to keep a plant small can shorten its life[200]. Fast growing, it flowers well when young, often in its second year from seed[11]. Hybridizes freely with other members of this genus[200]. The leaves have a strong scent of balsam[200]. Some members of this genus have a symbiotic relationship with certain soil microorganisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212].

#### 5.1.28 Ceanothus sanguineus

Oregon Tea Tree, Redstem ceanothus tfo2n 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ceanothus sanguineus is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: TeaA tea is made from the leaves[177, 183].

tcanta Dye SoapA green dye is obtained from the flowers[168]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K].

dwatta PoulticeA poultice of the dried, powdered bark has been applied to burns, sores and wounds[257].

nrakta Western N. America - British Columbia to California. ksacta Dry rocky crests, bluffs and borders of woods[43].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place within 1 -2 months at 20°c[138]. One report says that the stored seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. It then requires a period of chilling below 5°c for up to 84 days before it will germinate[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are guite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good per-

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Any pruning is best

carried out in the spring[219]. Fast growing, it flowers well when young, often in its second year from seed[11]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212].

#### 5.1.29 Ceanothus ovatus

Smaller Red-Root

tfo2n 4 tlin 8 cvuc 2 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ceanothus ovatus is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: Edible Uses: TeaThe young leaves and flowers are steeped in boiling water for about 5 minutes. The resulting liquid is vellowish in colour and tastes similar to Oriental tea but is considered milder and sweeter[183].

tcanta Dve Miscellany SoapA green dve is obtained from the flowers[168]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K].

dwatta MiscellanyA decoction of the roots has been used as a cough remedy[257].

nrakta Eastern and Central N. America - western Maine and Quebec to Manitoba, south to Texas. ksacta Sandy or rocky plains, prairies and slopes[43].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place within 1 -2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant. them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Any pruning is best carried out in the spring[219]. Fast growing, it flowers well when young, often in its second year from seed[11]. Closely related to C. americanus[235]. It hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen

is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212].

## 5.1.30 Vicia gigantea

tfo2n 4 tlin 8 cyuc 2 kcak 3 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia gigantea is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers welldrained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Young seed - raw or cooked[256]. The seeds are produced in pods 2 - 5cm long, each pod containing 3 - 4 round seeds the size of small peas[256]. They are eaten, when young, like green peas[2, 105, 118, 161], the flavour even of young seeds is rather strong, like old garden peas[256]. Some native North American Indian tribes regarded the seeds as poisonous, though other tribes would eat them as a snack. The pods were harvested when green and then roasted in an open fire until the pods started to split open. The seeds were then removed and eaten[256].

tcanta HairAn infusion of the roots has been used as a tonic hair wash and anti-dandruff treatment[257]. Nitrogen fixer. Dynamic accumulator.

dwatta Antidandruff LaxativeThe roots are laxative[257]. An infusion of the roots has been used as a tonic hair wash and anti-dandruff treatment[257].

nrakta Western N. America - Alaska to California. ksacta Moist places in California, especially in redwood forests[71]. propta Pre-soak the seed for 24 hours in warm water and

then sow in situ in spring or autumn.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of the country. The following notes are based on the general needs of the genus. Prefers a fairly heavy loam but succeeds in a sunny position in most soils that are well-drained[200]. Grows well in heavy clay soils.

## 5.1.31 Galega officinalis

Goat's Rue, Professor-weed

tfo2n 4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Galega officinalis is a PERENNIAL growing to 1.2 m (4ft) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista A few reports exist, none of them in Britain, of toxicity to mammals[76], though the plant is often fed to cows and goats in order to increase their milk yield[238].

kcakta Edible Parts: LeavesEdible Uses: Curdling agentLeaves - cooked[2]. Used like spinach[177, 183]. Some caution is advised due to reports of possible toxicity. The herb is used as a substitute for rennet in curdling plant milks

tcanta Cosmetic Green manureA fast-growing plant, it makes a good green manure crop, enriching the soil with organic matter and also fixing atmospheric nitrogen[7]. The plant is used cosmetically in hand and foot bathes[7].

dwatta Diaphoretic Diuretic Galactogogue HypoglycaemicGoat's rue was once important in the treatment of plague, fevers and infectious diseases[238]. It is still used in modern herbalism, though mainly for its effect in promoting milk-flow in lactating mothers (it has been shown to increase

soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

tcanta Fodder Hedge Shelterbelt Soil stabilization StrawThis species is planted for dune stabilization and for soil and water conservation[266]. Carbon Farming - Agroforestry Services: nitrogen, contour hedgerow, windbreak. Fodder: bank.

nrakta E. Asia - southern Siberia, Mongolia, northern and central China ksacta Consolidated and semiconsolidated sand dunes, rocky mountain slopes; at elevations from 1,000

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It usually germinates in 2 weeks[K]. Stored seed should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen then scarify it and re-soak for another 12 hours before sowing[138]. Germination usually takes place within 2 - 3 weeks at 20°c[138]. Good percentage[11]. As soon as they are large enough to handle, prick the seedlings out into individual nots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, mid summer in a frame[113]. Layering in spring.

Services: Nitrogen Agroforestry Services: break Fodder: Bank Management: Coppice Management: Standard Regional CropCaragana microphylla prefers a continental climate with its hot summers, cold winters and usually a clear movement from one season to another. The dormant plant can tolerate temperatures down to at least -30°c, but in more maritime climates it is often tempted to come into growth early and this new growth can easily be damaged by late spring frosts[200]. Prefers full sun and a light sandy dry or well-drained soil[1, 11, 200]. Dislikes damp conditions[1]. Does not require a rich soil, succeeding on marginal land[11]. Caragana microphylla is a polymorphic species and in some cases with transitional forms[266 1. Hybrids between this species and Caragana korshinskii may occur where these species are sympatric[266]. Plants in this genus are notably resistant to honey fungus[200] This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Climate: boreal to warm temperate. Humidity: arid to semi-arid. Carbon Farming - Cultivation: regional crop. Management: standard, coppice.

#### 5.1.52 Laburnum anagyroides

Laburnum, Golden chain tree tfo2n 4 tlin 8 cvuc 0 kcak 4 tcan 1 dwat 6 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Laburnum anagyroides is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, and especially the seed, are poisonous[1, 61].

tcanta Insecticide Rootstock WoodThis plant is often used as a rootstock for other members of the pea and bean family[11]. The seeds contain the poisonous alkaloid 'cytisine'. This has insecticidal properties similar to nicotine (Nicotiana spp.) but cannot be recommended for used since it needs to be used in such a concentration that it can then be absorbed over a wide area of the body with possibly fatal results[4]. Wood - coarse grained, durable, dark coloured and very hard, it can be used as an ebony substitute[4, 11,

46]. It is much in demand among turners, and is used in making instruments and furniture especially where strength and smoothness are important[4, 11, 46, 61].

dwatta PectoralThe seed contains the poisonous alkaloid 'cystisine'. This has been used in the treatment of whooping cough and asthma[4].

nrakta C. and S. Europe. ksacta Woods and scrub on limestone[50, 200].

propta Seed - best sown as soon as it is ripe in a greenhouse or cold frame[200]. Germination is usually very quick and good[78]. Prick out indoor-sown seedlings into individual pots when they are large enough to handle and plant them out in the summer. Another option is to pre-soak the stored seed for 12 hours in warm water and sow in an outdoor seed bed in early spring. These plants an be allowed to grow on in the seedbed for two years before planting them out in the winter. Cuttings of mature wood in late winter planted in the open ground[200].

nwatta A very tolerant and easily grown plant, it succeeds in almost any soil or situation[1] so long as it is not water-logged[11]. It grows well in heavy clay soils. Succeeds in cold exposed situations and tolerates industrial pollution[200]. Plants can be successfully transplanted even when guite large[200]. The flowers are delicately scented[245]. This species has a symbiotic relationship with certain soil nwatta Agroforestry Services: Contour hedgerow Agroforebacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. This species is notably susceptible to honey fungus[200]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 5.1.53 Alnus maximowiczii

tfo2n 4 tlin 8 cyuc 0 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcuphia7n hwicli hvisilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Alnus maximowiczii is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from March to April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

tcanta Charcoal Dye WoodA dye is obtained from the bark[46, 61]. No more details are given. Wood - close grained. Used for turnery, charcoal[46, 61].

nrakta E. Asia - Japan. ksacta High mountains, often to the alpine zone, C. and N. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, Kl. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. A polymorphic species[58], it is closely related to A. viridis[200]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a plant, root well-drained soil in a sunny position[1, 11]. Prefers a rather dry soil, tolerating poor and sandy soils[238]. Prefers a lime-free soil[244]. Succeeds in acid or basic soils. A very cold-tolerant plant, tolerating temperatures down to about -35°c[200]. Resents root disturbance and should only be transplanted whilst young[11, 169]. Sometimes cultivated as a dye plant, it is usually treated as a biennial for this purpose, the whole plant being harvested in the second year[141]. Plants do not require pruning, but they can be cut back as required once they have finished flowering in order to maintain shape[238]. Polymorphic, a number of named forms have been developed for their ornamental value[182]. A good bee plant[20]. Rabbits love eating this plant[169, K]. Cows also eat the plant, but it taints their milk[4]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

## 5.1.49 Alnus japonica

Japanese Alder

tto2n 4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 22 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Alnus japonica is a deciduous Tree growing to 22 m (72ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from February to March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

tcanta Charcoal Dye WoodA dye is obtained from the bark[46, 61]. No more details are given. Wood - close grained. Used for turnery, charcoal[46, 61].

dwatta CancerVarious species of alder, including this species, seem to contain antitumour compounds[218].

nrakta E. Asia - China, Japan. ksacta Wet lowlands all over Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Prefers a heavy soil and a damp situation, but it succeeds in ordinary garden soil[11]. Grows well in heavy clay soils[11]. Thrives in drier soils than many members of this genus[200]. Tolerates very infertile sites[200]. This species has a symbiotic relationship with certain soil microrquanisms, these form nodules on the roots of the plants and

fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 5.1.50 Senna marilandica

Wild Senna, Maryland senna tfo2n 4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Senna marilandica is a deciduous Shrub growing to 1.5 m (5ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

dwatta Cardiac Cathartic Diuretic Febrifuge Poultice VermifugeThe leaves and seedpods are cathartic, diuretic and vermifuge[1, 11, 21, 46]. The leaves are harvested before and during flowering, the pods are harvested when fully ripe in the autumn. Both are dried for later use[238]. The leaves are a safe and effective cathartic[207, 213]. They are best used with Foeniculum vulgare seeds in order to counteract a tendency to cause gripe[207, 213]. The seedpods can also be used and are milder but slower in their action[222]. The seeds have been soaked in water until they are mucilaginous and then swallowed as a treatment for sore throats[213, 257]. The root is cardiac and febrifuge[257]. An infusion has been used in the treatment of fevers and heart problems[257]. A poultice of the root has been used in treating sores[257].

nrakta South-eastern N. America - Pennsylvania to Florida, Kansas and Iowa. ksacta Thickets and dry roadsides[43]. Disturbed areas, sandy fields and open woods in Texas[274].

propta Seed - scarify and then pre-soak the seed for 2 - 3 hours in warm water before sowing it from early spring to early summer in a warm greenhouse[138]. The seed usually germinates in 1 - 12 weeks at 23°c[138]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse. Do not plant them out until the following spring[138]. Division as growth commences in spring[11]. Cuttings of moderately ripe wood, Iuly in a frame[1].

nwatta Succeeds in most well-drained soils but prefers an open sandy loam in a sunny sheltered position[1, 11, 200]. Established plants are drought tolerant[200]. Succeeds in light shade, but the plant is much less vigorous when grown in dry shade[200]. Although fairly cold-tolerant, plants can be killed in very severe weather, so it is best to mulch the roots of mature plants in bad winters[11]. Younger plants should be mulched each winter until they are well established[200]. Slugs are very attracted to this plant[K]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.51 Caragana microphylla

Littleleaf Peashrub

tfo2n 4 tlin 9 cvuc 0 kcak 3 tcan 0 dwat m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis

drutta Caragana microphylla is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained

the flow of milk in cows and goats by 35 - 50%[4, 7, 238]) and for its positive effect on the digestive system[238]. The plant contains galegine, an alkaloid that strongly reduces blood sugar levels which make it useful in the treatment of diabetes[254]. The leaves and flowering tops are diaphoretic, diuretic, galactogogue and hypoglycaemic[4, 7, 21, 165]. It has also been used in the treatment of fevers[4, 7]. It is taken internally to treat insufficient lactation, late-onset diabetes, pancreatitis and digestive problems, especially chronic constipation caused by a lack of digestive enzymes[238]. The plant is harvested as it is just coming into flower and is dried for later use[4]. Some caution is advised, see notes above on toxicity.

nrakta S. Europe to W. Asia. Naturalized in S. Britain. ksacta Scrub, woods, marshy fields and roadsides[187].

propta Seed - pre-soak for 12 hours in warm water and then sow the seed in spring or autumn in a cold frame[111, 200]. Spring-sown seed can be slow to germinate, a period of cold stratification may improve the germination time. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. If you have sufficient seed, then it is possible to sow outdoors in situ in mid to late spring. Division in spring or autumn[111]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils but repays generous treatment[1, 200]. Prefers full sun and a deep moist soil[1, 4] but it also succeeds in light shade[200]. Grows well even in poor soils[233]. Plants are very tolerant of neglect and can be grown in quite coarse grass, which can be cut annually in the autumn[233, 238]. A long-lived plant[1], it can be invasive in good growing conditions[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 5.1.32 Vicia americana

American Vetch, Mat vetch tfo2n 4 tlin 7 cyuc 2 kcak 4 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia americana is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Leaves Seed Seedpod ShootsEdible Uses: Young shoots - cooked[105, 155, 161]. The tender seeds are eaten by the N. American Indians[212]. Both the mature seeds and the immature seedpods can be used[257]. The pod is about 3cm long and contains 4 - 7 seeds[235].

tcanta StringThe stout roots have been used for tying[257]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Nitrogen Fixer.

dwatta Ophthalmic Salve StingsThe leaves have been rubbed in the hands and applied to spider bites[257]. An infusion of the crushed leaves have been used as a bath for treating soreness[257]. An infusion of the plant has been used as an eyewash[257]. An infusion of the leaves has been used by women as a love medicine[257].

nrakta N. America - Alaska to Ontario and New York, south to Virginia, Kentucky and Arizona. ksacta Damp or gravelly slopes, thickets and meadows[43].

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of the country. The following notes are based on the general needs of the genus. Succeeds in any well-drained

soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. A climbing plant, attaching itself to supports by means of tendrils[212]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 5.1.33 Medicago lupulina

Black Medick

tfo2n 4 tlin 8 cyuc 2 kcak 4 tcan 1 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Medicago İupulina is a ANNUAL/PERENNIAL growing to 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves -cooked[105]. Used as a potherb[183]. A nutritional analysis is available[218]. Seed - cooked[2, 105, 161]. Parched and eaten or ground into a powder[183]. The seed is said to contain trypsin inhibitors[218]. These can interfere with certain enzymes that help in the digestion of proteins, but are normally destroyed if the seed is sprouted first.

tcanta Green manureA good green manure plant, it is fairly deep rooted, has good resistance to 'Clover rot' but it is not very fast growing[87]. It can be undersown with cereals, succeeding even in a wet season[87].

dwatta Antibacterial LenitiveAqueous extracts of the plant have antibacterial properties against microorganisms[218, 240]. The plant is lenitive[218, 240]. One of our users has sent the following information 'Trypsin inhibitors can be inactivated by the application of heat, for example, boiling for 9 minutes. (Trypsin inhibitors are found in soy). L-canavanine can be destroyed by heat as well. Major saponins in alfalfa but also black medick, known as medicagenic acid and its derivatives, have major antifungal/antimycotic activity that could lend to better medical applications than existing antimycotic drugs that are limited in number and abilities. Medical applications meaning mycoses, which is a consequence of widespread use of immunospuppressive drugs used in transplants, cytotoxic chemotherapy in cancer treatments, broad spectrum antibiotics, recurring mycotic infections in those suffering of AIDS, and a recent hazard of previously agricultural niche saprophyte fungi that are becoming etiological agents and are relatively resistant to conventional therapies.

nrakta Europe, including Britain, south and east to N. Africa, the Atlantic Islands and W. Asia. ksacta Grassy places and roadsides[17], often occurring as a garden weed on acid and calcareous soils[1].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ[200]. The seed can also be sown in situ in autumn. Green manure crops can be sown in situ from early spring until early autumn[87]. (the later sowings are for an over-wintering crop)

nwatta Dislikes acid soils[87]. (This conflicts with the notes on its habitat above.) Dislikes shade. A good food plant for many caterpillars[30]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a

plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

## 5.1.34 Vicia hirsuta

Hairy Tare, Tiny vetch

tfo2n 4 tlin 9 cyuc 2 kcak 3 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia hirsuta is a ANNUAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed -cooked[2, 105, 177]. Used like lentils[2], the seed can be eaten as a staple food[178]. Leaves and stems - cooked[105, 177, 178]. Used as a vegetable[272]

tcanta General insect (especially bees) nectar plant. Shelter plant for beneficial insects including lacewings, parasitic Wasps, beetles and spiders. Pioneer Species- helps reestablish overused or damaged land. Nitrogen Fixing Plant - this plant creates its own nitrogen through a symbiotic relationship with microorganisms (bacteria) in its roots. Dynamic Accumulator Species - Potassium, Phosphorus, Nitrogen

nrakta Europe, including Britain, from Norway south and east to N. Africa and W. Asia. ksacta Grassy places. A common weed of cultivation, avoiding acid soils[17].

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Succeeds in any well-drained soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. Occasionally cultivated for its edible seed which is used as a lentil substitute[2]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

## 5.1.35 Wisteria frutescens

American Wisteria

tfo2n 4 tlin 8 cyuc 1 kcak 3 tcan 0 dwat 12 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Wisteria frutescens is a deciduous Climber growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed of all members of this genus is poisonous[200].

kcakta Edible Parts: FlowersEdible Uses: The fresh flowers are eaten in tossed green salads[183]. They are said to be excellent when dipped in batter and fried in oil as fritters[183].

tcanta Nitrogen fixer.

nrakta South-eastern N. America - Virginia to Florida, Arkansas and Texas. ksacta Clambering over cliffs and trees on woodland edges in low moist ground[235, 249].

propta The seed does not exhibit any dormancy habits. It can be sown as soon as it is ripe in a cold frame and should germinate in the spring. Pre-soak stored seed for 24 hours in warm water and then sow in a greenhouse in early

spring. The seed can also be sown in an outdoor seedbed in late spring[126]. Germination should take place in the first spring, though it can sometimes be delayed for another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Plants are very slow from seed and can take up to 20 years to come into flower[200]. Basal cuttings of side-shoots in early to mid summer in a frame[200]. Take the cuttings as soon as the new growth has hardened sufficiently. each cutting should have 2 - 3 leaves[249]. It can also help to remove a shallow slice of bark from the bottom 15mm of the cutting to expose extra cambium, since this will encourage more callusing and better rooting[249]. When kept in a mist frame with a bottom heat of 27 - 30°c, they will root within 4 weeks and produce well-established plants by the autumn[249]. Layering in spring. Simply lay any convenient long shoot along the ground and cover it with a shallow layer of soil. The shoot will readily produce roots at intervals along the stem. When these are well formed, the shoot can be divided up into a number of plants. These should be potted up and kept in a lightly shaded position in a greenhouse until well established and can then be planted out as required.

nwatta Prefers a good loamy soil in a sunny south or south-west facing position, sheltered from cold winds and from early morning sun on frosty mornings[11, 200]. Plants can become chlorotic on alkaline soils[200]. A soil that is too rich results in excessive foliage at the expense of flowering[200]. Plants can take a few years to settle down after planting out[219]. Too much shade or too rich a soil are normally the culprits, some form of root restriction can be beneficial[219]. A number of named forms have been selected for their ornamental value[200]. Any drastic pruning is best carried out in the spring, immediately after flowering[249]. Plants are very tolerant of even the most drastic pruning and will re-grow even if cut right back to the base[249]. Plants in this genus are notably susceptible to honey fungus[200]. A climbing plant, twining in an anticlockwise direction around the stems of other plants[249]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plants also form a symbiotic relationship with a mycorrhizal fungus which makes more water, phosphorus and other minerals available to the plants[249]. Wisteria macrostachya (Torr. and A.Gray) Robinson and Fer is a synonym of Wisteria frutescens (L.) Poir. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

## 5.1.36 Wisteria venusta

Silky Wisteria

258

tfo2n 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 10 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Wisteria venusta is a deciduous Climber growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

poista The seed of all members of this genus is poisonous[200].

kcakta Edible Parts: Leaves SeedEdible Uses: Seed -cooked[105]. Some caution is advised, see notes on toxicity at the top of the page. Young leaves - cooked[61, 105].

tcanta FibreA fibre obtained from the bark is used for making cloth and thread[46, 61, 249].

dwatta Antiinflammatory AntitumorGalls that develop on the plant as a result of infection by the bacterium Erwinia milletiae are used in Japanese folk medicine as an antiinflammatory agent[249]. Recent research has shown that substances in these galls can be used in the treatment of gastric cancer and can also inhibit kin tumour promotion by the Epstein-Barr virus[249].

Division in spring. It may not transplant well so care should be taken[200].

nwaita A good plant for the bog or marsh garden, succeeding in wet soils [1,200]. It is easily grown in any moderately good garden soil, preferring a position in full sun[200]. Plants climb by means of tendrils [188]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.47 Baptisia tinctoria

Wild Indigo, Horseflyweed

tfo2n 4 tlin 8 cyuc 1 kcak 2 tcan 3 dwat 0.9 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Baptisia tinctoria is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from April to October, in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The plant is poisonous in large quantities[21, 46]. Irritation of the eyes. May cause dermatitis. Avoid with inflammatory gastrointestinal diseases [301].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked. An asparagus substitute[2, 105, 161, 177]. Some caution is advised, see the notes above on toxicity.

tcanta Dye RepellentThis species is related to the tropical plant Indigo (Indigofera tinctoria) and, like that species, contains a blue dyestuff in the leaves[1]. The dyestuff is only contained in very low concentrations, however, and a very large quantity of leaves would be required to obtain reasonable quantities of indigo[169]. A yellow dye can also be obtained from the plant[61]. If the growing plant is harvested and hung up, it is said to repel flies[213].

dwatta Adaptogen Alterative Antibacterial Antiseptic Astringent Cholagogue Emetic Febrifuge Homeopathy Purgative StimulantWild indigo was a favourite medicine of the N. American Indians, a decoction of the roots being used as an antiseptic wash for wounds and skin complaints[213, 238]. Modern research has shown that this acrid bitter herb stimulates the immune system[222, 238] and is particularly effective against bacterial infections[238]. Caution is advised in the internal use of this plant, large or frequent doses are potentially harmful[222]. A tea made from the roots is cholagogue, emetic, febrifuge and purgative[4, 21, 46, 165, 222]. The fresh root is also considered to be antiseptic, astringent and laxative[4, 21, 46, 165, 222]. The infusion is used in the treatment of upper respiratory infections such as tonsillitis and pharyngitis, and is also valuable in treating infections of the chest, gastro-intestinal tract and skin[254]. The plants antimicrobial and immunestimulant properties combat lymphatic problems, when used with detoxifying herbs such as Arctium lappa it helps to reduce enlarged lymph nodes[254]. Wild indigo is frequently prescribed, along with Echinacea, in the treatment of chronic viral infections or chronic fatigue syndrome[254]. A decoction of the root soothes sore or infected nipples and infected skin conditions[254]. When used as a mouth wash or gargle the decoction treats mouth ulcers, gum infections and sore throats[254]. The fresh root, including the bark, is used to make a homeopathic medicine[232]. This has a limited range of action, but is used especially in the treatment of certain types of flu[232]

nrakta Eastern N. America - Virginia to Florida. ksacta Dry soils in open woods and clearings[21, 43].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed should be pre-soaked for 24 hours in warm water and then sown in a cold frame in late winter or early spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in the summer or following spring. Division in spring[188]. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Prefers a deep, rich, well-drained neutral to slightly acid soil in full sun[200, 233]. Grows freely in a loamy soil. Plants are shy flowering in British gardens[200, 233]. Plants have a very deep root system and dislike root disturbance, they should be left alone once they are established[188, 233]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 5.1.48 Genista tinctoria

Dyer's Greenweed, Common Woadwaxen, Broom tfo2n 4 tlin 7 cyuc 1 kcak 3 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hoa7tmwatli fyifxre7t hionli

drutta Génista tinctoria is a deciduous Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Coffee CondimentThe seed has been suggested as a possible coffee substitute[177, 183]. The flower buds are pickled and used as a substitute for capers[2, 183]. Used as a vegetable[105].

tcanta Dye FibreA very good quality yellow dye is obtained from the whole plant, but especially from the flowers and young shoots[4, 9, 11, 57, 66, 141, 169, 244]. It produces a very good quality green when mixed with woad (Isatis tinctoria)[11, 238]. Alum, cream of tartar and sulphate of lime are used to fix the colour[4]. The stems can be dried and stored until the dye is required[169]. A fibre obtained from the stems is used for coarse cloth and cordage[4, 169]. Plants can be used as a ground cover when spaced about 45cm apart each way[208]. The cultivar 'Flore Pleno' is always dwarf and is more reliable than the species[208].

dwatta Cathartic Diaphoretic Diuretic Emetic Homeopathy Stimulant Vasoconstrictor The twigs, leaves and flowering stems are cathartic, diaphoretic, diuretic, emetic, stimulant and vasoconstrictor [4, 9, 21, 46]. The seeds are also sometimes used [4]. The plant is harvested in early summer as it comes into flower and can be dried for later use [9]. It should not be stored for more than 12 months since its active ingredients break down[238]. The powdered seeds act as a mild purgative and were at one time used to make a plaster for broken limbs [244]. A decoction of the whole plant has been used as a remedy for dropsy, rheumatism and gout [4, 9, 244]. A homeopathic remedy is made from the fresh shoots [9]. It is used in the treatment of rheumatism [9].

nrakta Europe, including Britain, from Norway to the Mediterranean, east to the Urals, Caucasus and W. Asia ksacta Meadows, pastures, heaths and the edges of fields[4], especially on poor soils[11].

propta The seed requires a period of cold stratification and is best sown autumn in a cold frame. Pre-soak stored seed for 24 hours in warm water and sow February in a cold frame. Good germination[78]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Cuttings of half-ripe wood, 5-10 cm with a heel, July/August in a frame. Roots are formed in the spring[11]. Cuttings of ripe wood, 5-10 cm with a heel, September/October in a frame. Good percentage. Plant out the following autumn[78].

nwatta Landscape Uses:Border, Container, Erosion control, Foundation, Massing, Specimen. Easily grown in a light

tcanta BroomThe twigs are used in making brooms[151].

dwatta Astringent DysenteryThe juice of the roots is used to treat diarrhoea and dysentery[272].

nrakta E. Asia - China, Himalayas. ksacta River banks in Manchuria. Open places at elevations of 1000 - 2000 metres in Nepal[272]. Mountain slopes and thickets below 1500 metres in China[266].

propta Pre-soak the seed for 24 hours in warm water and then sow it in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in individual pots in a frame. It can be difficult to get the cuttings through their first winter, it is best to plunge the pots in a bed of ashes in a sheltered border outdoors[78].

nwatta Easily grown in a light loam in full sun[1]. The top growth is not very cold tolerant, although the rootstock is considerably hardier. Plants are usually cut back to the ground in all but very mild winters, though they generally resprout well from the base in the following spring and flower in late summer[182]. Related to L. sericea[182]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 5.1.44 Trifolium macrocephalum

Bighead Clover, Largehead clover tfo2n 4 tlin 8 cyuc 1 kcak 3 tcan 0 dwat m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Trifolium macrocephalum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked and used as a greens[212].

tcanta Dynamic accumulator.

nrakta Western N. America - Idaho to Washington and California. ksacta Dry, often rocky soils, usually amongst sagebrush or under yellow pine[212].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. If the seed is in short supply it might be better to sow it in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. Division in spring.

watta Succeeds in a moist, well-drained circum-neutral soil in full sun[200]. Succeeds in poor soils. It grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercups growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201].

## 5.1.45 Lespedeza capitata

Roundhead Lespedeza

tfo2n 4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lespedeza capitata is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both

male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: Tea<br/>The leaves have been boiled to make a tea<br/>[257].

tcanta Nitrogen Fixer.

dwatta Antidote Antirheumatic Cancer KidneyThe plant contains several biologically active compounds. Pharmaceutical preparations are manufactured from them[222]. An extract of the plant is of disputed utility in chronic kidney diseases[222]. Experimentally, it has demonstrated antitumor activity against Walker-256 carcinosarcoma and is also reportedly effective in lowering blood cholesterol levels[222]. It is also believed to reduce blood levels of nitrogen compounds in persons with high nitrogen levels in their urine[222]. The root has been used as an antidote to poisoning[257]. The stems have been used in moxibustion in the treatment of neuralgia and rheumatism[222, 257].

nrakta N. America - Maine to Florida, west to Kansas and Texas. ksacta Dry fields[222]. Sandy open woods or open ground in Texas[274]

propta Pre-soak the seed for 24 hours in warm water and then sow it in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in individual pots in a frame. It can be difficult to get the cuttings through their first winter, it is best to plunge the pots in a bed of ashes in a sheltered border outdoors[78].

nwatta Easily grown in a light loam in full sun[1]. The top growth is not very cold tolerant, although the rootstock is considerably hardier. Plants are usually cut back to the ground in all but very mild winters, though they generally resprout well from the base in the following spring and flower in late summer[182]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

## **5.1.46** Lathyrus palustris

Slenderstem Peavine, Marsh pea

tfo2n 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lathyrus palustris is a PERENNIAL CLIMBER growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista Although no records of toxicity have been found for this plant, the seed of some species in this genus contain a toxic amino acid that can cause a severe disease of the nervous system known as 'lathyrism' if they are eaten in large amounts (although small quantities are said to be nutritious)[65, 76]. Great caution is advised.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed -cooked[105, 161, 179]. The fully grown seeds are shelled and cooked as a vegetable[257]. Some caution is advised, see the notes above on toxicity. Young leaves and stems -cooked[177].

nrakta Europe, including Britain, from Norway south and east to N. Spain, Siberia and Japan. E. N. America ksacta Fens and damp places in grass or bushes[17],

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid sprind[200].

nrakta E. Asia - Japan. ksacta Clambering over cliffs and trees on woodland edges in mountains and hills[58, 249].

propta The seed does not exhibit any dormancy habits. It can be sown as soon as it is ripe in a cold frame and should germinate in the spring. Pre-soak stored seed for 24 hours in warm water and then sow in a greenhouse in early spring. The seed can also be sown in an outdoor seedbed in late spring[126]. Germination should take place in the first spring, though it can sometimes be delayed for another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Plants are very slow from seed and can take up to 20 years to come into flower[200]. Basal cuttings of side-shoots in early to mid summer in a frame[200]. Take the cuttings as soon as the new growth has hardened sufficiently, each cutting should have 2 - 3 leaves[249]. It can also help to remove a shallow slice of bark from the bottom 15mm of the cutting to expose extra cambium, since this will encourage more callusing and better rooting[249]. When kept in a mist frame with a bottom heat of 27 - 30°c, they will root within 4 weeks and produce well-established plants by the autumn[249]. Layering in spring. Simply lay any convenient long shoot along the ground and cover it with a shallow layer of soil. The shoot will readily produce roots at intervals along the stem. When these are well formed, the shoot can be divided up into a number of plants. These should be potted up and kept in a lightly shaded position in a greenhouse until well established and can then be planted out as required.

nwatta Prefers a good loamy soil in a sunny south or south-west facing position, sheltered from cold winds and from early morning sun on frosty mornings[11, 200]. Plants can become chlorotic on alkaline soils[200]. A soil that is too rich results in excessive foliage at the expense of flowering[200]. Hardy to about -20°c[184, 200]. Plants can take a few years to settle down after planting out[219]. Too much shade or too rich a soil are normally the culprits, some form of root restriction can be beneficial[219]. The name for this species was originally based on the cultivated garden form with white flowers. The true wild form is known as W. venusta violacea. Rehd[200]. Cultivated as a fibre plant in Japan[61]. There are several named varieties, develed for their ornamental value[249]. The flowers are scented, the smell can be either sweet or musky according to the variety being grown[249]. The plants flower mainly on short spurs so, if removing unwanted side-branches, it is best to cut them back to 2 - 3 leaves rather than removing them completely since this will encourage the formation of flowering spurs[249]. Any drastic pruning is best carried out in the spring, immediately after flowering[249]. Plants are very tolerant of even the most drastic pruning and will re-grow even if cut right back to the base[249]. A vigorous climbing plant supporting itself by twining around other plants, the shoots twine in an anticlockwise direction[184, 249]. Plants in this genus are notably susceptible to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plants also form a symbiotic relationship with a mycorrhizal fungus which makes more water, phosphorus and other minerals available to the plants[249].

#### 5.1.37 Robinia luxurians

New Mexico locust

tfo2n 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Robinia luxurians is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw[105].

tcanta Soil stabilization WoodPlants succeed in dry barresites, their suckering habit making them suitable for stabilizing banks[200]. Wood - heavy, exceedingly hard, strong, close-grained[82].

nrakta South-western N. America - New Mexico. ksacta Banks of mountain streams to elevations of 2100 metres[82].

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. The seed stores for over 10 years[113]. Suckers taken during the dormant season.

nwatta Succeeds in any soil, preferring one that is not too rich[1, 200]. Requires a well-drained soil, succeeding on dry barren sites[200]. Plants are tolerant of drought and atmospheric pollution[200]. Succeeds in a hot dry position. The branches are brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. Plants in this genus are notably resistant to honey fungus[200]. The flowers are fragrant[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 5.1.38 Maackia amurensis

Chinese Yellow Wood, Amur maackia tfo2n 4 tlin 7 cyuc 1 kcak 4 tcan 0 dwat 6 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Maackia amurensis is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

tcanta WoodWood - heavy, strong, very hard. Used for the interior of houses, utensils, tool handles  ${\sf etc}[46,\,61]$ . Nitrogen Fixer.

nrakta E. Asia - China, northern and central Japan, Korea. ksacta Forests on hill slopes at elevations of 300 - 900 metres in Hebei, Heilongjiang, Jilin, Liaoning, Nei Mogol and Shandong Provinces, China[266].

propta Pre-soak the seed for 24 hours in hot water and then sow it in a cold frame in the autumn[200]. The seed can also be pre-soaked and sown in late winter in a greenhouse[78]. Variable germination. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Root cuttings 4cm long in December. Good percentage[78].

nwatta Landscape Uses:Pest tolerant, Specimen, Street tree. Succeeds in most soils and situations, including deep soils over chalk and dry soils[1, 200]. Prefers a good soil in a sunny position[1]. Prefers a well-drained sandy soil[245]. A very hardy plant, tolerating temperatures down to about -25°c[200]. A polymorphic species[58]. It is closely related to the genus Cladrastis[200], and sometimes included in that genus[245]. Plants flower when guite young[200]. The flowers have a powerful scent of vanilla[245]. Transplants readily, even when fairly large[200], but the mature plants resent pruning[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering

#### 5.1.39 Amorpha fruticosa

False Indigo, False indigo bush tfo2n 4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 4.5 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Amorpha fruticosa is a deciduous Shrub growing to 4.5 m (14ft 9in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The plant is said to contain alkaloids and be poisonous to livestock[274].

kcakta Edible Parts: OilEdible Uses: Condiment OilThe crushed fruit is used as a condiment[105, 177, 183].

tcanta Bedding Dye Fodder Insecticide Oil Repellent Shelterbelt Soil stabilizationPlants have an extensive root system and are also fairly wind tolerant, they can be planted as a windbreak and also to prevent soil erosion[200]. Resinous pustules on the plant contain 'amorpha', a contact and stomachic insecticide that also acts as an insect repellent[57, 200]. The stems are used as bedding[61]. The plant contains some indigo pigment and can be used to make a blue dye[169]. Unfortunately, the pigment is only present in very small quantities, there is not enough to harvest commercially[169].

dwatta EczemaA user has recently sent us an article in www.frontiersin.org Amorpha fruticosa - A Noxious Invasive Alien Plant in Europe or a Medicinal Plant against Metabolic Disease? which states "Native Americans of the Great Plains employed several of the more common Amorpha species for a variety of uses. Amorpha fruticosa was used for bedding material, horse feed, arrow shafts, the stems were arranged on the ground to create a clean surface on which to put butchered meat, and name "false indigo" is related to the application of the plant as a blue dye (Hoffman, 1891; Gilmore, 1913, 1919; Smith, 1928; Vestal and Schultes, 1939; Munson, 1981; Kindscher and Noguera, 2002; Austin, 2004; Straub, 2010). For medicinal purposes such as stomach pain, intestinal worms, eczema, neuralgia. and rheumatism, the related species A. canescens was used and its powdered leaves were applied to wounds (Hoffman, 1891; Gilmore, 1913, 1919; Smith, 1928, Straub, 2010). Moreover, reports for medicinal use of Amorpha fruticosa are also available: The Seminoles used infusion from leaves and stems as a general tonic and also against rheumatism and chronic sickness together with other plants; the Omaha used the plant to cure wounds (Munson, 1981; Austin, 2004)." We will research and update this section soon.

nrakta Southern N. America. Locally naturalized in S. and C. Europe[50]. ksacta River banks, rich moist thickets etc[43, 184]. Grows chiefly in limestone soils[274].

propta Seed - pre-soak for 12 hours in warm water and then sow early spring in a greenhouse[78, 133]. The seed usually germinates in 1 - 2 months at 20°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, June/July in a frame. High percentage [78]. Cuttings of mature wood of the

current seasons growth, autumn, in a sheltered position outdoors. Takes 12 months[78]. Suckers in spring just before new growth begins[200]. Layering in spring

nwatta Agroforestry Services: Alley crop Agroforestry Contour hedgerow Agroforestry Services: Nitrogen Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Pesticide Management: Coppice Minor Global CropPrefers a light well-drained sandy soil in sun or light shade[184, 200]. Plants are fairly windresistant[200]. A very hardy plant, tolerating temperatures down to about -25c[184, 200]. A polymorphic species, there are many named forms[43]. The flowers have a vanilla perfume[245]. Plants resent root disturbance, they should be planted out into their final positions whilst small[133]. Trees only ripen their seed in fine autumns[80]. Plants are said to be immune to insect pests[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

## 5.1.40 Alnus viridis crispa

American Green Alder

260

tfo2n 4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Alnus viridis crispa is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: FlowersEdible Uses: Catkins - raw or cooked. A bitter taste[172].

tcanta Dye TeethAn orange-red to brown dye can be obtained from the bark[257]. Nitrogen fixer.

dwatta Abortifacient Appetizer Astringent Emetic Emmenagogue Haemostatic Poultice Skin Stomachic Tonic-The bark is astringent, emetic, haemostatic, stomachic and tonic[172]. The bark was burnt as an inhalant in the treatment of rheumatism[257]. The ashes were also used as a tooth cleaner[257]. A decoction of the inner bark has been used as a carminative to reduce gas in the stomach and as a febrifuge[257]. A decoction of the plant has been used in a steam treatment to bring about menstruation - it has been used as an abortifacient [257]. A poultice of the leaves has been used to treat infected wounds or sores[257]. The poultice was left in place over the wound until the leaves stuck to it and was then pulled off, removing the 'poison' with it[257]. An infusion of the plant tops was given to children with poor appetites[257].

nrakta Eastern N. America - Labrador to Alaska and Newfoundland and southwards. ksacta Rocky shores, slopes and mountains[43]. Singly or in thickets along streams, lakeshores, coasts, and bog or muskeg margins, or on sandy or gravelly slopes or flats, from sea level to 2000 meis ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils. A useful plant for cold damp places[11]. Tolerates lime and very infertile sites[11, 200]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and

#### 5.1.41 Robinia neomexicana

New Mexico Locust, Rusby's locust, Locust tfo2n 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Robinia neomexicana is a deciduous Tree growing to 2 m (6ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The bark, root and seed are said to be poisonous[155].

kcakta Edible Parts: Flowers Seed SeedpodEdible Uses: Flowers - raw or cooked[105, 155, 161, 183, 257]. They can be used as a flavouring in cooked dishes[257]. The flowers can be boiled, then dried and stored for later use[257]. Seedpods - raw or cooked[229, 257]. They are gathered in the fall and eaten when fresh[229]. The pods can also be cooked then dried and stored for later use[257]. Seed - cooked[229,

tcanta Fodder Soil stabilization WoodPlants succeed in dry barren sites, their suckering habit making them suitable for stabilizing banks[200, 229]. Wood - tough, elastic and durable[155, 257]. Used for fence posts etc[155].

dwatta Antirheumatic EmeticAntirheumatic[149, 216]. An emetic, it is used to clear the stomach[216, 257].

nrakta South-western N. America - Texas to New Mexico, Utah and Nevada. ksacta Mountain canyons and plains[82], generally in sunny positions in moist soils by streams[149], 1200 - 2500 metres[229].

propta Seed - pre-soak for 48 hours in warm water and sow the seed in late winter in a cold frame[80]. A short stratification improves germination rates and time[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in the following summer. The seed stores for over 10 years[113]. Suckers taken during the dormant season.

nwatta Agroforestry Services: Nitrogen Fodder: Bank Industrial Crop: Biomass Management: Coppice Regional CropLandscape Uses:Specimen. Succeeds in a hot dry position. Succeeds in any soil, preferring one that is not too rich[1, 200]. Requires a well-drained soil, succeeding on dry barren sites[200]. Plants are tolerant of drought and atmospheric pollution[200]. The branches are

propta Seed - best sown in a cold frame as soon as it brittle and very liable to wind damage[200]. When plants are grown in rich soils they produce coarse and rank growth which is even more liable to wind damage[11, 200]. Plants can be coppiced[155]. Any pruning should be done in late summer in order to reduce the risk of bleeding[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: North American native. Naturalizing, Attractive flowers or blooms.

## 5.1.42 Vicia cracca

Tufted Vetch. Bird vetch. Cow vetch tfo2n 4 tlin 8 cyuc 1 kcak 3 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vicia cracca is a PERENNIAL CLIMBER growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: TeaSeed cooked[2, 22, 105]. They are boiled or roasted[183]. Leaves and young stems - cooked[105]. Used as a potherb[183]. The leaves are a tea substitute[183].

tcanta Green manureCan be used as a green manure[46]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta GalactogogueThe cooked plant is used as a galactogogue[218].

nrakta Northern Europe, including Britain, to Japan in northern Asia. ksacta Grassy and bushy places, avoiding acid soils[13, 17].

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in spring or autumn.

nwatta Succeeds in any well-drained soil in a sunny position if the soil is reliably moist throughout the growing season, otherwise it is best grown in semi-shade[200]. This species has occasionally been cultivated as a food plant, but vields are too low to make it very worthwhile[2]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 5.1.43 Lespedeza juncea

Chinese Lespedeza, Juncea lespedeza tfo2n 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 1.2 m hkuc

261

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lespedeza juncea is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in September. and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

kcakta Edible Parts: LeavesEdible Uses: Young leaves and shoots - cooked[179].

of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern and Central N. America - Ontario to Alabama, west to Oklahoma. ksacta Open woods, usually in alluvial or fertile soils[43]. Frequently found in limestone soils[229].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Espalier, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to at least -18°c[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[11], the branches are almost thornless[229]. A rather variable species, it has been separated into several different species by some botanists[82]. This species is much confused with C. chrysocarpa[11] and with C. coccinea[50]. It is very closely related to C. submollis, differing in having 20 stamens to a flower (as compared to 10 in C. submollis)[202]. Special Features: North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a nonsuckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.88 Hemerocallis multiflora

4 tlin 8 cyuc 4 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis multiflora is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral abasic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked. Relatively small for a day lily, but the flowers are crisp with a pleasant sweetness and no aftertaste - they make a delicious addition to salads[K]. The flowers can also be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[K]. We have found them to be tender but fairly bland with a slight sweetness[K]. The roots are slightly fleshy, with a swollen, tuberous part near the tip[266]. The swollen roots are quite small and are only really worthwhile using if the plant is being dug up for divisions or some other reason[K].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China in Hunan, Japan. ksacta Hill forests and openings in forests on hilltops at elevations of 700 - 1000 metresin China[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

mwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[11] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. This species is closely related to H. micrantha and H. plicata[205]. Individual flowers are short-lived but the plant produces a succession of blooms. Each scape carries between 75 and 100 blooms[205]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

## 5.2.89 Hordeum distichon

Two-Rowed Barley

4 tlin 8 cyuc 4 kcak 0 tcan 3 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hordeum distichon is a ANNUAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Daucus carota sativus is a BIENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Carrots sometimes cause allergic reactions in some people[46]. Skin contact with the sap is said to cause photo-sensitivity and/or dermatitis in some people[218].

kcakta Edible Parts: Leaves RootEdible Uses: Coffee Colouring CondimentRoot - raw or cooked[2, 7, 27]. The roots of well-grown plants are crisp, sweet and juicy, they are very nice raw and are also cooked as a vegetable or added to soups, stews etc[K]. The grated root is a tasty addition to the salad bowl[K]. The juice can be extracted from the root and used as a health-promoting drink[46]. The root is very rich in carotene, which is transformed by the body into vitamin A when it is eaten[7]. The root is sometimes ground into a powder and used in making cakes, bread etc[7, K]. The roasted root is a coffee substitute[21, 46]. Carotin, extracted from the roots, is used as an orange-vellow food dye[171]. Leaves - raw or cooked. A very strong flavour, they can be added in small quantities to mixed salads[K]. The leaves contain an oil that is rich in vitamin E, they are sometimes used as a flavouring in soups[7]. An essential oil from the seed is used as a food flavouring.

tcanta Alcohol Dye EssentialThe roots are fermented in order to produce alcohol[7]. An orange dye is obtained from the root[171]. An essential oil from the seed has a distinctive fragrance and is used in perfumery[7, 46].

dwatta Anthelmintic Carminative Deobstruent Diuretic Galactogogue Ophthalmic StimulantCultivated carrot roots are a rich source of beta-carotene, which is converted to vitamin A by the liver[254]. When used as a regular item in the diet the roots improve eyesight and skin health, and also have anti-cancer effects[238]. A wonderful cleansing medicine, it supports the liver and stimulates urine flow and the removal of waste by the kidneys[254]. The root is diuretic and ophthalmic[7]. The juice of organic carrots is a delicious drink and a valuable detoxifier[254]. The raw root, grated or mashed, is a safe treatment for threadworms, especially in children[254]. The seed is carminative, galactogogue, lithontripic and stimulant[7, 240]. They are useful in the treatment of kidney diseases, dropsy and to settle the digestive system[240, 254]. They stimulate menstruation and have been used in folk medicine as a treatment for hangovers[254]

nrakta A cultivated form of D. carota. ksacta Not known in the wild.

propta Seed - sow in situ in succession from early spring to early summer. Do not transplant the seedlings, since this will usually cause damage to the roots and a good crop will not be obtained. Carrot seed needs a well-made seed bed with a fine tilth if good germination is to be achieved. The earliest sowings can be made of an early maturing variety in a cold frame or greenhouse in January or February, this will provide edible roots in late spring. The first outdoor sowings are made as the soil warms up in the spring. Successional sowings can be made until early summer if required. A September sowing in mild areas can provide an early spring supply of young roots, though the plants will often require some protection.

nwatta Prefers a good light warm well-drained soil and plenty of moisture[16, 27, 37, 200]. Prefers a sandy or calcareous loam[132]. Plants are extremely sensitive to soil conditions, good roots can only be produced in a soil that permits easy penetration of the root[200]. Carrots are reported to tolerate an annual precipitation in the range of 31 to 410cm, an annual temperature range of 3.6 to 28.5°C and a pH of 4.2 to 8.7[269]. They prefer a pH in the range 6.5 to 7.5[200]. Carrots are widely cultivated in most areas of the world for their edible root, which can be available all year round from successional sowings[46]. There are many named varieties, with roots varying in size and shape from short and round to long and tapering[183, 200]. World-wide, the yields of roots averages about 24 tonnes per hectare, the

world low production yield was 3.125 kg/ha in Zaire, whilst the world high production yield was 62,889 kg/ha in Belgium-Luxembourg[269]. Plants grow best at a mean temperature of 16 - 18°c. At temperatures above 28°c top growth is reduced and the roots become very strongly flavoured. At temperatures below 16°c the roots become long and tapered and are pale in colour[200]. The leaves are moderately susceptible to frost but the roots are much hardier and can safely be left in the ground in the winter in most areas[200], so long as pests such as slugs or root fly are not a problem[K]. If dug up for storage, the roots can be kept for up to six months at 0 -1°c and high relative humidity[200]. Carrots are very susceptible to a number of pests and diseases. The young seedlings are adored by slugs and so will generally need some protection. Carrot root fly is also a major problem. This creature lays its eggs near the young carrots. When they hatch, the larvae burrow into the soil and then eat their way into the root. In bad seasons almost all the crop can be heavily damaged. It is possible to reduce this damage by timing seed sowing to try and avoid the worst times of infestation, a June sowing of a fast-maturing cultivar will often be successful. There are also various companion plants that can help to reduce infestation. In general, these are strong-smelling plants such as garlic, onions and various aromatic plants such as wormwood. The idea is that these plants will mask the smell of the carrots and therefore the fly, which mainly uses scent to find the plants, will not be able to detect the smell of the carrots This method is most likely to fail when the fly comes close enough to the plants to see them and then no longer relies on scent. The most successful organic solution to date has been to erect barriers of clear polythene about 1 metre tall all around the bed of carrots. Since the fly generally flies below this height, it has proved to be quite effective, although any fly that does get in will then tend to stay inside the barrier and lay all of its eggs there. About 95% of carrot flowers are pollinated by insects, with the remaining 5% self-pollinating[269]. Carrots grow well with lettuce and chives [18] but dislike dill [20]. They also grow badly with potatoes, kohl rabi, fennel and cabbages[201]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 5.2.21 Ribes nigrum

Blackcurrant, European black currant 4 tlin 8 cyuc 5 kcak 2 tcan 3 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hjonli

drutta Ribes nigrum is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from March to November, in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit raw or cooked. An excellent aromatic flavour[K]. The fully ripe fruit is very acceptable raw, though it is more often cooked and used to make pies, jams etc[1, 2, 5, 9, 34]. Very rich in vitamin C[244]. The fruit is about 10mm in diametr[200], though selected cultivars have larger fruits[K]. The leaves are used in soups[183]. The dried leaves are a tea substitute[74, 177, 183]. They are sometimes added to blended herb teas[238].

tcanta Cosmetic Dye Miscellany PreservativeThe oil from the seed is added to skin preparations and cosmetics. It is often combined with vitamin E to prevent oxidation[238]. A yellow dye is obtained from the leaves[100]. A blue or violet dye is obtained from the fruit[100]. The leaves are used for vegetable preservation[74]. No more details.

dwatta Antidiarrhoeal Antirheumatic Diaphoretic Diuretic Febrifuge Miscellany Vitamin CBlackcurrant fruits are a good source of minerals and vitamins, especially vitamin C. They have diuretic and diaphoretic actions, help to increase bodily resistance to infections and are a valuable remedy for treating colds and flu[4, 254]. The juice, especially when fresh or vacuum-sealed, helps to stem diarrhoea and calms indigestion[4, 254]. The leaves are cleansing, diaphoretic and diuretic[4, 9]. By encouraging the elimination of fluids they help to reduce blood volume and thereby lower blood pressure[254]. An infusion is used in the treatment of dropsy, rheumatic pain and whooping cough, and can also be used externally on slow-healing cuts and abscesses[9].It can be used as a gargle for sore throats and mouth ulcers[254]. The leaves are harvested during the growing season and can be used fresh or dried[238]. It is believed that an infusion of the leaves increases the secretion of cortisol by the adrenal glands, and thus stimulates the activity of the sympathetic nervous system[254]. This action may prove useful in the treatment of stress-related conditions[254]. An infusion of the young roots is useful in the treatment of eruptive fevers[4]. A decoction of the bark has been found of use in the treatment of calculus, dropsy and haemorrhoidal tumours[4]. The seed is a source of gamma-linolenic acid, an unsaturated fatty acid which assists the production of hormone-like substances[238]. This process is commonly blocked in the body, causing disorders that affect the uterine muscles, nervous system and metabolism[238]. We have no records of the oil from this species being used medicinally, though it is used in cosmetic preparations[238, K].

nrakta Europe, including Britain, from Scandanavia south and east to France, Bulgaria, N. and C. Asia. ksacta Hedges and woodlands, often by streams[9, 17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and  $5^{\circ}c$  and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15 cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11, 200]. Best grown on a deep sandy loam[1]. Dislikes very heavy clay, chalky soils and thin dry soils, but it can succeed on most soil types if plenty of organic matter is incorporated[1]. Plants require plenty of nitrogen if they are to do well[200]. Prefers a pH in the range 6.7 to 7 and is intolerant of acid soils[200]. Plants are guite tolerant of shade though do not fruit so well in such a position[11]. Plants fruit less freely when grown in windy sites[200]. The plant is hardy to about -20°c, though flowers are damaged at -1°c[200]. Blackcurrants are widely cultivated in temperate areas for their edible fruit, there are many named varieties[183, 200]. Most fruit is produced on one year old wood. Pruning usually consists of removing about a third of all the stems from just above ground level in the autumn. The oldest stems with least new growth are removed since these will be the poorest fruiters. The plant is able to make new growth from the base of the removed stems and, if the plants are well fed, this growth is very vigorous and will fruit heavily the following year. The flowers can self-fertilize but many cultivars fruit better with insect pollination[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc., and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out. The root pattern is suckering with new plants from underground runners away from the plant

## 5.2.22 Allium cepa proliferum

Tree Onion, Walking Onion

4 tlin 8 cyuc 5 kcak 3 tcan 3 dwat 1.2 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium cepa proliferum is a BULB growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of this plant. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Leaves RootEdible Uses: The plant forms small bulbs at the top of the flowering stem, these can be eaten raw or cooked[16, 33]. They have a strong onion flavour and are often used as pickled onions or added to salads[K]. As long as the bulbils are dried properly at harvest time, they store well[4]. Bulb - raw or cooked. The bulb can be up to 4cm in diameter and has a strong onion flavour[K]. Chopped into slices, it makes a good addition to salads and can also be used as a vegetable or as a flavouring in cooked foods[K]. Leaves - raw or cooked. A strong onion flavour, it makes a nice flavouring in salads though it should not be harvested in quantity because this would reduce the yield of bulbils[K]. The leaves are produced from late autumn, though we have found that harvesting them at this time will often encourage diseases such as mildew[K].

tanta Cosmetic Dye Hair Polish Repellent RustThe juice of the plant is used as a moth repellent and can also be rubbed onto the skin to repel insects[7]. The plant juice can be used as a rust preventative on metals and as a polish for copper and glass[7]. A yellow-brown dye is obtained from the skins of the bulbs[141, 168]. Onion juice rubbed into the skin is said to promote the growth of hair and to be a remedy for baldness[7]. It is also used as a cosmetic to get rid freckles[7]. The growing plant is said to repel insects and moles[201]. A spray made by pouring enough boiling water to cover 1kg of chopped unpeled onions is said to increase the resistance of other plants to diseases and parasites[201].

dwatta Anthelmintic Antiinflammatory Antiseptic Antispasmodic Carminative Diuretic Expectorant Febrifuge Hypoglycaemic Hypotensive Lithontripic Skin Stomachic TonicAlthough rarely used specifically as a medicinal herb, the onion has a wide range of beneficial actions on the body and when eaten (especially raw) on a regular basis will promote the general health of the body. The bulb is anthelmintic. anti-inflammatory, antiseptic, antispasmodic, carminative, diuretic, expectorant, febrifuge, hypoglycaemic, hypotensive, lithontripic, stomachic and tonic[4, 7, 21]. When used regularly in the diet it offsets tendencies towards angina, arteriosclerosis and heart attack[254]. It is also useful in preventing oral infection and tooth decay[254]. Baked onions can be used as a poultice to remove pus from sores[254]. Fresh onion juice is a very useful first aid treatment for bee and wasp stings, bites, grazes or fungal skin complaints[7, 201]. When warmed the juice can be dropped into the ear to treat earache[254]. It also aids the formation of scar tissue on wounds, thus speeding up the healing process, and has been used as a cosmetic to remove freckles[7].

nrakta Original habitat is obscure. ksacta Not known in

propta Harvest bulbils in late summer and replant immediately or store them in a cool dry frost-free place and plant them out in late winter or early spring. Division of the bulbs after the leaves die down in late summer.

nwatta Prefers a sunny position in a light well-drained soil[1] but succeds in most soils that are in good condition[16]. Tolerates a pH in the range 4.5 to 8.3. The bulbs should be planted fairly deeply[1]. Some modern works have moved this plant from A. cepa, seeing it as being of hybrid origin with A. fistulosum and therefore renaming in A. x proliferum. The tree onion is a genuinely perennial form of A. cepa that is sometimes grown in the herb garden for its edible bulbils. Plants rarely if ever produce seed, instead the flowering head is comprised of a number of small onions or bulbis[16, 33]. Plants are propagated by means of these bulblis or by dividing the main bulb that grows underground[K]. By

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[2001]. Sow stored seed in a cold frame as soon as it is received. The seed, especially if it has been stored, can be very slow to germinate, sometimes taking 18 months or more. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in a shady part of the greenhouse or cold frame. It will normally take 2 or more growing seasons before the roots are large enough to plant out - this is best done when the plant is dormant in the autumn. Division as the plant comes into growth in early spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame for their first year, planting them out in the following spring.

nwatta Requires a cool leafy soil in shade or partial shade[187]. Thrives in a moist light soil containing organic matter[1]. Hardy to at least -20°c. A polymorphic species, there are many sub-species[43]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.86 Crambe maritima

Sea Kale

4 tlin 8 cyuc 4 kcak 3 tcan 0 dwat m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli priklwishsom hpa7tmwatli fyifxre7t hionli

drutta Crambe maritima is a PERËNNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves Root ShootsEdible Uses: Young leaves - raw or cooked like spinach[9, 12, 37, 52, 183]. They have a pleasant almost nutty flavour and go well in a mixed salad[K]. They also make a very pleasant cooked vegetable[K]. Older leaves develop a bitterness and are not so pleasant[K]. Young shoots - raw or cooked[2, 5, 37, 46, 183]. Available in the spring, they have a delicate nutty flavour with a crisp texture[200, 264]. The shoots are usually blanched and can be cooked like asparagus[9, 183]. When properly cooked they retain their crispness and have a very agreeable flavour, somewhat like hazelnuts but with a slight bitterness[183]. Root - cooked. Rich in starch and sugars[74]. Young flower buds - raw or cooked[264]. The flowering shoots are harvested when about 10 - 15cm long and before the flowers have opened. Used like sprouting broccoli, they are guite nice raw and delicious when lightly steamed[K].

tcanta Plants can be used for ground cover when spaced about 60cm apart each way[208].

nrakta Atlantic coast of Europe, including Britain, along the Baltic coast and around the Black Sea. ksacta Coastal sands, shingle, rocks and cliffs near the sea, often on the drift line[17].

propta Seed - sow March/April in a seedbed outdoors and either thin the plants out or move them to their permanent positions when about 10cm tall[111]. Plants can be cropped once they are more than 12 months old[264]. The young plants are very attractive to slugs so some protection will often be needed. Germination can be slow so it is best to sow the seed in pots in a cold frame[164]. Germination usually takes place in 3 - 26 weeks at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions when they are at least 10cm tall. Division in spring or autumn[1, 111]. Dig up the root clump and cut off as many sections as you require, making sure they all have at

propta Seed - best sown in a cold frame as soon as it is in the summer[200]. Sow stored seed in a cold frame oon as it is received. The seed, especially if it has been ed, can be very slow to germinate, sometimes taking 18 this or more. Prick out the seedlings into individual pots e they are large enough to handle and grow them on in a ty part of the greenhouse or cold frame. It will normally

nwatta An easily grown plant, succeeding in a good loam and an open sunny position[1, 111, 200] but also tolerating some shade [188]. Prefers a slightly alkaline soil in a position sheltered from strong winds [200] (this report totally conflicts with the plants native habitat which is on sea shores - we have found this species to be very tolerant of strong maritime winds though it does not like cold northerlies much[K]). Tolerates poor soil and some shade[200]. Dislikes acid[1] and very stiff soils[37]. Prefers a rich , well-drained very deep sandy loam and a pH of 7[104, 264]. Established plants are very drought tolerant[190]. This species is hardy to about -20°c[187], it grows best in a cool maritime climate[200]. Seakale is sometimes cultivated for its edible young shoots in the spring which are blanched by excluding light in order to make them less bitter[61, 264]. Two or three crops can usually be harvested each year[264]. There are some named varieties[183]. The roots are sometimes brought into a greenhouse in the winter and grown on there in order to produce an early crop of shoots[183]. A deep-rooted and very longlived plant[233, 264], it dislikes root disturbance[164]. The seed is dispersed by seawater, on which it can float for several days without loss of viability[17]. A good bee plant[115]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 5.2.87 Crataegus mollis

Red Haw, Downy hawthorn

4 tlin 8 cyuc 4 kcak 2 tcan 2 dwat m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus mollis is a deciduous Tree growing to 9 m (29ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[22, 46, 62, 101, 183]. Sub-acid, dry and mealy[82, 227]. The fruit is also used for making jellies and preserves[61, 95, 183]. Fairly large, it is about 20 - 25mm in diameter[200], with a thick flesh[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. A tea-like beverage can be made from the twigs[257].

tcanta Hedge HedgeThe plant is tolerant of being trimmed and will even resprout if cut back into very old wood. It can be used as a hedge[50]. Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers

nrakta E. Asia - C. and S. Japan ksacta Long cultivated, the plant is not known in the wild

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones. preferring a rich moist soil and a sunny position[200] but tolerating partial shade. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Unlike the type species, this form does produce viable seed[187]. Plants take a year or two to become established after being moved[200]. Individual flowers are shortlived, opening in the morning and withering in the evening. The plant, however, produces a succession of flowers over a period of about 6 weeks[205]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

## 5.2.84 Hordeum vulgare

Barley Common barley

4 tlin 8 cyuc 4 kcak 0 tcan 3 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Hordeum vulgare is a ANNUAL growing to 1 m (3ft 3in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Exposure to barley flour can cause asthma. Possible trigger for coeliac disease. Possible hypersensitivity to barley [301].

kcakta Edible Parts: SeedEdible Uses: Coffee Drink Salt SweetenerSeed - cooked as a whole grain or ground up and used as a flour for making bread, porridges etc[2, 7, 46, 183]. It has a low gluten content and so is unsuitable for making wheat-type breads[238, K]. The seed can be fermented into sourdough and many other fermented foods such as 'tempeh' and 'miso'[183]. The seed can also be sprouted and added to salads or the sprouted seed juiced and the juice drunk as a health-food drink[183]. The decorticated seed is called pearl barley. This is no longer viable since the decortication process damages the embryo. It is used in soups, stews etc[238]. Malt is obtained by sprouting the whole seed and then roasting it. The seed is then ground into a flour and boiled in water. The resulting liquid is very sweet and can be used in making beer or other drinks, and as a nutritious sweetener in various foods.[7, 46]. The roasted (unsprouted) seed is used as a coffee[46, 183] and a salt substitute.

tcanta Biomass Mulch PaperThe stems, after the seed has been harvested, have many uses. They are a source of fibres for making paper, a biomass for fuel etc, they can be shredded and used as a mulch[141, 171].

dwatta Abortifacient Cancer Carminative Demulcent Digestive Digretic Emollient Expectorant Febrifuge Galactofuge Hypoglycaemic Lenitive Nutritive Poultice StomachicThe shoots are diuretic[218]. The seed sprouts are demulcent, expectorant, galactofuge, lenitive and stomachic[176, 218]. They are sometimes abortifacient[218]. They are used in the treatment of dyspepsia caused by cereals, infantile lacto-dyspepsia, regurgitation of milk and breast distension[176]. They are best not given to a nursing mother since this can reduce milk flow[176]. The seed is digestive, emollient, nutritive, febrifuge and stomachic[218].

It is taken internally as a nutritious food or as barley water (an infusion of the germinated seed in water) and is of special use for babies and invalids[238]. Its use is said to reduce excessive lactation[238]. Barley is also used as a poultice for burns and wounds[4, 46, 176, 218]. The plant has a folk history of antitumour activity[218]. The germinating seed has a hypoglycaemic effect preceded by a hyperglycaemic action[218]. Modern research has shown that barley may be of aid in the treatment of hepatitis, whilst other trials have shown that it may help to control diabetes[254]. Barley bran may have the effect of lowering blood cholesterol levels and preventing bowel cancer[254]. Other uses for bronchitis and diarrhoea, and as a source of folic acid and vitamin B12 and B6. Weight loss[301].

nrakta Of uncertain origin. ksacta Not known in the wild, it is found in Britain as a relict of cultivation but does not persist[17].

propta Seed - sow in situ in March or October and only just cover the seed. Make sure the soil surface does not dry out if the weather is dry. Germination takes place within 2

nwatta Staple Crop: Balanced carb Under DevelopmentSucceeds in most soils and in climates ranging from sub-arctic to sub-tropical[1, 171]. Easily grown in light soils[162]. Prefers a calcareous soil[7]. Best grown in a sunny position[238]. Barley first came under cultivation about 12,000 years ago[238]. It is widely cultivated in Temperate areas of the world for its edible seed, there are many named varieties[57, 183]. It succeeds further north than most other cereal crops (it succeeds in Norway at latitude 70° N[142]), and at higher altitudes (it is a staple crop in Tibet)[57, 238]. The Coeleste group contains the hull-less barleys. Although lower yielding than the type, these hullless seeds are much easier to harvest making them a much easier crop to grow on a small scale[183].

## 5.2.85 Streptopus amplexifolius

Wild Cucumber, Claspleaf twistedstalk, Tubercle twisted-

4 tlin 8 cyuc 4 kcak 1 tcan 2 dwat 1 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Streptopus amplexifolius is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to July. and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit Leaves RootEdible Uses: Fruit - raw or cooked in soups and stews[105, 161, 172]. Juicy with a cucumber flavour[183], they are reported to be slightly cathartic when growing in certain areas only[183]. The fruit is laxative if eaten in large quantities according to another report[172]. The oval berry is up to 15mm long[235]. Tender young shoots - raw in salads or cooked like asparagus[177, 183, 257], A cucumber-like flavour[172, 183], Root raw. It is sometimes used in salads for its cucumber flavour[105, 177, 183].

tcanta IncenseThe plant has been tied to the clothes, body or hair and used as a scent[257].

dwatta Analgesic Appetizer Cathartic Haemostatic Kidney Oxytoxic Stomachic VDThe fruit is cathartic[172, 207]. An infusion of the stems and fruit has been used to treat 'sickness in general'[257]. The plant is tonic[257]. An infusion of the whole plant has been used to treat stomach complaints and loss of appetite[257]. A compound infusion of the plant has been used in the treatment of spitting up of blood, kidney problems and gonorrhoea[257]. The root has been chewed in order to induce labour in cases of protracted delay[257]. A compound infusion of the root has been used as an analgesic in the treatment of internal pain[257].

nrakta Europe to E. Asia and N. America - Alaska to North Carolina, Ohio, Michigan and New Mexico. ksacta Wet sub-alpine woods[50, 187]. Moist woods and thickets[43, 50]. Rich moist coniferous and deciduous woods at elevations of 0 - 2800 metres in America[270].

no means a heavily productive plant, though the bulbils are soil[1], though it prefers a reasonably well-drained and modvery well flavoured and the plant is fairly easily grown[K]. Its main problem is that slugs seem to be attracted to it and can eat to death even well-established plants[K]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes [18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Said to be immune to onion root flv[16]. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 12 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

## 5.2.23 Malva alcea

Vervain mallow. Hollyhock Mallow 4 tlin 8 cyuc 5 kcak 2 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malva alcea is a PERENNIAL growing to 1.2 m (4ft) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

poista Although we have seen no reports of toxicity for this species, when grown on nitrogen rich soils (and particularly when these are cultivated inorganically), the leaves of some species tend to concentrate high levels of nitrates in their leaves[76]. The leaves are perfectly wholesome at all other times

kcakta Edible Parts: Flowers Leaves Oil Oil SeedEdible Uses: Oil OilLeaves - raw or cooked[74]. A mild pleasant flavour[K]. The leaves are mucilaginous and fairly bland, this is a very good perennial substitute for lettuce in a salad, producing fresh leaves from spring until the middle of summer, or until the autumn from self-sown plants[K], Flowers - raw[K]. A very decorative addition to the salad bowl, they have a mild flavour and a texture similar to the leaves[K]. Seed - raw[74]. Best used before it is fully mature, the seed has a pleasant nutty taste but it is rather small and fiddly to

tcanta Dve Fibre Oil OilA fibre obtained from the stem is used for making cordage[74]. Cream, yellow and green dyes can be obtained from the plant and the seed heads[168]. The seed yields 15% oil[74]. The uses of this oil have not been given though it is almost certainly edible[K].

dwatta Demulcent MouthwashThe leaves are demulcent. They are also used as a mouthwash for inflammatory and catarrhal conditions[74].

nrakta Europe. An occasional casual in Britain, ksacta Gardens, vineyards and waste places[74].

propta Seed - best sown in early spring in a cold frame. The seed germinates quickly and easily. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in their permanent positions in the early summer[K]. If you have sufficient seed then it can be sown outdoors in situ in the middle to late spring. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container, Massing. A very easily grown plant, succeeding in ordinary garden erately fertile soil in a sunny position[200]. A very ornamental and polymorphic plant[1, 50]. It tends to be guite shortlived in cultivation but usually self-sows when well-sited[233, K]. It is closely related to M. excisa[74]. If the plant is cut back to the ground as it comes into flower, then it will produce a fresh flush of leaves for salads[K]. Plants seem to be immune to the predations of rabbits[233] and are seldom bothered by slugs[K]. Plants are prone to infestation by rust fungus[200]. Special Features: Not North American native, Naturalizing, Extended bloom season in Zones 9A and above. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread

## 5.2.24 Fragaria vesca 'Semperflorens'

Alpine Strawberry

4 tlin 8 cyuc 5 kcak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Fragaria vesca 'Semperflorens' is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to November, and the seeds ripen from June to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy). medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Coffee TeaFruit - raw, cooked or made into preserves[183]. Sweet and succulent with an exquisite taste, they are far superior to the cultivated strawberry [K]. The fruit is fairly small, up to 15mm in diameter, but it is produced abundantly from early summer until the frosts of autumn[K]. Young leaves - raw or cooked[52, 105]. Added to salads or used as a potherb[183]. The fresh or dried leaves are used as a tea substitute[7, 177]. 1831. The root has been used as a coffee substitute in India[240].

tcanta Compost TeethThe flowers are an alternative ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The fruit is used as a tooth cleaner[4]. The fresh fruit removes stains from teeth if it is allowed to remain for about 5 minutes[4]. The fruit is also used cosmetically in skin-care creams[7]. It tones and whitens the skin, combats wrinkles, lightens freckles, soothes sunburn and whitens the teeth[244].

dwatta Astringent Diuretic Laxative TonicThe leaves and the fruit are astringent, diuretic, laxative and tonic[4, 9, 222]. The leaves are mainly used, though the fruits are an excellent food to take when feverish and are also effective in treating rheumatic gout[4]. A slice of strawberry is also excellent when applied externally to sunburnt skin[4]. A tea made from the leaves is a blood tonic[222]. It is used in the treatment of chilblains[53] and also as an external wash on sunburn[222]. The leaves are harvested in the summer and dried for later use[238]. The fruits contain salicylic acid and are beneficial in the treatment of liver and kidney complaints, as well as in the treatment of rheumatism and gout[244]. The roots are astringent and diuretic[4, 222]. A decoction is used internally in the treatment of diarrhoea and chronic dysentery[4, 244]. Externally it is used to treat chilblains and as a throat gargle[244]. The roots are harvested in the autumn and dried for later use[238].

nrakta Most of Europe, including Britain, to temperate Asia. ksacta Woodland and damp undergrowth[7].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[27, 200]. Tolerates semi-shade though fruit production will be reduced when plants are growing in such a position. Prefers some shade according to some reports[3, 31]. Plants are often found on clay soils[31] and on soils overlying chalk[13]. Alpine strawberries appreciate a mulch of pine or spruce leaves [18]. The alpine strawberry is often cultivated in the garden for its edible fruit. This fruit is fairly small but exquisitely flavoured and is freely produced from June to November. There are some named varieties[183]. It is not very feasible to grow this plant on a commercial scale because it is very labour intensive to pick and it is also hard to get the fruit to market in good quality. However, it is sometimes grown by specialised growers for the luxury market. The main drawback of growing this plant is that it tends to lose vigour after about 2 - 3 years, partly due to virus diseases and partly because the plant flowers and fruits so freely that it exhausts itself.

#### 5.2.25 Corvlus maxima

Filbert, Giant filbert

4tlin 8 cyuc 5 kcak 5 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyif hjonli

drutta Corylus maxima is a deciduous Shrub growing to 6 m (19ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil Oil SeedEdible Uses: Milk Oil OilSeed - raw or cooked[22, 34, 46, 105]. It is rich in oil. Large and well flavoured, it can be eaten raw, cooked in cakes, pies, breads etc or used to make a plant milk[183]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

tcanta Basketry Charcoal Hedge Hedge Oil Oil WoodThe seed contains up to 65% of a non-drying oil, used in paints, cosmetics etc[13, 46, 57, 132]. The whole seed can be used to polish and oil wood[6]. Very easy and effective[K]. Plants can be grown as a tall hedge[29]. They need to be left untrimmed or only lightly trimmed if seed is required. Wood - soft, easy to split, not very durable, beautifully veined. Used for inlay work, small items of furniture, hurdles, wattles, basketry, pea sticks etc[7, 13, 23, 46, 61, 63, 66, 125]. The twigs are used as dowsing rods by water diviners[11]. The wood also yields a good quality charcoal, used by artists[63, 101].

nrakta S. Europe to W. Asia. ksacta Woods, hedges and

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prich the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very

easy, they can be planted out straight into their permanent positions.

nwatta Management: Coppice Management: Standard Regional Crop Staple Crop: Protein-oilAn easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. A very hardy plant but the male flowers can be damaged by heavy frosts at flowering time[200]. The filbert is often cultivated for its edible seeds[50], there are many named varieties[63]. It has often been hybridized with C. avellana in breeding programmes[11]. Plants are self-fertile but a more certain crop is obtained if more than one cultivar is grown[200]. The main difference between cob nuts and filberts is that the husk of a filbert is longer than the seed and often completely encloses it, whilst the husk on a cob nut is shorter than the seed[200]. Squirrels are a major pest of this plant, often decimating the crop of nuts[200]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

## 5.2.26 Allium cepa

Onion, Garden onion

4 tlin 10 cyuc 5 kcak 3 tcan 3 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip

drutta Allium cepa is an evergreen Bulb growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil

pcista There have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of this plant. Dogs seem to be particularly susceptible[76]. Hand eczema may occur with frequent handling. May interfere with drug control of blood sugar [301].

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Bulb - raw or cooked. A very versatile food, the bulb can be 10cm or more in diameter and is widely used in most countries of the world. Eaten raw, it can be sliced up and used in salads, sandwich fillings etc, it can be baked or boiled as a vegetable in its own right and is also commonly used as a flavouring in soups, stews and many other cooked dishes. Some cultivars have been selected for their smaller and often hotter bulbs and these are used for making pickles. Leaves - raw or cooked[2, 37]. There are some cultivars, the spring onions, that have been selected for their leaves and are used in salads whilst still young and actively growing - the bulb is much smaller than in other cultivars and is usually eaten with the leaves. By successional sowing, they can be available at any time of the year. Flowers - raw. Used as a garnish on salads. The flowers are somewhat dry and are less pleasant than many other species[K]. The seeds are sprouted and eaten. They have a delicious onion flavour[K].

tcanta Cosmetic Dye Hair Polish Repellent RustThe juice of the plant is used as a moth repellent and can also be rubbed onto the skin to repel insects[7]. The plant juice can be used as a rust preventative on metals and as a polish for copper and glass[7]. A yellow-brown dye is obtained from the skins of the bulbs[141, 168]. Onion juice rubbed into the skin is said to promote the growth of hair and to be a remedy for baldness[7, 254]. It is also used as a cosmetic to get rid of freckles[7]. The growing plant is said to repel insects and moles[201]. A spray made by pouring enough boiling water to cover 1kg of chopped unpeeled onions is said to increase the resistance of other plants to diseases and parasites[201].

dwatta Anthelmintic Antiinflammatory Antiseptic Antispasmodic Appetizer Carminative Diuretic Expectorant Febrifuge Homeopathy Hypoglycaemic Hypotensive Lithontripic Skin Stings Stomachic TonicAlthough rarely used specifically as a medicinal herb, the onion has a wide range of beneficial actions on the body and when eaten (especially raw) on a regular basis will promote the general health of

making jam[9]. At one time the fruit was kept in brine and used like olives[183]. The fruit is a reasonable size, up to 15mm long, with a single large seed[K]. A small amount of edible oil can be extracted from the seeds[7]. Seeds are roasted, ground into a powder and used as a coffee substitute[183].

tcanta Dye Hedge Hedge Oil Oil Tannin WoodAn oil is obtained from the seed[7]. A dye is obtained from the bark[3, 7]. No more details are given. Another report says that a red dye is obtained from the plant, but does not say which part of the plant[4]. The leaves are a good source of tannin[7]. Wood - very hard, it is highly valued by turners[7]. The wood is heavier than water and does not float[7]. It is used for tools, machine parts, etc[7, 11, 13, 61].

dwatta Astringent Cholera Febrifuge NutritiveThe bark and the fruit are astringent, febrifuge and nutritive[7]. The astringent fruit is a good treatment for bowel complaints and fevers, whilst it is also used in the treatment of cholera[4, 254]. The flowers are used in the treatment of diarrhoea[4].

nrakta Europe. Naturalized in Britain[17]. ksacta Woodlands. especially in calcareous soils[7, 13].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Border, Firewood, Pest tolerant, Hedge, Screen, Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Prefers a moist soil[108] and a sunny position[15] but also succeeds in light shade[188]. Plants are fairly wind resistant[K]. Plants grow and crop well in pots. A very hardy plant, tolerating temperatures down to about -25°c[184]. At one time the cornelian cherry was frequently cultivated for its edible fruit, though it has fallen into virtual disuse as a fruit crop in most areas[3]. It is still being cultivated in parts of C. Europe and there are some named varieties[183]. 'Macrocarpa' has larger fruits than the type[182]. 'Nana' is a dwarf form, derived from a yellowfruited clone[182]. 'Variegata' has been seen on a number of occasions with very large crops of fruit, even in years when the type species has not fruited well[K]. 'Jolico' has wellflavoured fruits 3 times larger than the species. There are also a number of cultivars with yellow, white and purplish fruit. Seedlings can take up to 20 years to come into fruit. Plants produced from cuttings come into fruit when much younger, though they do not live as long as the seedlings. A very ornamental plant[1] it flowers quite early in the year and is a valuable early food for bees[13, 108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds. Not North American native. Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients

and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.2.82 Ribes burejense

Bureja gooseberry,

4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes burejense is a deciduous Shrub growing to m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitĒdible Uses: Fruit - raw or cooked[105]. Acid but palatable, it is a gooseberry and can hang on the bush until November if the birds leave it alone[K]. At this time of year it develops a rather nice black-currant flavourfK]. The fruit is about 10mm in diameter[200].

nrakta Northern N. America - Alaska to N. Asia - Manchuria to N. Korea. ksacta Mountain coniferous forests, slopes and stream banks[74].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 2 to 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Quite tolerant of shade though not fruiting so well in such a position[11]. Hardy to about -20°c[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.83 Hemerocallis fulva longituba

4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Hemerocallis fulva longituba is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic[127, 137]. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[105, 116]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. They can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[205]. A pleasant nutty flavour.

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nwatta Experimental Crop Industrial Crop: Dye Industrial Crop: Hydrocarbon Industrial Crop: Tannin Management: CoppiceLandscape Uses:Border, Erosion control, Pest tolerant, Massing, Specimen. Succeeds in a well-drained fertile soil in full sun[11, 200]. Tolerates poor soils[169, 200]. Established plants are drought resistant[169]. A very hardy species, when fully dormant it can tolerate temperatures down to about -25°c[200]. However, the young growth in spring can be damaged by late frosts. A very ornamental plant[1]. It is quite fast-growing but shortlived in the wild[229]. In the north of its range plants are dwarf, around 1.2 metres tall, but in the south they can be up to 7 metres tall[182]. Some botanists divide this species into separate species, whilst others see it as a single species with geographical forms. R. copallina is usually a shrub and is found in moist soils in sun or shade[227]. R. copallina lanceolata. Gray, is more tree-like and is found in drier soils[227]. Transplants easily[169]. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attracts birds, North American native. Attracts butterflies. Attractive flowers or blooms. Carbon Farming - Cultivation; experimental. Management: coppice. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 5.2.80 Sanguisorba minor

Salad Burnet, Small burnet 4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Sanguisorba minor is an evergreen Perennial growing to 0.6 in (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves and shoots - raw or cooked[2, 5, 9, 14, 21]. They are best used before the plant comes into flower[9]. Eaten in salads, used as a garnish or added to soups, cooling drinks and claret cups[183]. Young seedlings are boiled and eaten[183]. A bit fiddly to harvest and the leaves sometimes become bitter in hot dry summers, but they are usually fairly mild tasting in the winter and some people detect a cucumber flavour to them[K]. In the acid soil of our Cornish trial grounds, the leaves have a distinctly bitter flavour, though when the same

plants were grown on a chalky soil they had a much milder flavour[K]. The leaves contain about 5.65% protein, 1.2% fat, 11% carbohydrate, 1.7% ash, 74.5% water[179]. A herb tea is made from the dried leaves[21, 183].

tcanta Soil reclamation Soil stabilizationPlants have extensive root systems and are used for erosion control, they are also used to reclaim landfills and mined-out terrain[160]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astringent Diaphoretic Eczema Skin StypticBoth the root and the leaves are astringent, diaphoretic and styptic, though the root is most active[4]. The plant is an effective wound herb, quickly staunching any bleeding[244]. An infusion is used in the treatment of gout and rheumatism[244]. The leaves can be used fresh, or are harvested in July and dried (the plant should be prevented from flowering)[4]. The root is harvested in the autumn and dried[4]. An infusion of the leaves is used as a soothing treatment for sunburn or skin troubles such as eczema[201].

nrakta Europe, including Britain, from Sweden south and east to France, Armenia and Iran. ksacta Grassland, usually on calcareous soils[9, 17, 37]

propta Seed - sow March/April or September/October in a cold frame. Germinates in 3 weeks. Prick out the seedlings when they are large enough to handle into individual pots. Plant them out in the spring or early summer. The seed can also be sown in situ in spring or autumn if you have sufficient seed. Division in spring.

nwatta Prefers a light dry calcareous soil[1, 37, 200] but succeeds in most good soils[1, 37]. Plants also succeed in poor soils[4]. One report says that it grows well in marshy soil[24] but this is possibly a mistake[K]. Dislikes shade[14]. Occasionally cultivated in the herb garden, this is an evergreen herbaceous plant and it supplies fresh edible leaves all the year round, even in guite severe winters[K]. When grown as a salad, the plant should be prevented from flowering[4]. Grows well in the spring meadow[24]. Makes a good edging plant in the border[200]. Plants often self-sow, sometimes to the point of nuisance[K]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# **5.2.81** Cornus mas

Cornelian Cherry, Cornelian Cherry Dogwood 4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-wisslip hpa7tmwatli xre7t hjonli

drutta Cornus mas is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to March, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Fruit Oil OilEdible Uses: Coffee Oil OilFruit - raw, dried or used in preserves[2, 3, 7, 9, 13, 183]. Juicy, with a nice acid flavour[11]. The fully ripe fruit has a somewhat plum-like flavour and texture and is very nice eating, but the unripe fruit is rather astringent[K]. It is rather low in pectin and so needs to be used with other fruit when

the body. The bulb is anthelmintic, anti-inflammatory, antiseptic, antispasmodic, carminative, diuretic, expectorant, febrifuge, hypoglycaemic, hypotensive, lithontripic, stomachic and tonic[4, 7, 21]. When used regularly in the diet it offsets tendencies towards angina, arteriosclerosis and heart attack[254]. It is also useful in preventing oral infection and tooth decay[254]. Baked onions can be used as a poultice to remove pus from sores[254]. Fresh onion juice is a very useful first aid treatment for bee and wasp stings, bites, grazes or fungal skin complaints[7, 201]. When warmed the juice can be dropped into the ear to treat earache[254]. It also aids the formation of scar tissue on wounds, thus speeding up the healing process, and has been used as a cosmetic to remove freckles[7]. Bulbs of red cultivars are harvested when mature in the summer and used to make a homeopathic remedy[232]. This is used particularly in the treatment of people whose symptoms include running eyes and nose[232] The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Allium cepa Onion for appetite loss, arteriosclerosis, dyspeptic complaints, fevers and colds, cough/bronchitis, hypertension, tendency to infection, inflammation of mouth and pharynx, common cold (see [302] for critics of commission E)

nrakta W. Asia - Iran? The original habitat is obscure. ksacta Not known in the wild.

propta Seed. Early sowings can be made in February in a greenhouse to be planted out in late spring. The main sowing is made in March or April in an outdoor seedbed, this bed must be very well prepared. A sowing can also be made in an outdoor seedbed in August of winter hardy varieties (the Japanese onions are very popular for this). These overwinter and provide an early crop of onion bulbs in June of the following year. Onion sets can be planted in March or April. Sets are produced by sowing seed rather thickly in an outdoor seedbed in May or June. The soil should not be too rich and the seedlings will not grow very large in their first year. The plants will produce a small bulb about 1 - 2cm in diameter, this is harvested in late summer, stored in a cool frost-free place over winter and then planted out in April. A proportion of the bulbs will run quickly to seed but most should grow on to produce good sized bulbs.

nwatta Prefers a sunny sheltered position in a rich light well-drained soil[1, 16]. Prefers a pH of at least 6.5[200]. Plants tolerate a pH in the range of 4.5 to 8.3. Onions are best grown in a Mediterranean climate, the hot dry summers ensuring that the bulbs are ripened fully [200]. For best growth, however, cool weather is desirable at the early stages of growth[200]. Plants are frost-tolerant but prolonged temperatures below 10°c cause the bulb to flower[200]. Optimum growth takes place at temperatures between 20 and 25°c[200]. Bulb formation takes place in response to longday conditions[200]. Plants are perennial but the cultivated forms often die after flowering in their second vear though they can perennate by means of off-sets[1]. The onion was one of the first plants to be cultivated for food and medicine[244]. It is very widely cultivated in most parts of the world for its edible bulb and leaves, there are many named varieties capable of supplying bulbs all the year round[200]. This species was derived in cultivation from A. oschaninii[203]. Most forms are grown mainly for their edible bulbs but a number of varieties, the spring onions and everlasting onions, have been selected for their edible leaves. There are several sub-species:- Allium cepa 'Perutile' is the everlasting onion with a growth habit similar to chives, it is usually evergreen and can supply fresh leaves all winter. Allium cepa aggregatum includes the shallot and the potato onion. These are true perennials, the bulb growing at or just below the surface of the ground and increasing by division. Plants can be divided annually when they die down in the summer to provide bulbs for eating and propagation. Allium cepa proliferum is the tree onion, it produces bulbils instead of flowers in the inflorescence. These bulbils have a nice strong onion flavour and can be used raw, cooked or pickled. Onions grow well with most plants, especially roses, carrots, beet and chamomile, but they inhibit the growth of legumes[18, 20, 54, 201]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.27 Hemerocallis middendorffii

Amur daylily, Middendorf, Daylily 4 tlin 8 cvuc 5 kcak 2 tcan 1 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis middendorffii is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves Shoots Edible Uses: Leaves and young shoots - cooked[105, 116, 177, 183]. They must be consumed when very young or else they become fibrous [K]. Flowers and flower buds - raw or cooked[105, 177, 183]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208]. (This report was for a plant labelled H. middendorfiana, which I have assumed is a mis-spelling of this species[K]). Attractive flowers.

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan, Korea. ksacta Meadows in high mountains of N. Japan[58]. Forests, forest margins, meadows and wet grasslands from near sea level to 2000 metres in China[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Seashore. Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Individual flowers are short-lived, but the plant produces a succession of blooms and also flowers again. in late summer[205]. The plant has a fibrous root system that does not extend far[205]. Plants take a year or two to become established after being moved but then form large clumps[200, 187]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

#### 5.2.28 Crataegus missouriensis

4 tlin 8 cyuc 5 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crataegus missouriensis is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It

is hardy to UK zone 5 and is not frost tender. The seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The size of a large cherry, the flesh is sweet, soft and fairly juicy[K]. The fruit is only about 10mm thick according to another report[235]. The fruit ripens in mid to late September in southern Britain[K], it makes a delicious dessert fruit and can also be used in making pies, preserves etc[K]. The fruit can be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to North Carolina and Missouri. ksacta Rocky bluffs and river banks[235].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species has a good potential as a fruit crop in Britain. It regularly produces heavy crops of high quality, the tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. A plant growing at Hillier Arboretum was about 3 metres tall (with a trunk 2 metres long) and 3 metres wide, it was fruiting well in 1993 and 1994[K]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 5.2.29 Agastache foeniculum

Anise Hyssop, Blue giant hyssop 4 tlin 9 cyuc 5 kcak 3 tcan 1 dwat 0.9 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Agastache foeniculum is a PERENNIAL growing to  $0.9~\mathrm{m}$  (3ft) by  $0.4~\mathrm{m}$  (Ift 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Drink TeaLeaves and flowers - raw or cooked. They are used as a flavouring in raw or cooked dishes[108, 177, 257]. Excellent raw, they have a sweet aniseed flavour and are one of our favourite flavourings in salads[K]. They make a delicious addition to the salad bowl[183] and can also be used to flavour cooked foods, especially acid fruits[K].The only drawback to the leaves is that they tend to have a drying effect in the mouth and so cannot be eaten in quantity[K]. A pleasant tasting tea is made from the leaves[46, 61, 161, 183].

tcanta Attracts wildlife. Invertebrate Shelter, nectary.

dwatta Cardiac Diaphoretic Pectoral PoulticeThe leaves are cardiac and diaphoretic[222, 238, 257]. An infusion of the leaves is used in the treatment of colds, fevers, weak heart etc[222]. When left to go cold, the infusion is used to treat pains in the chest (such as when the lungs are sore from too much coughing)[207]. A poultice of leaves and stems can be used to treat burns[257].

nrakta Western N. America - Ontario to Washington, south to Colorado. ksacta Dry thickets, fields and waste ground[43] on prairies and plains[235].

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed usually germinates in 1 - 3 months at 13°c[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant out in late spring or early summer[K]. Division in spring. Fairly simple, if large divisions are used it is possible to plant them straight out into their permanent positions. Basal cuttings of young shoots in spring[111]. Harvest the young shoots when they are about 10 - 15cm tall and pot them up in a lightly shaded position in a greenhouse. They should root within 3 weeks and can be planted out in the summer or following spring.

nwatta Prefers a sunny position and a dry well-drained soil[187, 200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring is very susceptible to slug damage[K]. The flowering plants are very attractive to bees and butterflies[K]. There is at least one named variety. 'Texas American' has an anise-pennyroyal fragrance and is used in a similar way to the species[183]. The plant is heat tolerant in zones 12 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-21. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

#### 5.2.30 Viola odorata

Sweet Violet, English Violet, Garden Violet, Sweet Violet, Florist's Violet

4 tlin 8 cyuc 5 kcak 3 tcan 3 dwat 0.1 m hkuc

do not flower in northern Europe. They are sensitive to daylength hours, requiring longer periods of light from seedling to maturation of plant, and shorter periods for tuber formation. They do not grow where day-lengths vary little[269] The plant is good weed eradicator, it makes so dense a shade that few other plants can compete [269]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants only produce flowers in Britain after a long hot summer[17] and seed is rarely formed[200]. Grows well with corn[20]. Plants can be invasive[1]. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 5.2.78 Lonicera angustifolia

Narrow-leafed honeysuckle 4 tlin 8 cyuc 4 kcak 2 tcan 0 dwat 2.7 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lonicera angustifolia is a deciduous Shrub growing to 2.7 m (8ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[11, 51, 158, 200, 272]. Sweet and pleasant tasting, the fruit is a bit smaller than a blackcurrant[K]. Plants often produce a second crop in late summer[K].

tcanta WoodWood - hard, very close grained. Used for walking sticks[158, 272].

nrakta E. Asia - Himalayas. ksacta Forests and shrubberies, under oak, fir and deodar, to elevations of 3600 metres[51, 146].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta An easily grown plant, it grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200]. Plants are fairly wind tolerant[K]. Plants flower and fruit better in hotter climates than Britain[182]. Plants have been seen bearing good crops of fruit in eastern Britain, though we have only managed to produce light crops on our Cornish trial grounds[K]. The flowers have a soft 'honeysuckle' perfume[245]. This species is closely related to L. myrtillus[11].

#### 5.2.79 Rhus copallina

Dwarf Sumach, Winged sumac, Flameleaf Sumac, Winged Sumac, Shining Sumac

4 tlin 10 cyuc 4 kcak 3 tcan 2 dwat 2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutia Rhus copallina is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista There are some suggestions that the sap of this species can cause a skin rash in susceptible people, but this has not been substantiated. See also notes in 'Cultivation Details'.

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - raw or cooked[22, 46, 161]. An agreeable acid flavour[2]. The fruit is only 3 - 5mm long with very little flesh, but it is borne on dense panicles and is thus easily harvested[229]. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[95, 105, 149, 159, 183]. The mixture should not be boiled since this will release tannic acids and make the drink astringent.

tcanta Dye Hedge Hedge Mordant Oil Resin Soil stabilization Tannin Varnish WoodThe leaves are rich in tannin[46, 82, 169], so is the bark[149] and the fruit[169]. The leaves can be collected as they fall in the autumn and used as a brown dye or as a mordant[169, 171]. The leaves contain 10 - 25% tannin[171]. Up to 35.8% has been obtained from some plants[223]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The plants extensive root system makes it useful for stabilizing soils. A black dve is obtained from the fruit[149, 257]. A resin, 'copal resin', is obtained from the sap of this plant. When dissolved in any volatile liquid, such as oil of turpentine, it makes a beautiful varnish[4]. (Is this a mistaken entry? Perhaps it belongs with one of the toxic species[K]). Wood - light, soft, coarse grained[82]. It weighs 32lb per cubic foot[227]. Sometimes used for small posts[149].

dwatta Astringent Dysentery Enuresis Galactogogue Poultice SalveA decoction of the root has been used in the treatment of dysentery[222]. An infusion of the roots has been used in the treatment of VD[257]. A poultice of the root has been applied to sores and skin eruptions[257]. A team dee from the bark has been drunk to stimulate milk flow in nursing mothers. A decoction of the bark has been used as a wash for blisters and sunburn blisters[222, 257]. An infusion of the leaves has been used to cleanse and purify skin eruptions[257]. The berries were chewed in the treatment of bed-wetting and mouth sores[222, 257]. Some caution is advised in the use of the leaves and stems of this plant, see the notes above on toxicity.

nrakta Eastern N. America - Maine to Florida, west to Texas and Illinois. ksacta Generally found in dry soils on hillsides, along the margins of woodlands and roads, and in abandoned fields[229].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. This soak water can be drunk and has a delicious lemon-flavour. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

varies from plant to plant, the best forms are sweet and make very pleasant eating(K). The fruit ripens from late July and can hang on the bush until early autumn(K). The fruit can also be dried for winter use[183]. The fruit is about 10mm in diameter, though it is larger in some selected cultivars[200]. Flowers - raw. A sweet taste[85]. The leaves can be used to make a tea or as a flavouring in foods[183].

dwatta Antidotea poultice of the plant has been applied to snakebites[257].

nrakta Central N. America - Saskatchewan and Minnesota, west to the Rockies and south to Texas. ksacta Rocky bluffs and slopes, also along the sides of streams[235].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200]. Division of suckers in the dormant season. They can be planted out direct into their permanent positions.

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11, 200]. Prefers full sun but it is quite tolerant of shade though it does not fruit so well in such a position[11]. Hardy to about -25°c[184]. A very ornamental plant[1]. The flowers are deliciously clove-scented[245]. This species is closely allied to R. aureum[11, 200]. Occasionally cultivated for its edible fruit, there are some named varieties[183]. The period of fruit ripening is unusually long[183]. The cultivar 'Crandall' has large edible fruits with a tart-sweet flavour that are high in pectin[200]. This species succeeds in regions having hot summers[183]. The fruits can be red, black, vellow. golden or reddish-brown[164]. Plants often produce suckers, especially when growing in damp soils. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 5.2.77 Helianthus tuberosus

Jerusalem Artichoke

4 tlin 8 cyuc 4 kcak 3 tcan 1 dwat 2.4 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Helianthus tuberosus is a PERENNIAL growing to 2.4 m (7ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in October, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: RootEdible Uses: Coffee SweetenerTubers - raw or cooked[2, 46, 61, 95]. The tuber develops a pleasant sweetness during the winter, especially if subjected to frosts, and is then reasonably acceptable raw[K]. Otherwise it is generally best cooked, and can be used in all the ways that potatoes are used[K]. The tubers are rich in inulin[46], a starch which the body cannot digest, so Jerusalem artichokes provide a bulk of food without many calories[K]. Some people are not very tolerant of inulin, it tends to ferment in their guts and can cause guite severe wind[K]. The tubers are fairly large, up to 10cm long and 6cm in diameter[200]. The tubers bruise easily and lose moisture rapidly so are best left in the ground and harvested as required[200]. The inulin from the roots can be converted into fructose, a sweet substance that is safe for diabetics to use[46, 171]. The roasted tubers are a coffee substitute[183].

tcanta BiomassThe plants are a good source of biomass. The tubers are used in industry to make alcohol etc[141]. The alcohol fermented from the tubers is said to be of better quality than that from sugar beets[269]. A fast-growing plant, Jerusalem artichokes can be grown as a temporary summer screen[200]. Very temporary, it is July before they reach a reasonable height and by October they are dying down[K].

dwatta Aperient Cholagogue Diuretic Stomachic TonicReported to be aperient, aphrodisiac, cholagogue, diuretic, spermatogenetic, stomachic, and tonic, Jerusalem artichoke is a folk remedy for diabetes and rheumatisml 2691.

nrakta Eastern N. America - Nova Scotia to Minnesota and Kansas. Occasionally naturalized in Britain. ksacta Rich and damp thickets[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Harvest the tubers in late autumn or the winter and either replant the tubers immediately or store them in a cool but frost-free place and plant them out in early spring. Jerusalem artichoke is propagated by tubers, which should be planted as early as possible in the spring when the soil can be satisfactorily worked[269]. Late planting usually reduces tuber yields and size seriously. Whole tubers or pieces about 50 g (2 oz.) should be planted like potatoes and covered to a depth of 10 cm. Pieces larger than 50 g do not increase the yield, though those smaller will decrease it. Deeper planting may delay emergence, weaken the sprouts, and cause the tubers to develop deeper, making harvest more difficult[269]. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Management: Standard Staple Crop: ProteinoilA very easily grown plant, it grows best in a loose circumneutral loam but succeeds in most soils and conditions in a sunny position[1, 16, 37, 38, 269]. Plants are more productive when grown in a rich soil[1, 37, 38]. Heavy soils produce the highest yields, but the tubers are easily damaged at harvest-time so lighter well-drained sandy loams are more suitable[200]. Dislikes shade[1]. Likes some lime in the soil[16]. Jerusalem artichoke is reported to tolerate an annual precipitation of 31 to 282cm, an average annual temperature of 6.3 to 26.6°C and a pH in the range of 4.5 to 8.2[269]. Jerusalem artichokes were cultivated as a food plant by the N. American Indians and they are today often grown in temperate areas for their edible tubers. There are some named varieties[4, 46, 183, 200]. The plant is a suitable crop in any soil and climate where corn (Zea mays) will grow. It survives in poor soil and in areas as cold as Alaska. It also tolerates hot to sub-zero temperatures [269]. The first frost kills the stems and leaves, but the tubers can withstand freezing for months[269]. The plants are particularly suited to dry regions and poor soils where they will out-yield potatoes[200]. Tuber production occurs in response to decreasing day-length in late summer[200]. Yields range from 1 - 2kg per square metre[200]. The tubers are very cold-tolerant and can be safely left in the ground in the winter to be harvested as required. They can be attacked by slugs, however, and in sites prone to slug damage it is probably best to harvest the tubers in late autumn and store them over the winter. It is almost impossible to find all the tubers at harvest time, any left in the soil will grow away vigorously in the spring. Plants

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vióla odoraťa is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from February to April, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista May cause vomiting. Possible additive effect with laxatives [301].

kcakta Edible Parts: Flowers LeavesEdible Uses: Condiment TeaYoung leaves and flower buds - raw or cooked[21, 85, 183]. Usually available all through the winter[K]. The leaves have a very mild flavour, though they soon become quite tough as they grow older. They make a very good salad. their mild flavour enabling them to be used in bulk whilst other stronger-tasting leaves can then be added to give more flavour[K]. When added to soup they thicken it in much the same way as okra[62, 85, 159]. Also used as a flavouring in puddings etc. A tea can be made from the leaves[85]. Flowers - raw. Used to decorate salads and desserts[5, 9, 85]. A sweet mild flavour with a delicate perfume, the flowers are an especially welcome decoration for the salad bowl since they are available in late winter[K]. The flowers are also used fresh to flavour and colour confectionery[238]. A soothing tea can be made from the leaves and flowers[85, 183]. A leaf extract is used to flavour sweets, baked goods and ice cream[183].

tcanta Essential LitmusAn essential oil from the flowers and leaves is used in perfumery[57, 100]. 1000kg of leaves produces about 300 - 400g absolute[46]. The flowers are used to flavour breath fresheners[238]. A pigment extracted from the flowers is used as a litmus to test for acids and alkalines[4, 13, 100, 115]. Plants can be grown as a ground cover when spaced about 30cm apart each way[208]. They make an effective weed-excluding cover[K]. ornamental. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiinflammatory Antirheumatic Cancer Demulcent Diaphoretic Diuretic Emetic Emollient Expectorant Homeopathy Laxative Purgative UrinarySweet violet has a long and proven history of folk use, especially in the treatment of cancer and whooping cough[4, 165, 218]. It also contains salicylic acid, which is used to make aspirin[244]. It is therefore effective in the treatment of headaches, migraine and insomnia[244]. The whole plant is anti-inflammatory, diaphoretic, diuretic, emollient, expectorant, and laxative[4, 7, 21, 46, 165]. It is taken internally in the treatment of bronchitis respiratory catarrh coughs asthma and cancer of the breast, lungs or digestive tract[238]. Externally, it is used to treat mouth and throat infections[238]. The plant can either be used fresh, or harvested when it comes into flower and then be dried for later use[4]. The flowers are demulcent and emollient[240]. They are used in the treatment of biliousness and lung troubles[240]. The petals are made into a syrup and used in the treatment of infantile disorders[240]. The roots is a much stronger expectorant than other parts of the plant but they also contain the alkaloid violine which at higher doses is strongly emetic and purgative[4, 244, 254]. They are gathered in the autumn and dried for later use[7]. The seeds are diuretic and purgative. They have been used in the treatment of urinary complaints are considered to be a good remedy for gravel[4]. A homeopathic remedy is made from the whole fresh plant[4]. It is considered useful in the treatment of spasmodic coughs and rheumatism of the wrist[4]. An essential oil from the flowers is used in aromatherapy in the treatment of bronchial complaints, exhaustion and skin com-

nrakta Europe, including Britain, from Norway south and east to N. Africa, W. Asia and Syria. ksacta Fields, hedgerows and woodlands, especially on calcareous soils[7, 17, 31].

propta Seed - best sown in the autumn in a cold frame. The seed requires a period of cold stratification and the germination of stored seed can be erratic. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Massing, Rock garden, Woodland garden. Succeeds in most soils but prefers a cool moist welldrained humus-rich soil in partial or dappled shade and protection from scorching winds[1, 14, 31, 200]. When grown in the open it prefers a moderately heavy rich soil[1]. Plants have done very well in a hot dry sunny position on our Cornish trial grounds[K]. Tolerates sandstone and limestone soils. Plants are hardy to about -20°c[187]. Sweet violets are very ornamental plants, there are many named varieties[187]. They produce their delicately scented flowers in late winter and early spring - these are designed for fertilisation by bees and since there are few bees around at this time of year these flowers seldom set seed[4]. However, the plants also produce a second type of flower later in the year. These never open, but seed is produced within them by self-fertilization[4]. The plants will often self-sow freely when well-sited[188]. They can also spread fairly rapidly at the roots when they are growing well[K]. Responds well to an annual replanting in rich loose leafy soils[187]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159]. Special Features: Edible, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Extended bloom season in Zones 9A and above. Fragrant flowers. For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 5.2.31 Hemerocallis middendorffii esculenta

4tlin 8 cyuc 5 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis middendorffii esculenta is a PERENNIAL growing to 0.5 m (1Rt 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[105, 116, 177, 183]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 127, 177, 183]. The flowers are crisp and succulent with a delicious sweet flavour and no aftertaste[K]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208]. (This report was for a plant labelled H. middendorfiana, which I have assumed is a mis-spelling of this species[K])

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan ksacta Meadows in high mountains, N. and C. Japan[58, 205]. Forests, forest margins, grassy slopes, stony places and roadsides at elevations of 500 - 2500 metres in China[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Individual flowers only live for one day[205]. Plants take a year or two to become established after being moved but then form large clumps[200, 187]. The roots are fibrous without any obvious swellings[205]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 5.2.32 Allium canadense mobilense

Canadian Garlic

4 tlin 8 cyuc 5 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Allium canadense mobilense is a BULB growing to  $0.5 \mathrm{\,m}$  (1ft 8in) by  $0.2 \mathrm{\,m}$  (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[46, 61, 62, 177]. It can be used as a vegetable, or as a flavouring in soups and stews, and can also be pickled[2]. The bulb is up to 30mm in diameter, it is crisp, mild and with a pleasant flavour[183]. Used as a leek substitute according to one report[22], it is a garlic substitute according to others[55, 159, K]. Leaves - raw or cooked[55, 62, 177]. A delicious mild flavour, they are available from early spring until the autumn[K]. They make a very acceptable salad and can also be used as a greens or as a flavouring in cooked foods[K]. Flowers - raw. A little bit stronger flavour than the leaves, especially as the seeds begin to form, they can be used as a flavouring and garnish on salads[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Antiasthmatic Carminative Cathartic Diuretic Expectorant StimulantThe plant is antiasthmatic, carminative, cathartic, diuretic, expectorant and stimulant[257]. A tincture is used to prevent worms and colic in children, and also as a remedy for croup[257]. Although no other specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Southeaster N. America - Texas to North Carolina. ksacta Low woods, thickets and meadows[43]. Woods and prairies in sandy or rocky soils, rarely on limestone or clav[274].

propta Seed - sow spring in a cold frame. Prick out the sedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta Prefers a sunny position in a light well-drained soil[1]. A moisture loving plant according to another report[42]. The bulbs should be planted fairly deeply[1]. Bulbs grow to a good size under cultivation[183]. Some forms of this species produce many bulbils and are considered to be a pernicious weed in some areas of America[159], there is some risk that they could spread aggressively in Britain. This subspecies, however, is a form that does not produce bulbils and is much better behaved[200]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.33 Allium schoenoprasum sibir-

Giant Chives

288

4 tlin 8 cyuc 5 kcak 2 tcan 2 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium schoenoprasum sibiricum is a BULB growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw, cooked or dried for later use. The leaves have a mild onion flavour and are an excellent addition to mixed salads, they can also be used as a flavouring in soups etc[90, 105]. This form has a stronger garlic flavour than common chives[183] The leaves are often available from late winter and can continue to produce leaves until early the following winter, especially if the plant is in a warm, sheltered position[K]. A good source of sulphur and iron[201]. The bulbs are rather small but can be used as spring onions[K]. They can be harvested with the leaves still attached and be used as spring onions[K]. They have a pleasant mild onion flavour. The flowers can be used as a garnish in salads etc[183]. The flowers of this species are rather dry and less desirable than the flowers of many other species[K].

tcanta Fungicide RepellentThe juice of the plant is used as nissect repellent, it also has fungicidal properties and is effective against scah, mildew etc[14, 18, 20]. The growing plant is said to repel insects and moles[14, 20].

dwatta Appetizer Digestive Hypotensive TonicThe whole plant has a beneficial effect on the digestive system and the blood circulation. It improves the appetite, is digestive, hypotensive and tonic[201]. It has similar properties to garlic (A. sativum), but in a much milder form, and it is rarely used medicinally[238].

nrakta N. America to E. Asia - Siberia, Japan. ksacta Calcareous or basic rock, gravels and shores, Alaska and southwards[43].

#### 5.2.74 Smilax herbacea

Carrion Flower, Smooth carrionflower 4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta Smilax herbacea is a PERENNIAL CLIMBER growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Fruit Leaves RootEdible Uses: GelatineLeaves and young shoots - raw or cooked and used like asparagus[85, 102, 159]. A delicate and palatable vegetable[183]. Fruit - raw or cooked and used in jellies etc[85, 183]. It should only be used when fully ripe[183]. A pleasant flavour[207, 257]. The fruit is about 10mm in diameter[200]. Root - cooked[257]. It can be dried, ground into a powder and then used with cereals for making bread etc[62, 102]. It can also be used as a gelatine substitute[62, 102].

dwatta Analgesic Antiaphonic Kidney Pectoral Poultice SalveEating the fruit is said to be effective in treating hoarseness[207, 257]. The parched and powdered leaves have been used as a dressing on burns[257]. The wilted leaves have been used as a dressing on boils[257]. The root is analgesic[257]. A decoction has been used in the treatment of back pains, stomach complaints, lung disorders and kidney problems[257].

nrakta Eastern N. America - southwards from Quebec. ksacta Open woodlands, meadows and rich alluvial thickets[43]. Higher elevations in rich woods, alluvial thickets, and meadows, often in calcareous soils at elevations of 100-800 metres[270].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most soils in sun or semi-shade[200]. Hardy to about -20°c[200]. A polymorphic species, varying in both leaf shape and growth habit[43, 270]. The flowers are malodorous[200], they smell like dead rats[207]. A vigorous plant, it can be grown through trees or shrubs or over tree stumps[200]. The sub-species S. herbacea nipponicum is used in Japan[61]. This report probably refers to the species S. nipponica[K]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous.

# 5.2.75 Ribes divaricatum

Coastal Black Gooseberry, Spreading gooseberry, Parish's gooseberry, Straggly gooseberry

4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat 2.7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ribes divaricatum is a deciduous Shrub growing to 2.7 m (8ft 10in). See above for USDA hardiness. It is

hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked[2, 3, 61, 118, 257]. Sweet and juicy[183]. A very acceptable flavour, though a bit on the acid side[K]. It is considered to be one of the finest wild N. American goose-berries[183]. The fruit is sometimes harvested before it is fully ripe and then cooked[256]. The fruit is about 10mm in diameter[200]. On the wild species the fruit can hang on the plant until the autumn (if the birds leave it alone][K]. Young leaves and unripe fruits are used to make a sauce[183].

tcanta Miscellany Needles StringThe roots have been boiled with cedar (Juniperus spp, Thuja sp.) and wild rose (Rosa spp) roots, then pounded and woven into rope[257]. The sharp thorns have been used as probes for boils, for removing splinters and for tattooing[257].

dwatta Miscellany TB VDThe inner bark has been chewed, and the juice swallowed, as a treatment for colds and sore throats[257]. A decoction of the bark or the root has been used as an eye wash for sore eyes[257]. An infusion of the roots has been used in the treatment of sore throats, venereal disease and tuberculosis[257]. The burnt stems have been rubbed on neck sores[257].

nrakta Western N. America. ksacta Open woods, prairies and moist hillsides[60].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 2001.

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11, 200]. Reguires a very sunny position if it is to do well[11]. Plants are hardy to about -20°c[200]. This species is closely allied to R. rotundifolium[11]. Immune to mildew[101], this species is a parent of many mildew resistant hybrids and is being used in breeding programmes in Europe[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Sometimes cultivated for its edible fruit, there is at least one named variety[183]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

#### 5.2.76 Ribes odoratum

Buffalo Currant

313

4 tlin 8 cyuc 4 kcak 0 tcan 1 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes odoratum is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers FruitEdible Uses: Condiment TeaFruit - raw or cooked[2, 62, 85, 257]. The quality

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis buxifolia is an evergreen Shrub growing to 2.5 m (8ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or used in conserves[3, 11, 69, 139, 177]. Freely borne in Britain. Large and black with a pleasant flavour, they are eaten out of hand[183]. Said to be the best flavoured of the South American barberries, the fruit is hardly acid and but slightly astringent[2]. The green unripe fruits can be used like gooseberries in pies etc[2, 183]. The fruits are about 8mm lond[200].

tcanta Dye Hedge HedgeA yellow dye is obtained from the root[139]. The dwarf form, var. 'Nana' makes a good dwarf hedge to 1 metre tall[182]

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta S. America - Š. Chile and S. Argentina. Occasionally naturalized in Britain[17]. ksacta Coastal scrub, forest margins, clearings and moister areas in grass[69].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible [80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame, Roots in 4 - 8 weeks[113], Pot up in spring[113]. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils and in full sun[11, 200]. Grows well in heavy clay soils. Plants are hardy to about -15°c[184], but they can be deciduous in cold winters[188]. The dwarf B. buxifolia nana is the form of this species that is most commonly found growing in Britain. It is very free flowering but to date (1994) we have not seen this form bearing fruit[K]. The species is supposed to be self-fertile so it is possible that this form is sterile. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

#### 5.2.73 Amaranthus caudatus

Love Lies Bleeding

4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat 2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwissliphsom hpa7tmwatli fyif hjonli

drutta Amaranthus caudatus is a ANNUAL growing to 2 m (6ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic mildly alkaline) soils and can grow in very acid, very alkaline

and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista No members of this genus are known to be poisonous, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: ColouringLeaves - raw or cooked as a spinach or added to soups etc[22, 46, 61, 105, 183]. The mild flavoured leaves are rich in vitamins and minerals[183, K]. Seed - cooked[22, 46, 57, 105]. Very small but easy to harvest and very nutritious, individual plants can bear up to 100, 000 seeds[196]. It is eaten cooked or ground into a powder and used in baking[61, 183, 196]. The seed can also be popped in much the same way as popcorn[97, 183]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. The seed is very nutritious and contains 13-18% of a very high quality protein that is rich in the amino acid lysine[196]. It also contains good quantities of calcium, phosphorus, iron, potassium, zinc, vitamin E and the vitamin B complex[196]. A red food colouring called 'betalaina' is obtained from red cultivars[196].

tcanta DyeYellow and green dyes can be obtained from the whole plant [168].

dwatta Anthelmintic AstringentThe plant is astringent, anthelmintic and diuretic[4, 240]. It is used in the treatment of stranguary and is applied externally to scrofulous sores[240].

nrakta Tropics. ksacta A weed of cultivated ground[145].

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

nwatta Prefers a well-drained fertile soil in a sunny position[196, 200]. Grows moderately well in poor soils[200]. Requires a hot sheltered position if it is to do well[K]. Plants are drought resistant though reasonable moisture levels are required for germination and also at pollination[196]. Some forms can tolerate a pH up to 8.5, there are also some that can tolerate mild salinity[196]. It is likely that they will also tolerate acid soils and aluminium toxicity[196]. Plants are not frost-hardy the most cold tolerant cultivars can tolerate temperatures down to about 4°c[196]. Plants should not be given inorganic fertilizers, see notes above on toxicity. This species is cultivated for its edible seed and leaves in the Andes and various other parts of S. America[46, 61, 97]. It probably arose through cultivation from A. guitensis. There are some named varieties[196]. Plants take 4 - 6 months from sowing to harvesting the seed, but up to 10 months in some Andean highland regions[196]. Yields from 1 - 3 tonnes per hectare are common, 5 tonnes has been achieved and research sites have produced the equivalent of 6 tonnes per hectare[196]. The seed is usually harvested just before maturity otherwise some of the seed will be lost during harvesting[196]. Plants usually have downward facing seedheads but varieties have been developed with upward facing heads that can be harvested mechanically[196]. This species is sensitive to day-length most cultivars are short-day and have not done well in northern latitudes, but there are some varieties that flower at day-lengths up to 16 hours[196]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

propta Seed - sow spring in a cold frame. Germination is usually free and easy, pot up the seedlings as soon as they are large enough to handle easily and plant out in the following spring. Division can be carried out at almost any time of the year but is probably best done in spring. The clumps should be divided at least every 3 or 4 years in order to maintain vigour[200], the divisions can be planted out direct into their permanent positions.

nwatta An easily grown plant[203], it prefers a sunny position in a rich moist but well-drained soil[14, 37]. Succeeds in most soils[1, 37] and in light shade[203]. Grows well in heavy clay soils[203]. Tolerates a pH in the range 5.2 to 8.3. This is a more robust form of A. schoenoprasum, the chive. It is often grown in the garden for its edible leaves which are available from late winter to the beginning of the next winter[K]. The bulbs divide rapidly and large clumps are guickly formed. There are some named varieties[183]. Regular cutting of the leaves ensures a continuous supply of young leaves and prevents flowering[33]. Plants can be moved into a frame or other protected environment in the autumn and will then produce leaves throughout the winter[33]. Do not do this every year or it weakens the plants. The bulbs should be planted fairly deeply[1]. A good bee plant[24]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. Helps to reduce the incidence of scab when it is grown under apple trees[201]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.34 Allium cepa ascalonicum

01-11-4

4 tlin 8 cyuc 5 kcak 0 tcan 3 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Allium cepa ascalonicum is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist

pcista There have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of this plant. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. A mild onion flavour, the bulbs can be up to 6cm in diameter. They can be added to salads etc, cooked as a vegetable or used as a flavouring in soups etc[1, 2, 16, 37]. Leaves - raw or cooked. A pleasant onion flavour, though they should not be harvested in quantity since this would reduce production of the bulbs[K]. Flowers - raw. Used as a garnish on salads. The flowers are somewhat dry and are less pleasant than many other species[K].

tcanta Cosmetic Dye Hair Polish Repellent RustThe juice of the plant is used as a moth repellent and can also be rubbed onto the skin to repel insects[7]. The plant juice can be used as a rust preventative on metals and as a polish for copper and glass[7]. A yellow-brown dye is obtained from the skins of the bulbs[141, 168]. Onion juice rubbed into the skin is said to promote the growth of hair and to be a remedy for baldness[7]. It is also used as a cosmetic to get rid of freckles[7]. The growing plant is said to repel insects and moles[201]. A spray made by pouring enough boiling water to cover 1kg of chopped unpeeled onions is said to increase the resistance of other plants to diseases and parasites[201].

dwatta Alterative Anthelmintic Antiinflammatory Antiseptic Antispasmodic Astringent Carminative Diuretic Expectorant Febrifuge Hypoglycaemic Hypotensive Lithontripic Nutritive Skin Stings Stomachic Tonic VulneraryAlthough rarely used specifically as a medicinal herb, the onion has a wide range of beneficial actions on the body and when eaten (especially raw) on a regular basis will promote the general health of the body. The bulb is anthelmintic, anti-inflammatory, antiseptic, antispasmodic, carminative, diuretic, expectorant, febrifuge, hypoglycaemic, hypotensive, lithontripic, stomachic and tonic[4, 7, 21]. When used

regularly in the diet it offsets tendencies towards angina, arteriosclerosis and heart attack[254]. It is also useful in preventing oral infection and tooth decay[254]. Baked onions can be used as a poultice to remove pus from sores[254]. Fresh onion juice is a very useful first aid treatment for bee and wasp stings, bites, grazes or fungal skin complaints[7, 201]. When warmed the juice can be dropped into the ear to treat earache[254]. It also aids the formation of scar tissue on wounds, thus speeding up the healing process, and has been used as a cosmetic to remove freckles[7].

nrakta Original habitat is obscure. ksacta Not known in the wild.

propta Plant out bulbs in late winter or very early spring. Plant firmly to half the bulbs depth and protect from birds until the bulbs have rooted[200]. (Birds seem to have a fascination for pulling the bulbs out of the ground and then leaving them lying on the surface[K].) Traditionally, bulbs were planted on the shortest day and harvested on the longest. Smaller bulbs are less likely to bolt as a result of exposure to cold conditions[200].

nwatta Prefers a sunny position in a light well-drained soil but tolerates most soils.[1, 200]. Does not grow well on heavy clays[200]. Prefers a pH in the range 6 to 7[200]. Tolerates a pH in the range 4.5 to 8.3. We are using the name A. cepa ascalonicum for this plant in order to differentiate it from the potato onion, A. cepa aggregatum, though it should really be included in A. cepa aggregatum[K]. This is a genuinely perennial form of A. cepa that is widely grown in temperate and tropical areas for its edible bulbs [200]. These are milder but smaller than the onion. There are several named forms[200]. The plant is easier to grow than onions, matures faster and keeps better[200], though yields are lower. Plants are very tolerant of high temperatures up to 30°c and bulbing only occurs at temperatures above 20°c[200]. Plants rarely produce viable seed in temperate areas, they are usually propagated by means of their bulbs, each one dividing up in the growing season to produce from 2 to more than 12 new bulbs[200]. Bulbs can become infected with virus, it is important to only plant clean stock[200]. Closely related to A. oschanini. O.Fedsch., a wild species found in C. Asia. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes [18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.35 Fragaria x ananassa

Strawberr

4 tlin 8 cyuc 5 kcak 3 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Fragaria x ananassa is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw. Fruits of the best cultivars are sweet and succulent with an exquisite flavour[K]. Strawberries are a very popular fruit and are widely available in the summer. The fruit of some cultivars is up to 3cm in diameter[200]. Young leaves - raw.

tcanta A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch

nrakta A hybrid of garden origin, probably F. virginiana x F. chiloensis. ksacta Not known in the wild.

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the sumer. This is a hybrid species and seed will not breed true, though this is the only way to develop new varieties. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years

crop[200]. They can also be moved in the following spring if required though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[200]. Tolerates semi-shade though fruit production will be reduced when plants grow in such a position. Strawberries appreciate a mulch of pine or spruce leaves[18]. The strawberry is widely cultivated in temperate areas for its edible fruit, there are many named varieties[183] that can supply fruit from late spring (under cloches) to late autumn. Most strawberry varieties are daylength sensitive and only flower at certain times of the year. However, a number of cultivars have been selected that are not sensitive to day-length and can produce fruit for most of the summer. These cultivars are normally referred to as 'remontants'. The blossom can be damaged by late spring frosts[1]. Oat straw should not be used as a mulch since this can infect the strawberries with stem and bulb eelworm. Strawberry plants are very subject to virus diseases, these are usually spread by an aphid. Plants tend to degenerate after a few years and need to be replaced. Seed is a safe means of propagation though, since this species is of hybrid origin, the seed will not breed true. Strawberries are a good companion plant, growing well with bush beans, spinach, borage, lettuce and pyrethrum[20]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

#### 5.2.36 Allium tuberosum

Garlic Chives, Chinese chives, Oriental Chives, 4 tlin 8 cyuc 5 kcak 3 tcan 2 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Allium tuberosum is a BULB growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves Oil RootEdible Uses: OilLeaves - raw or cooked[1, 15, 46, 52, 88]. A mild flavour, somewhat like a cross between garlic and chives[K], they are delicious in salads[183]. The flavour is destroyed by lengthy cooking[238]. The leaves are available from early spring until late in the autumn[K]. They contain about 2.6% protein, 0.6% fat, 2.4% carbohydrate, 0.95% ash. They also contain small amounts of vitamins A, B1 and C[179]. The rather small bulbs are about 10mm in diameter and are produced in clusters on a short rhizome[200]. Flowers and flower buds - raw or cooked[52, 88, 183]. A delicious flavouring and pretty garnish for the autumn salad bowl[K]. Rootraw or cooked. An edible oil is obtained from the seed[183].

tcanta Oil RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Antibacterial Cardiac Digestive Stomachic Tonic UrinaryThe whole plant is antibacterial, cardiac, depurative, digestive, stimulant, stomachic and tonic[61, 174, 218]. It is an anti-emetic herb that improves kidney function[238]. It is used internally to treat urinary incontinence, kidney and bladder weaknesses etc[238]. The seed is carminative and stomachic[218]. They are used in India in the treatment of spermatorrhoea[240]. The leaves and the bulbs are applied to bites, cuts and wounds[218].

nrakta E. Asia? Original habitat is obscure. ksacta Not known in a truly wild situation.

propta Seed - sow spring in a cold frame. The seed has a fairly short viability and should not be used when more than 1 year old[206]. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Plant out in late summer if the plants have developed sufficiently, otherwise plant them out the following spring. Division in early spring. Very easy, the plants divide successfully at almost any time of the year. The divisions can be planted straight out into their permanent positions if required.

nwatta Landscape Uses:Border, Container, Ground cover. Rock garden. An easily grown plant[203], it prefers a sunny position in a rich moist but well-drained soil[1, 88]. Tolerates most soils[52, 88], including clay[203, 206]. Tolerant of dry soils, established plants also resist drought[190]. Tolerates some shade, even in N.W. England[203]. The roots penetrate up to 50cm into the soil[206]. Tolerates a pH in the range 5.2 to 8.3. This plant succeeds in temperate and tropical climates[90]. It appears to be fully hardy in Britain[90]. Plants tolerate 40 degrees of frost in Manchuria (the report does not say if this is fahrenheit or centigrade)[206]. Plants remain green until temperatures fall below 4 - 5°c, they come into new growth in spring when temperatures go above 2 -3°c[206]. Often cultivated for its edible leaves and bulb in the Orient, there are many named varieties[90, 183]. There are two main types of cultivar, one is grown for its leaves and the other for its flowering stem[200, 206]. This species is being increasingly grown as a garden vegetable in Britain[K]. A very ornamental plant, it grows well as an edging plant in the flower garden[K]. Closely related to A. ramosum[203]. The bulbs should be planted fairly deeply[1]. Grows well with most plants, especially roses, carrots, beet and chamomile. but it inhibits the growth of legumes [18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Edible, Fragrant foliage, Not North American native, Invasive, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

#### 5.2.37 Allium ursinum

Wild Garlic

290

4 tlin 8 cyuc 5 kcak 0 tcan 3 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium ursinum is a BULB growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from February to June, in flower from May to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of this species. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw or cooked[2, 5, 9, 12, 24]. Usually available from late January[K]. One report says that they have an overpowering garlic odour that dissipates on cooking[183], though our experience is that they are considerably milder than garlic[K]. The leaves make a very nice addition to salads, drutta Sambucus caerulea is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The leaves, green fruits and stems of some (if not all) members of this genus are poisonous[9, 76, 226]. The fruit of this species has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: TeaFruit - raw, cooked or used in preserves[2, 3, 15, 85, 94, 183, 257]. Rather sweet and juicy but full of small seeds[82, 256], this is the best flavoured of the North American elders[212]. The fruit is rather nice raw, seven people ate and enjoyed a small quantity of the raw fruit with no ill effects[K]. The fruit can be dried for later use[257]. A somewhat rank taste fresh[101], the fruit is usually dried before being used[183]. The fruit is about 6mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked in fritters etc[15, 85, 94, 183]. Very pleasant and refreshing raw[K]. A pleasant tea is made from the dried flowers[62, 183].

tcanta Musical Repellent Tinder WoodA decoction of the leaves, when watered on plants, repels caterpillars[94]. The dried flower stems repel insects and rodents[101]. The hollow stems can be used as flutes and pipes[257]. The pith of the stems has been used as a tinder for lighting fires[257]. Wood - light, soft, weak, coarse grained. Of no commercial value, though it is used locally for flutes, skewers, pegs, straws etc[82, 94, 99, 229].

dwatta Analgesic Antiseptic Astringent Diaphoretic Emetic Febrifuge Haemostatic Laxative Pectoral Salve Stomachic TonicHaemostatic[94]. An infusion or extract made from the flowers, bark and root has been used to cure fevers and gripe, it is also laxative[226]. A decoction of the plant has been used as an antiseptic wash to treat itches[257]. The bark is analgesic and astringent[257]. An infusion has been used in the treatment of diarrhoea and rheumatism[257]. A decoction has been used as a wash in the treatment of swellings and pain[257]. An ointment made by mixing the bark with fat has been used externally in the treat ment of burns, ulcers, skin irritations etc[226]. The fresh bark has been placed in a tooth cavity to ease the pain of toothache[257]. The inner bark is strongly emetic[257]. The leaves are analgesic, antiseptic, diaphoretic, febrifuge and purgative[257]. A decoction has been used in the treatment of new colds[257]. An infusion of the leaves and flowers has been used as a steam bath in the treatment of colds and headaches[257]. A decoction of the leaves has been used as an antiseptic wash on limbs affected by blood poisoning [257]. The crushed leaves have been used as a poultice to treat burns and swollen hands[257]. A decoction of the root has been used in the treatment of bladder problems and dyspepsia[257]. A decoction of the flowers has been used in the treatment of stomach troubles and lung complaints [257]. Applied externally, it has been used to treat sprains and bruises and as an antiseptic wash for open sores and itches[257]. A wine made from the fruit has been used as a tonic[257].

nrakta Western N. America - British Columbia to California, east to Montana, Texas and Mexico. ksacta Gravelly, rather dry soils on stream banks, margins of fields, woodlands etc[62, 82].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year.

Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed/781.

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. A fast-growing but short-lived tree in the wild[229]. A shrub at Kew in September 1993 was carrying a good crop of tasty fruits[K]. Plants in this genus are notably resistant to honey fungus[200].

#### **5.2.71** Chaenomeles cathavensis

Chinese Quince

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chaenomeles cathayensis is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit-very harsh raw but fragrant when cooked[1, 3, 4, 11, 177]. It makes an excellent jelly[183] and a very good jam, it is especially good cooked with apples in apple pies[K]. The fruit is very large and can be 15 cm long and 9 cm wide[200].

dwatta Antiemetic Antirheumatic Antispasmodic DigestiveThe fruit is antiemetic, antirheumatic, antispasmodic and digestive[176]. It is used in the treatment of rheumatic pain, convulsions of the calf muscles, vomiting, dyspepsia and diarrhoea[176].

nrakta E. Asia - China. ksacta Scrub and hedges in W. Hubei[184]. Slopes, forest margins and roadsides at elevations of 900 - 2500 metres[266].

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. Cuttings of half-ripe wood, July/August in a frame[11]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta Easily cultivated in any reasonably good soil[1, 200]. Prefers a deep moist well-drained loam[4, 11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[188, 200]. Tolerates atmospheric pollution[200]. A very ornamental plant[1], it is hardy to about -25°c[200]. Plants are subject to canker, especially when growing in the milder moister areas of Britain[49]. Plants in this genus are notably resistant to honey fungus[200]. Fruits are usually freely produced in Britain, but they do not always ripen[11, 182]. The plant grows and fruits well on a south wall at Kew[K]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching; a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 5.2.72 Berberis buxifolia

311

Magellan Barberry 4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 2.5 m hkuc is very drought tolerant[1, 11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. This species is an excellent soil-enriching understorey in pine forests[200], growing and fruiting well so long as the canopy of pines is fairly light. Although it is very winter-hardy, this species only really thrives in areas with hot summers[200]. The young growth in spring, even on mature plants, is frosttender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants can spread widely by means of underground suckers[11]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus[200]. Fruits are produced in 2 - 3 years from seed[117]. One report says that plants never fruit. in Britain[11], but a 2 metre tall plant at Wisley fruits most years[K]. Trees on our Cornish trial grounds produced a few female flowers when 1 metre tall and 4 years old[K]. This species is occasionally cultivated for its edible seed in N. America, there are some named varieties[183]. The plants produce seeds abundantly in the wild[183]. The sub-species C. pumila ashei. Sudw. (Zone 7) is a coastal form, found from Virginia to Texas[200]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is suckering with new plants from underground runners away from the plant

# 5.2.68 Amelanchier basalticola

Dwarf Service-berry

4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier basalticola is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: We have no records for this species, but the fruit is almost certainly edible both raw or cooked[K]. It is 9 - 12mm in diameter[200]. The fruit is rich in iron and copper[226].

nrakta North-western N. America - Washington. ksacta Open woods, canyons and hillsides, from near sea level to the sub-alpine zone [60].

propta Seed - it is best harvested 'green', when the seed is ally formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their

permanent positions during the winter. Layering in springtakes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Prefers an acid or neutral soil. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. There is much difference of opinion in the naming of members of this genus, with many botanists viewing this species as no more than a form of A. alnifolia[60]. It hybridizes freely with other members of the genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

# 5.2.69 Helianthus hybrids

Perennial Sunflower

4tlin11cyuc4kcak2tcan2dwat $3.6\ m$ hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatprikl-

wis hpa7tmwatli hionli

drutta Helianthus hybrids is a PERENNIAL growing to 3.6 m (11ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 10. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista None Known

kcakta Edible Parts: Flowers Oil Seed StemEdible Uses: Drink OilCarbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Perennial crops are being developed for their oil-seed. The Land Institute see them as part of a perennial polyculture system [1-1].

tcanta Biomass OilSee individual species. Some sunflowers are a good source of biomass. The tubers are used in industry to make alcohol etc[141]. The alcohol fermented from the tubers is said to be of better quality than that from sugar beets[269]. Can be grown as a temporary summer screen[200]. Ornamental. A food plants for the larvae of many lepidopterans.

dwatta Various medicinal qualities depending on the

nrakta Origin: hybrid. All Helianthus species are native to North America except for three species in South America. ksacta Cold to semi-arid regions.

propta See individual species.

nwatta Management: Standard Staple Crop: Proteinoil Under DevelopmentClimate: boreal to warm temperate.
Humidity: semi-arid to humid. Carbon Farming Solutions
- Cultivation: under development. Management: standard
(Describes the non-destructive management systems that are
used in cultivation) [1-1]. Perennial crops are being developed for their oil-seed. The Land Institute see them as
part of a perennial polyculture system [1-1]. Several perennial sunflowers are being worked with including prairie natives handling boreal to warm temperate semi-arid conditions: Helianthus maximliani (Maximilian sunflower), Heilanthus tuberosus (Jerusalem artichoke), Helianthus pauciflorus (Stiff sunflower). Less tolerant of boreal conditions but
good on poor soils is Helianthus cusickii (Cusick's sunflower)
[1-1].

#### 5.2.70 Sambucus caerulea

Blue Elder

hitu Entol 4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli and are especially welcome as a vital and fresh green leaf in the middle of winter[K]. Flowers - raw or cooked. These are somewhat stronger than the leaves, in small quantities they make a decorative and very tasty addition to salads[K]. The flowering heads can still be eaten as the seed pods are forming, though the flavour gets even stronger as the seeds ripen[K]. Bulb - raw or cooked[2]. A fairly strong garlic flavour, though it is quite small and fiddly to harvest[K]. The bulbs can be harvested at any time the plant is dormant from early summer to early winter. Harvested in early summer, they will store for at least 6 months[K]. The bulbs can be up to 4cm long and 1cm in diameter[00]. The small green bulbils are used as a caper substitute[183].

tcanta Companion Disinfectant RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20]. The juice of the plant has been used as a general household disinfectant[7].

dwatta Anthelmintic Antiasthmatic Anticholesterolemic Antiseptic Antispasmodic Astringent Cholagogue Depurative Diaphoretic Disinfectant Diuretic Expectorant Febrifuge Hypotensive Rubefacient Stimulant Stomachic Tonic VasodilatorRamsons has most of the health benefits of the cultivated garlic, A. sativum[7, 238], though it is weaker in action[254]. It is therefore a very beneficial addition to the diet, promoting the general health of the body when used regularly. It is particularly effective in reducing high blood pressure and blood cholesterol levels[9]. It is recognised as having a good effect on fermentative dyspepsia[244]. All parts of the plant can be used, but the bulb is most active. The plant is anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, astringent, cholagogue, depuritive, diaphoretic, diuretic, expectorant, febrifuge, hypotensive, rubefacient, stimulant, stomachic, tonic and vasodilator[7, 21]. Ramsons ease stomach pain and are tonic to the digestion, so they can be used in the treatment of diarrhoea, colic, wind, indigestion and loss of appetite[254]. The whole herb can be used in an infusion against threadworms, either ingested or given as an enema[254]. The herb is also beneficial in the treatment of asthma, bronchitis and emphysema[254]. The juice is used as an aid to weight loss and can also be applied externally to rheumatic and arthritic joints where its mild irritant action and stimulation to the local circulation can be of benefit[254].

nrakta Much of Europe, including Britain, east to the Caucasus and W. Asia. ksacta Damp soils in woods, copses, valleys and similar moist shady localities[9].

propta Seed - best sown as soon as it is ripe either in situ or in a cold frame. It germinates quickly and can be grown on in the greenhouse for the first year, planting out the dormant bulbs in the late summer of the following year. Stored seed can be sown in spring in a greenhouse. Division in summer after the plants have died down. Very easy, the divisions can be planted out straight into their permanent positions.

nwatta Prefers woodland conditions in a moist well-drained soil[203]. Plants are often found in the wild growing in quite wet situations[K]. When growing in suitable conditions, wild garlic forms a dense carpet of growth in the spring and can be a very invasive plant[24, 203, K]. It dies down in early summer, however, allowing other plants to grow in the same space[K]. The bulbs should be planted fairly deeply[1]. The seeds are dispersed by ants[244]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browing deer[233].

#### 5.2.38 Carva hybrids

Hybrid and neohybrid hickories

4 tlin 11 cyuc 4 kcak 3 tcan 3 dwat 40 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Carya hybrids is a deciduous Tree growing to 40 m (131ft) by 35 m (114ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista None Known

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Oil-Carbon Farming Solutions - Staple Crop: oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta OilSee individual plant entries. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch

dwatta See individual species.

nrakta Hybrid origin. ksacta Not native

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Management: Standard Minor Global Crop Staple Crop: OilClimate: cold temperate to subtropical, tropical highlands. Humidity: humid. Carbon Farming Solutions - Cultivation: minor global crops. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 5.2.39 Aesculus spp

Horse chestnut

4 tlin 9 cyuc 4 kcak 4 tcan 4 dwat 30 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Aesculus spp is a deciduous Tree growing to 30 m (98ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The seed is rich in saponins[10, 21, 65]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Avoid in patients with kidney or liver disease. Avoid if taking warfarin as can interfere with anticoagulant therapy [301].

kcakta Edible Parts: SeedEdible Uses: The roasted seed is used as a coffee substitute[2, 7]. Seed - cooked. It can be dried, ground into a powder and used as a gruel[7, 46, 55, 61]. The seed is quite large, about 3cm in diameter, and is easily harvested. It is usually produced in abundance in Britain. Unfortunately the seed is also rich in saponins, these must be removed before it can be used as a food and this process also removes many of the minerals and vitamins, leaving behind mainly starch. See also the notes above on toxicity. The seed contains up to 40% water, 8 - 11% protein and 2-26% toxic saponins[218]. The following notes apply to A.

californica, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213].

tcanta Saponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. The seed contains variable amounts of saponins, up to a maximum of 10%[240]. A starch obtained from the seed is used in laundering[100]. The bark and other parts of the plant contain tannin, but the quantities are not given[223]. A yellow dye is obtained from the bark[4]. The flowers contain the dvestuff guercetin[223]. Wood - soft, light, not durable. Of little commercial value, it is used for furniture, boxes, charcoal[2, 11, 46, 61]. Carbon Farming Solutions - Industrial Crop: starch, medicinal (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1].

dwatta Various medicinal qualities depending on the species. They include: Alterative; Analgesic; Antiinflammatory; Antirheumatic; Astringent; Bach; Diuretic; Expectorant; Febrifuge; Haemostatic; Narcotic; Tonic; Vasoconstrictor; Vulnerary.

nrakta N. Temperate. ksacta Trees and shrubs native to the temperate Northern Hemisphere, with six species native to North America and seven to 13 species native to Eurasia

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Hypothetical Crop Industrial Crop: Medicinal Industrial Crop: Starch Management: StandardClimate: cold to warm temperate, Mediterranean. Humidity: semi-arid to humid. Landscape Uses: Firewood, Pollard, Specimen, Street tree. Prefers a deep loamy well-drained soil but is not too fussy tolerating poorer drier soils[11, 200]. Tolerates exposed positions and atmospheric pollution[200]. A very ornamental and fast-growing tree[1, 4], it succeeds in most areas of Britain but grows best in eastern and southeastern England[200]. Trees are very hardy when dormant. but the young growth in spring can be damaged by late frosts. The flowers have a delicate honey-like perfume[245]. Trees are tolerant of drastic cutting back and can be severely lopped[200]. They are prone to suddenly losing old heavy branches[98]. The tree comes into bearing within 20 years from seed[98]. Most members of this genus transplant easily, even when fairly large[11]. Special Features: Attractive foliage. Not North American native. Naturalizing, Blooms are very showy. Carbon Farming Solutions - Cultivation: hypothetical. Management: standard (Describes the nondestructive management systems that are used in cultivation) [1-1].

#### 5.2.40 Fagus sylvatica

Beech, European beech, Common Beech 4 tlin 7 cyuc 4 kcak 4 tcan 2 dwat 30 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli hjonli

drutta Fagus sylvatica is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Large quantities of the seed may be toxic[65, 76]. kcakta Edible Parts: Leaves Oil SeedEdible Uses: Coffee OilYoung leaves - raw[183]. A very nice mild flavour, they go well in a mixed salad. However, the leaves quickly become tough so only the youngest should be used[2, 5, 12, K]. New growth is usually produced for 2 periods of 3 weeks each year, one in spring and one in mid-summer. Seed - raw or cooked[2, 5, 7, 63, 183]. A pleasant sweet flavour, though rather small and fiddly[K]. The seed can also be dried and ground into a powder and then used with cereal flours when making bread, cakes etc[12]. The seed is rich in oil. The seed should not be eaten in large quantities because it contains a deleterious principle[65, 238]. The seed contains 17 - 20% of an edible semi-drying oil[4, 7, 8, 57]. This stores well without going rancid and is said to be equal in delicacy to olive oil[183] It is used as a dressing for salads and also for cooking[238]. The seed residue is poisonous[9, 57]. The roasted seed is used as a coffee substitute[2, 63].

tcanta Charcoal Fuel Hedge Hedge Oil Stuffing Teeth WoodA semi-drying oil is obtained from the seed, it is used as a fuel for lighting, as a lubricant, for polishing wood etc[12, 13, 46, 57, 63]. The seed residue is poisonous[9, 57]. The leaf buds harvested in the winter and dried on the twigs are used as toothpicks[66]. The leaves are gathered in autumn and used as a stuffing material for mattresses etc[115]. Wood - hard, heavy, strong, very durable[13, 46]. It is not suitable for outdoor use[1] and is often attacked by a small beetle[4]. It has a wide range of applications, including furniture, flooring, turnery etc[100]. It makes a very good fuel[6, 66], burning with a lot of heat[4], and yields a charcoal known as 'Carbo Ligni Pulveratus' [46]. The wood has often been used as a source of creosote, tar, methyl alcohol. acetic acid[123]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antacid Antipyretic Antiseptic Antitussive Bach Expectorant Odontalgic SkinThe bark is antacid, antipyretic, antiseptic, antitussive, expectorant, odontalgic[7, 9]. A tar (or creosote), obtained by dry distillation of the branches. is stimulating and antiseptic[4]. It is used internally as a stimulating expectorant and externally as an application to various skin diseases[4, 238]. The pure creosote has been used to give relief from toothache, but it should not be used without expert guidance[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Intolerance', 'Criticism' and 'Passing judgements' [209].

nrakta Europe, including Britain, from Norway south and east to Spain, Greece, W. Russia and the Crimea. ksacta Grows in woodlands where it is often the dominant species, especially on chalky and soft limestone soils, though sometimes also on well-drained loams and sands[13-17]

propta Seed - the seed has a short viability and is best sown as soon as it is ripe in the autumn in a cold frame. Protect the seed from mice. Germination takes place in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are slow growing for the first few years and are very susceptible to damage by late frosts. The seed can also be sown in an outdoor seedbed in the autumn[186]. The seedlings can be left in the open ground for three years before transplanting, but do best if put into their final positions as soon as possible and given some protection from spring frosts.

nwatta Landscape Uses: Firewood, Pest tolerant, Hedge, Aggressive surface roots possible, Screen, Specimen. Thrives on a light or medium soil, doing well on chalk, but ill-adapted for a heavy wet soil[1, 11]. Prefers a calcareous soil but succeeds in acid soils though it does not make such a fine tree in such a situation[186]. Succeeds in almost any soil and any pH, it is also very tolerant of a wide range of climatic conditions so long as there is sufficient rainfall[200]. Established trees are drought tolerant[186]. Very wind tolerant but dislikes salt[200]. Trees are shallow rooted and this might make them less wind resistant[186]. Trees have two growth periods a year, each of about 3 weeks in duralived[200], this is partly because of the need for the tree to undercut the roots if they are to be left undisturbed for more produce a constant supply of new wood since most fruit is formed on one-year old wood (though some fruit spurs are formed)[200]. Garlic is a good companion for this plant, helping to prevent disease, especially peach leaf curl[20, 201]. Tansy grown below peach trees helps to keep them healthier[201]. Peach leaf curl can also be prevented by protecting the plants from winter and early spring rains, perhaps by covering them in plastic[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. Espalier: tree or other plant that is trained to grow flat against a support (such as a trellis or wall).

# 5.2.66 Crataegus durobrivensis

Caughuawaga Hawthorn

4 tlin 8 cvuc 4 kcak 2 tcan 2 dwat 5 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Crataegus durobrivensis is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A reasonable size, it is up to 15mm in diameter[200]. and is very acceptable for raw eating[K]. It is sweet and fairly juicy when fully ripe with a hint of apple in its flavour[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America. ksacta Not known in a truly wild situation, it is possibly a hybrid C. pruinosa x C. suborbiculata[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -18°c[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Probably a natural hybrid, C. pruinosa x C. suborbiculata[43].

#### 5.2.67 Castanea pumila

Chinguapin, Ozark chinkapin

4 tlin 8 cvuc 4 kcak 2 tcan 1 dwat 4 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hionli

drutta Castanea pumila is a deciduous Shrub growing to 4 m (13ft 1in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[2, 61, 105]. Sweet with a nice nutty flavour[46, 82, 183], it is very acceptable raw and has a superior flavour to sweet chestnuts (C. sativa)[142, 161, K]. When baked it becomes even sweeter and develops a floury texture, it makes an excellent potato or cereal substitute[K]. The seed is quite small, about 2cm thich[270], which is about half the size of C. dentata[183]. It is sold in local markets in America[82]. The seed husks only contain one (rarely two) seed[235]. The seed contains 45% starch and 2.5% protein[213].

tcanta Tannin WoodThe bark, leaves, wood and seed husks all contain tannin. Wood - coarse-grained, hard, strong, light, durable, easy to split. It weighs 37lb per cubic foot. Too small for commercial use, but it is occasionally used for fence posts, fuel etc[46, 61, 227, 229].

dwatta Antiperiodic Astringent TonicThe leaves contain tannin and are antiperiodic, astringent and tonic[46, 61, 213]. An infusion of the leaves has been used as an external wash for the feverish condition common to colds[213, 257].

nrakta Eastern N. America - New Jersey and Pennsylvania to Florida, Missouri and Texas. ksacta Dry sandy ridges and rich hillsides where it forms thickets, also in woods and on the borders of swamps[43, 82].

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check reqularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K]. Division of suckers in winter[200]. They can be planted straight out into their permanent positions.

nwatta Prefers a good well-drained slightly acid loam but succeeds in dry soils[1, 11, 200]. Once established, it

shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177, 200]. The fruit is up to 3cm in diameter[200].

nrakta E. Asia - N. China. ksacta Slopes, dry cold regions at elevations of 100 - 2000 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at  $1^{\circ}c$  and should be sown as early in the year as possible[200]. Temperatures over 15 -  $20^{\circ}c$  induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200]. This species is closely related to P. ussuriensis ovoidea[200]. This species is commonly cultivated in northern China, preferring sunny, dry, loamy soils. It includes many important forms with excellent fruit[266]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 5.2.65 Prunus persica nucipersica

Nectarine

4 tlin 8 cyuc 4 kcak 2 tcan 3 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Prunus persica nucipersica is a deciduous Tree growing to 6 m (19th) by 6 m (19th). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed can contain high levels of hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is readily detected by its bitter taste. Usually present in too small a quantity to do any harm, any very bitter seed or fruit should not be eaten[65]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Flowers Fruit Oil Oil SeedEdible Uses: Gum Oil Oil TeaFruit - raw, cooked or dried for later use[1, 2, 34, 46]. The fruit is often used in ice creams, pies, jams etc[183]. When fully ripe, the fruits of the best forms are soft and juicy with a rich delicious flavour[K]. The size of fruit varies between cultivars but can be up to 7cm in diameter and contains one large seed[200]. Flowers - raw or cooked. Added to salads or used as a garnish[183]. They can also be brewed into a tea[183]. The distilled flowers yield a white liquid which can be used to impart a flavour resembling the seed[183] Seed - raw or cooked. Do not eat if it is too bitter, seed can contain high concentrations of hydrocyanic acid. See the notes above on toxicity. A semi-drying oil is obtained from the seed[57]. Although the report does not mention edibility it can be assumed that it is edible. A gum is obtained from the stem. It can be used for chewing [64].

tcanta Adhesive Cleanser Dye Gum Oil OilA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. A semi-drying oil is obtained from the seed[57]. It is used as a substitute for almond oil in skin creams[238]. The bruised leaves, when rubbed within any container, will remove strong odours such as garlic or cloves so long as any grease has first been fully cleaned off[4]. A gum obtained from the stem is used as an adhesive[64]. Espalier.

dwatta Alterative Antiasthmatic Antitussive Astringent Demulcent Diuretic Emollient Expectorant Febrifuge Haemolytic Laxative SedativeAntihalitosis[194]. The leaves are astringent, demulcent, diuretic, expectorant, febrifuge, laxative, parasiticide and mildly sedative[21, 218]. They are used internally in the treatment of gastritis, whooping cough, coughs and bronchitis[238]. They also help to relieve vomiting and morning sickness during pregnancy, though the dose must be carefully monitored because of their diuretic action[21]. The dried and powdered leaves have sometimes been used to help heal sores and wounds[21]. The leaves are harvested in June and July then dried for later use[4]. The flowers are diuretic, sedative and vermifuge[4, 21, 176, 194, 218]. They are used internally in the treatment of constipation and oedema[238]. A gum from the stems is alterative, astringent, demulcent and sedative[4, 21, 176, 194, 218]. The seed is antiasthmatic, antitussive, emollient, haemolytic, laxative and sedative[4, 21, 176, 194, 218]. It is used internally in the treatment of constipation in the elderly, coughs, asthma and menstrual disorders[238]. The bark is demulcent, diuretic, expectorant and sedative[4]. It is used internally in the treatment of gastritis, whooping cough, coughs and bronchitis[238]. The root bark is used in the treatment of dropsy and jaundice[218]. The bark is harvested from young trees in the spring and is dried for later use[4]. The seed contains 'laetrile', a substance that has also been called vitamin B17[218]. This has been claimed to have a positive effect in the treatment of cancer, but there does not at present seem to be much evidence to support this [K]. The pure substance is almost harmless, but on hydrolysis it yields hydrocyanic acid, a very rapidly acting poison - it should thus be treated with caution[218]. In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China. ksacta Not known in a truly wild situation, it is possibly derived in cultivation from P. davidiana

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. The stored seed is best given 2 months warm followed by 3 months cold stratification[113]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. A very low percentage[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[1, 11]. Thrives in a loamy soil, doing well on limestone[11]. Best not grown in acid soils. Prefers some chalk in the soil but it is apt to become chlorotic if too much is present[1]. Prefers a pH in the range 6 to 7[200]. Succeeds in light shade but fruits better in a sunny position[11]. Reguires shelter from north and north-east winds[11] and also from spring frosts[200]. Widely cultivated for its edible fruit in warm temperate areas and continental climates, this is a form of the peach with a smooth skin. There are some named varieties[183]. There are numerous divisions of the varieties according to skin colour etc. Perhaps the most useful from the eaters point of view is whether it is free-stone (the flesh parts easily from the seed) or cling-stone (the flesh adheres to the seed)[200, K]. Trees are normally hardy in southern Britain[11], tolerating temperatures down to about -20°c[184], but they require some protection if cropping is to be at all reliable[11]. This is not due so much to lack of cold hardiness, more to the cooler summers in Britain which do not fully ripen the wood and the fruit, plus the unpredictable winters and springs which, in a mild spell, can excite the tree into premature flowering and growth which is then very liable to damage in any following cold spell. Hand pollination at this time can improve fruit-set[200]. In general it is best to site nectarines in a very warm sheltered sunny position, preferably against a south or west facing wall[200, 219], though some success is occasionally seen with plants grown fully in the open[K]. Most cultivars are self-fertile[200]. Trees are often grafted onto plum or other rootstocks but are said to be better when grown on their own roots in southern Britain[11]. Trees are not generally longtion. The first is in spring around the end of April, the second is in summer, around the end of July. Trees are often slow growing and also can be very slow to establish after transplanting. However, in good conditions they are capable of growing up to a metre in a year. Young trees are very shade tolerant, but are subject to frost damage to their flowers and young leaves and so are best grown in a woodland position which will protect them[200]. An important food plant for many caterpillars, it has 64 species of associated insects[24]. Trees have a heavy canopy and cast a dense shade, very few other species can grow in a dense beech wood and on suitable soils it becomes the dominant species[186]. Very intolerant of coppicing, trees producing none or only very weak growth afterwards and this is soon smothered by other plants[186]. Plants are very tolerant of light pruning however and if this is carried out in late summer the plants will retain their dead leaves over winter[29]. There are many named forms selected for their ornamental value. Those forms with purple leaves prefer a position in full sun whilst forms with yellow leaves prefer some shade[188]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, All or parts of this plant are poisonous, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 4. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

## 5.2.41 Quercus robur

Pedunculate Oak, English oak 4 tlin 8 cyuc 4 kcak 5 tcan 3 dwat 30 m hkuc hmimhtut cyutli hgattcuphja7n hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus robur is a deciduous Tree growing to 30 m (98ft) by 30 m (98ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Possible digestive complaints. May delay absorption of alkaloids and other alkaline drugs [301].

kcakta Edible Parts: SeedEdible Uses: Coffee Gum-Seed - cooked[2, 5, 8, 13]. Nourishing but indigestible[4]. Chopped and roasted, the seed is used as an almond substitute[8]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[63]. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[21, 61]. An edible gum is obtained from the bark[177]. Another report says that an edible manna is obtained from the plant

and that it is used instead of butter in cooking[183]. This report probably refers to the qum[K].

tcanta Basketry Charcoal Compost Fuel Gum Ink Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20, 201]. The bark is an ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The bark is very rich in calcium[18]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A black dye and an excellent long-lasting ink is made from the oak galls, mixed with salts of iron[4, 7, 66]. The colour is not very durable[4]. When mixed with alum, the dye is brown and with salts of tin it is yellow[4]. Trees can be coppiced to provide material for basket making, fuel, construction etc[23]. The wood is a source of tar, quaiacol, acetic acid, creosote and tannin[123]. Tannin is extracted commercially from the bark and is also found in the leaves[223]. On a 10% moisture basis, the bark contains11.6% tannin and the wood 9.2%[223]. The bark strips easily from the wood in April and May[4]. A purplish dye is obtained from an infusion of the bark with a small quantity of copperas[4]. It is not bright, but is said to be durable[4]. Wood - hard, tough, durable even under water - highly valued for furniture, construction etc[4, 13, 61, 66]. It is also a good fuel[6] and charcoal[61].

dwatta Antiseptic Astringent Bach Decongestant Dysentery Haemostatic TonicThe oak tree has a long history of medicinal use. It is anti-inflammatory, antiseptic, astringent, decongestant, haemostatic and tonic[4, 7, 9, 13, 21, 165]. The bark is the part of the plant that is most commonly used[4], though other parts such as the galls, seeds and seed cups are also sometimes used[7]. A decoction of the bark is useful in the treatment of chronic diarrhoea, dysentery, intermittent fevers, haemorrhages etc[4]. Externally, it is used to bathe wounds, skin eruptions, sweaty feet, piles etc[9]. It is also used as a vaginal douche for genital inflammations and discharge, and also as a wash for throat and mouth infections[9]. The bark is harvested from branches 5 - 12 years old, and is dried for later use[9]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Despondency', 'Despair, but never ceasing effort'[209]. A homeopathic remedy is made from the bark. It is used in the treatment of disorders of the spleen and gall bladder[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Quercus robur Pedunculate Oak for coughs/bronchitis, diarrhoea, inflammation of mouth and pharynx, inflammation of the skin (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Urals and Crimea. ksacta Often the dominant woodland tree, especially on clay soils and in the eastern half of Britain, but avoiding acid peat and shallow limestone soils[17].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Young plants tolerate reasonable levels of side shade[200]. Succeeds in heavy clay soils[13] and in wet soils so long as the ground is not water-logged for long periods[186]. Dislikes dry or shallow soils but is otherwise drought tolerant once it is established[186]. Tolerant of exposed sites though it dislikes salt-laden winds[186]. The oak is a very important timber tree in Britain, it is also a very important food plant for the caterpillars of many species of butterfly[30], there are 284 insect species associated with

this tree[24]. It has often been coppiced or pollarded for its wood in the past[23], though this should not be done too frequently[186], about once every 50 years is the average. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Older trees have a thick corky bark and this can protect them from forest fires, young trees will often regenerate from the base if cut down or killed back by a fire[186]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Immune to attacks by the tortix moth[1]. This species is notably resistant to honey fungus[88, 200].

#### 5.2.42 Acer saccharum

Sugar Maple, Florida Maple, Hard Maple, Rock Maple 4 tlin 8 cyuc 4 kcak 4 tcan 2 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Acer saccharum is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from April to May, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female or gans) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains guite a large proportion of sugar. This can be used as a refreshing drink, or be concentrated into a syrup by boiling off the water[1, 2, 11, 34, 57]. The syrup is used as a sweetener on many foods. The sap can be harvested in late winter or early spring[[142], the flow is best on a warm sunny day after a frost[213]. Trees on southern slopes in sandy soils give the best yields. It is best to make a hole about 7cm deep and about 1.3 metres above the ground[171]. Yields of 40 - 100 litres per tree can be obtained[142]. The best sap production comes from coldwinter areas with continental climates. The sap contains 2 -6% sugar, thus about 32 litres are required to make a litre of maple syrup[229]. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[213]. Seeds cooked. The wings are removed and the seeds boiled then eaten hot[62, 105, 159, 213]. The seed is about 6mm long and is produced in small clusters[82]. Inner bark - cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161]. The related Oregon Maple (Acer macrophyllum) has vellow flower clusters, sweet with nectar, eaten raw[183]. No information was found for this species.

tcanta Companion Fodder Fuel Potash Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - close grained, tough, hard, heavy, strong, not very durable, it takes a high polish, remains smooth under abrasion and has a high shockresistance[46, 61, 82, 171, 227]. It holds nails well, is fair in gluing, dries easily and shrinks moderately[227]. The wood weighs 43lb per cubic foot[235]. Considered by many to be the most valuable hardwood tree in N. America, the sugar maple is used for a wide range of applications including furniture, flooring, turnery, musical instruments and ship building[46, 61, 82, 171, 227]. Accidental forms with the grain curled and contorted, known as curly maple and bird's eve maple, are common and are highly prized in cabinet making[82]. The wood is also a very good fuel, giving off a lot of heat and forming very hot embers[82, 226]. The ashes of the wood are rich in alkali and yield large quantities of potash[82]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Blood tonic Diuretic Expectorant Hepatic OphthalmicA tea made from the inner bark is a blood tonic, diuretic and expectorant[222]. It has been used in the treatment of coughs, diarrhoea etc[222]. A compound infusion of the bark has been used as drops in treating blindness[257]. The inner bark has been used for treating sore eyes[257]. The inner bark has been used as an expectorant and cough rem-

edy[257]. Maple syrup is used in cough syrups and is also said to be a liver tonic and kidney cleanser[222].

nrakta Eastern N. America - Newfoundland to Georgia, west to Texas and Minnesota. ksacta Found in a variety of soil types, doing best in deep rich well-drained soils from sea level to 1600 metres[229]. Rich usually hilly woods[43].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. A lot of the seed is non-viable, it is best to cut a few open to see if there is an embryo[113]. An average of 95% germination can be achieved from viable seed[98]. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate, sometimes taking two years[125]. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Agroforestry Services: Crop shade Fodder: Bank Management: Standard Regional Crop Staple Crop: SugarLandscape Uses:Firewood, Screen, Specimen, Street tree, Woodland garden. Of easy cultivation, it prefers a good moist well-drained soil but succeeds on most soils[11, 98]. though it is more likely to become chlorotic as a result of iron deficiency on alkaline soils. Grows well in heavy clay soils. Trees need full light and a lot of space[98]. This species is one of the most shade tolerant of the N. American maples[226]. It tolerates atmospheric pollution[200] and so is often used as a street tree, though it can suffer from soil compaction and the use of salt on the roads in frosty weather. Tolerates a pH in the range 4.5 to 7.3. Hardy to about -45°c when fully dormant[160]. A fast-growing tree for its first 40 years in the wild[229], this species is not a great success in Britain[1], though it does better than once thought[11]. It grows well in Cornwall[59]. In cultivation it has proved to be slow growing when young[11]. Trees can live for 250 years in the wild[229]. A very ornamental tree[1] but a bad companion plant, inhibiting the growth of nearby plants[18, 20]. This species is commercially exploited in America for its sap[1, 11]. Along with its sub-species it is the major source of maple syrup[11]. There are some named varieties[183]. The sap can be tapped within 10 - 15 years from seed but it does not flow so well in areas with mild winters[160]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and

# 5.2.43 Castanea species

Chestnut Hybrids
4 tlin 9 cyuc 4 kcak 4 tcan 2 dwat 30 m hkuc
hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli
flatprik hpa7tmwatli hjonli

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus typhina is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from June to August, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista There are some suggestions that the sap of this species can cause a skin rash in susceptible people, but this has not been substantiated. See also notes in 'Cultivation Details'

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - cooked[22, 62]. A very sour flavour, they are used in pies[183]. The fruit is rather small and with very little flesh, but it is produced in quite large clusters and so is easily harvested. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[55, 85, 95. 101, 102, 183]. The mixture should not be boiled since this will release tannic acids and make the drink astrinoent.

tcanta Dye Hedge Hedge Ink Mordant Musical Oil Pipes Shelterbelt Soil stabilization Tannin WoodThe leaves are rich in tannin, up to 48% has been obtained in a controlled plantation[223]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169, 171]. The bark, especially the root bark, and the fruits are also very rich in tannin[82, 159, 169]. A yellow dye can be obtained from the roots[257]. An orange dye can be obtained from the inner bark and central pith of the stem, mixed with bloodroot (Sanquinaria canadensis)[257]. A black ink can be made by boiling the leaves and the fruit[226]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. Pipes are made from the young shoots and are used for drawing the sap of sugar maples (Acer spp)[82]. They are also used as flutes[159]. The plant has an extensive root system and is planted as a windbreak screen and to prevent soil erosion[200]. Wood - soft, light, brittle, coarse grained[82, 101]. It weighs 27lb per cubic foot[235]. Of no commercial value, though it is sometimes used as a rough construction wood or is employed in turning[226].

dwatta Antihaemorrhoidal Antiseptic Astringent Blood purifier Diuretic Emetic Galactogogue Poultice Stomachic Tonic VD WartsStag's horn sumach was often employed medicinally by several native North American Indian tribes who valued it especially for its astringent qualities[257]. It is little used in modern herbalism. Some caution is advised in the use of the leaves and stems of this plant, see the notes above on toxicity. The bark is antiseptic, astringent, galactogogue and tonic[222, 257]. An infusion is used in the treatment of diarrhoea, fevers, piles, general debility, uterine prolapse etc[213, 222]. An infusion is also said to greatly increase the milk flow of a nursing mother - small pieces of the wood were also eaten for this purpose[257]. The inner bark is said to be a valuable remedy for piles[257]. The roots are astringent, blood purifier, diuretic and emetic[222]. An infusion of the roots, combined with purple coneflower (Echinacea purpurea) has been used in the treatment of venereal disease[257]. A poultice of the roots has been used to treat boils[257]. The leaves are astringent. They have been used in the treatment of asthma, diarrhoea and stomatosis[222]. An infusion of the fruits has been used as a tonic to improve the appetite and as a treatment for diarrhoea[257]. The berries are astringent and blood purifier[257]. They were chewed as a remedy for bed-wetting[222, 257]. A tea made from the berries has been used to treat sore throats[213]. The flowers are astringent and stomachic. An infusion has been used to treat stomach pains[257]. The sap has been applied externally as a treatment of warts[226]. Some caution is advised here since the sap can cause a rash on many

nrakta Eastern N. America - New Brunswick to the

southern Appalachian mountains and west to Iowa. ksacta Usually found in upland sites on rich soils, but it is also found in gravel and sandy nutrient-poor soils. It grows by streams and swamps, along roadsides, railway embankments and edges of woods[229].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 -  $90\mathrm{c}$  and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. This soak water can be drunk and has a delicious lemonfavour. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood,  $10\mathrm{cm}$  with a heel, July/August in a frame[200]. Root cuttings  $4\mathrm{cm}$  long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Landscape Uses:Border, Massing, Specimen. Succeeds in a well-drained fertile soil in full sun[11, 200]. Tolerates poor soils[169, 200]. Succeeds in dry soils and is drought resistant once it is established[169]. A fairly wind hardy plant, though the branches are brittle and can be broken off in very high winds[200, K]. A very hardy plant, when fully dormant it can tolerate temperatures down to at least -25°c[200]. However, the young growth in spring can be damaged by late frosts. A fast growing but shortlived tree[159], it can sucker freely, forming thickets and becoming guite anti-social when grown in small areas[11]. Single-stem plants are short-lived in cultivation, but if the plants are coppiced regularly and allowed to form thickets, then they will live longer and also be more ornamental with larger leaves [238]. Any coppicing is best carried out in early spring[238]. A very ornamental plant, there are some named varieties[182]. It is susceptible to coral spot fungus[11] but is notably resistant to honey fungus[88, 200]. It transplants easily[169]. This is a very good bee plant, the flowers producing an abundance of pollen and nectar[226]. There is some doubt over the validity of this name and the earlier R. hirta. [L.] has been proposed as the correct name. However, it seems likely that R. typhina will be retained because it is so well known[214]. This species is closely related to and hybridizes with R. glabra[101]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attracts birds, North American native. Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant

#### 5.2.64 Pyrus bretschneideri

4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus bretschneideri is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alka-line) soils. It can grow in semi-shade (light woodland) or no

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia polygama is a deciduous Climber growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked[183]. Not very palatable, it is eaten salted[151, 177]. Some cultivars have nice flavoured fruits[183]. The fruit contains up to 5 times the vitamin C. of blackcurrants[74]. Fairly large fruits, up to 3cm across[200] The ovoid fruits are orange and hairless when fuly ripe[266]. It contains a number of small seeds, but these are easily eaten with the fruit[K]. Leaves - raw or cooked[4, 61, 105, 177, 183]. The leaves can also be roasted and mixed with tea[183].

dwatta Hallucinogenic Sedative Vitamin CThe leaves are hallucinogenic and sedative[192]. The leaves contain substances that make them very attractive to cats and for this reason they are especially useful as a sedative for lions etc in zoos[192]. When consumed in large quantities the leaves can have a mild hallucinatory effect[192]. Polygamol, which is made from the fruits, is used as a heart tonic[218]. A dry decoction is used to treat colic and rheumatism[218].

nrakta E. Asia - China, Japan ksacta Woodlands and hedges in mountains throughout Japan [58]. Mountain forests at elevations of 500 - 1900 metres in China[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. Plants are hardy to about -30°c. when dormant but young growth in spring can be cut back by late frosts[160]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. The flowers are fragrant[245]. This is a climbing plant, supporting itself by twining around branches etc[200]. The plant is very attractive to cats and can be damaged by them[74, 151, 200]. This species has been confused in literature with A. kolomikta[198]. It is closely related but can be distinguished by the leaves which are tapered at the base whilst those of A. kolomikta are heart-shaped[219]. Plants in this genus are notably resistant to honey fungus[200]. One report suggests that plants are self-fertile whilst another says that they are dioecious. It is likely that most plants are dioecious but that there are some self-fertile hermaphrodite forms. A cultivar named 418-77 is self-fertile[183].

#### 5.2.62 Crataegus succulenta

Fleshy hawthorn

4 tlin 8 cvuc 4 kcak 2 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasilutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus succulenta is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62, 101, 105]. Excellent for making jellies[183], it can also be dried for later use. A small fruit with a sweet, juicy and pulpy flesh[82, 183], it is up to 17mm in diameter[235]. Another report says that the fruit is large for a Crataegus species, it is about 35mm in diameter and is borne in small clusters[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Nova Scotia to North Carolina, west to Montana, Colorado and Utah. ksacta Thickets, pastures and woodland edges, especially in dry or rocky soils[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is closely related to C. tomentosa[11].

# 5.2.63 Rhus typhina

Stag's Horn Sumach, Velvet Sumac, Staghorn Sumac 4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 6 m hkuc

drutta Castanea species is a deciduous Tree growing to monoecious (individual flowers are either male or female, but 30 m (98ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[183]. Eaten raw, there is a distinct astringency, especially if the fleshy inner skin beneath the outer shell of the seed is not removed[K]. When cooked, however, and especially when baked, the seed becomes much sweeter and has a floury texture[K]. It then makes an excellent food and can be used as a staple food in much the same way as potatoes or cereals[K]. The seed is low in fats and oils but high in carbohydrates[183]. Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta The bark, leaves, wood and seed husks all contain tannin. Wood - hard, strong, light. Carbon Farming Solutions - Industrial Crop: biomass, tannin (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Other Systems: woody agriculture.

dwatta Some see for example the individual entries for Castanea dentata, Castanea mollissima, Castanea pumila nrakta Hybrid origin ksacta Not known in a wild situa-

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K]. These plants are of hybrid origin, so seed is unlikely to breed true[K].

nwatta Industrial Crop: Biomass Industrial Crop: Tannin Management: Coppice Management: Standard New Crop Other Systems: Woody agriculture Staple Crop: Balanced carbClimate: cold to warm temperate. Humidity: humid. This record includes a number of garden hybrids involving various species - the origin of each hybrid will be mentioned in the individual cultivar notes. To date, these different hybrids have not been assigned their own specific name. The following notes are based on the general needs of the genus. Prefers a good well-drained slightly acid loam but succeeds in dry soils[1, 11, 200]. Once established, it is very drought tolerant[1, 11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. An excellent soilenriching understorey in pine forests[200]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Carbon Farming Solutions - Cultivation: new crop. Management: standard, coppice (Describes the non-destructive management systems that are used in cultivation) [1-1].

# 5.2.44 Ouercus bicolor

Swamp White Oak

4 tlin 8 cvuc 4 kcak 3 tcan 2 dwat 25 m hkuc hmimhtut cyutli tcuphja7n hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ouercus bicolor is a deciduous Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[105, 161, 226]. A rather sweet flavour[159, 235]. The seed is quite large, about 2 - 3cm long and 15 - 20mm wide[82, 200], and unlike most other oaks, is attached to the tree by a long stem[183]. It matures in its first year[235]. The seed can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The seed from some trees can contain bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. Roasted seed is a coffee substitute

tcanta Repellent Rust Tannin WoodThe leaves of most species in this genus are more or less rich in tannins. A mulch of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and this inhibit plant growth[20, K]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark has been boiled with hemlock (Tsuga sp.?) and soft maple bark (Acer spp), and the liquid used to remove rust. The mixture was also believed to prevent rust[257]. The wood is close-grained, strong, hard, tough, heavy[46, 82, 171, 229]. It weighs 48lb per cubic foot[235]. Trees do not self-prune and dead branches remain on the trees for many years. This does mean that the wood is usually quite knotty[226]. The wood machines well, though it can check and warp if not dried properly. It is of some importance commercially. And is used for construction, cabinet making, furniture, interior finishes, veneers, fence posts etc[6, 82, 171, 229, 338, 1050]. The wood makes a good

dwatta Astringent DysentervAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Ouebec to Minnesota, Georgia and Arkansas. ksacta Bottomlands, stream margins and swamps[43]. Tolerant of poorly drained sites, it is frequently found in heavy mucky soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Pest tolerant, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A relatively fast-growing tree in the wild, living 300 - 350 years[229], though it is relatively shallow-rooted and is considerably more susceptible to forest fires than most other oaks[226]. This species is one of the best of the white oaks for growing in this country[1]. However, it is said that the seed is rarely formed in Britain[105]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Trees do not commence bearing until about 25 - 30 years old, large crops being produced every 3 - 5 years[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. The seed of this species is attached to the tree by unusually long (by oak tree standards) stems[183]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 5.2.45 Quercus prinus

Rock Chestnut Oak

4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis

hpa7tmwatli hjonli drutta Quercus prinus is a deciduous Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found

on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime

exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[2, 46, 83, 159]. Somewhat sweet according to some reports[62, 82, 95, 229, 235] whilst another says that it contains bitter tannin[183]. The seed is quite large, up to 4cm long and 25mm wide[82, 200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. If the seed contains bitter tanning, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Buttons Dve Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. The seed cups are used as buttons[95]. The bark is a commercial source of tannin[46, 223]. On a 10% moisture basis, the bark contains 9.7% tannin[223]. Tannin is also found in the leaves and wood[223]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff[4]. A red dye is obtained from the bark[4]. Tan-coloured according to another report[257]. Wood - close-grained, heavy, hard, rather tough, strong, durable in contact with the soil[46, 61. 82, 229]. It weighs 47lb per cubic foot[235]. Used commercially like Q. alba, it is used for furniture, cabinet making, interior finishes, fence posts and fuel[46, 61, 229].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Maine to Georgia and Alabama. ksacta Dry or rocky woods, mainly on siliceous soils[43] and on the borders of streams[82]. The best specimens are found on deep rich well-drained soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain[200], but trees still grow well in this country[1]. A slow-growing tree in the wild, though it can live 400 years[229]. The tree produces large crops of acorns every 4 - 7 years, with small crops in the intervening years[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. This species is often confused with Q. michauxii, Q. muehlenbergii and Q. prinoides[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 5.2.46 Juglans ailanthifolia cordiformis

Heartseed Walnut

4 tlin 8 cyuc 4 kcak 4 tcan 1 dwat 20 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Juglans ailanthifolia cordiformis is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: OilSeed - raw or cooked[183]. They are also used in sweets, pies etc[183]. A mild and pleasant flavour, they can be eaten in quantity for dessert[183]. The shell is thin and easily cracked[117]. It is considered to be superior in taste to C. ailanthifolia. An edible oil is obtained from the seed[183], though it tends to go rancid quickly. Young buds (leaf?) and peduncles - cooked[105, 177].

tcanta Dye Herbicide Oil Tannin WoodA brown dye is

of woods and roads[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to about -18°c[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is sometimes confused with C. coccinea[50]. It is also very close to C. mollis, differing in having 10 stamens to a flower (as compared to 20 in C. mollis)[202]. It is considered to be part of C. mollis by some botanists[229].

#### 5.2.60 Amelanchier canadensis

Juneberry, Canadian serviceberry, Serviceberry Downy, Shadblow, Shadbush, Serviceberry

4 tlin 7 cyuc 4 kcak 4 tcan 1 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier canadensis is a deciduous Shrub growing to 6 m (19ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[3, 55, 101, 159]. The fruit contains a few small seeds at the centre, it has a sweet flavour with a hint of apple[1, 2]. It can be eaten out of hand, used in pies, preserves etc or dried and used like raisins[183]. We have found the fruit to be of variable quality, with some forms having a distinct bitterness in the flavour whilst others are sweet, juicy and delicious[K]. When the fruit is thoroughly cooked in puddings or pies the seed imparts an almond flavour to the food[183]. The fruit is rich in iron and copper[226]. It is about 10mm in diameter[200]. Trees can yield 7 to 15 tonnes per hectare[160].

tcanta Disinfectant Hedge Hedge Rootstock Shelterbelt WoodThis species can be used as a dwarfing rootstock for

open fertile ground[43]. Rich damp hillsides and the borders Malus spp. (the apples) and Pyrus spp. (the pears)[160]. Plants can be grown as an informal hedge[200]. Any trimming is best done after flowering[200]. A fairly wind-tolerant species, it can be used to give protection from the wind as part of a mixed shelterbelt[200]. Wood - hard, strong, close grained. Used for tool handles, small implements etc[46, 61].

dwatta Anthelmintic Disinfectant Women's complaintsA tea made from the root bark (mixed with other unspecified herbs) was used as a tonic in the treatment of excessive menstrual bleeding and also to treat diarrhoea[222, 257]. A bath of the bark tea was used on children with worms[222, 257]. An infusion of the root was used to prevent miscarriage after an injury [257]. A compound concoction of the inner bark was used as a disinfectant wash[257].

nrakta Eastern N. America - Nova Scotia to Ontario. south to Florida. Naturalized in Britain[17]. ksacta Swamps, low ground, woods and thickets[43]. Grows in woods and hedgerows in Britain[17].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Landscape Uses:Specimen, Woodland garden. Prefers a rich loamy soil in a sunny position or semi-shade[1, 2001 but thrives in any soil that is not water-logged, too dry or poor[11], though it is more wet-tolerant than other members of this genus[11]. Grows well in heavy clay soils. Prefers an acid soil[17, 43]. Trees produce more and better quality fruits better when growing in a sunny position[1]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. There is at least one named variety of this species with superior fruits. 'Prince William' is a large multi-stemmed shrub to 3 metres tall and 2 metres across[183, 200]. It crops heavily and its good quality fruit is about 12mm in diameter[183]. Considerable confusion has existed between this species and A. arborea, A. laevis and A. lamarckii, see [11] for the most recent (1991) classification. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. Special Features: Attracts birds. North American native, Attracts butterflies, Blooms are very showy. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

# 5.2.61 Actinidia polygama

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 6 m hkuc

on in light shade in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. This is a hybrid species and so it will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[11, 113]. The cuttings can be slow to root[200]. Cuttings can also be taken of soft wood in spring[113]. Root cuttings, December in a warm greenhouse[113]. Layering in early spring[1]. Very easy, the plants usually self-layer and so all you need to do is dig up the new plants and plant them out directly into their permanent positions.

nwatta Requires a well-drained moisture retentive soil[200]. Succeeds in acid or alkaline soils[200]. Prefers partial shade but succeeds in full sun[200]. Succeeds on a north facing wall[219]. Dormant plants are hardy to about -15°c but they can be somewhat tender when young and are best given some protection at this time[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Resentful of root disturbance, either grow plants in containers prior to planting them out or plant them out whilst very young[219]. A naturally occurring hybrid, A. guinata x A. trifoliata[200]. Plants are evergreen in mild winters[11, 200]. They are fast growing and can be invasive[200]. Plants are not normally pruned, if they are growing too large they can be cut back by trimming them with shears in early spring[202]. Shy to fruit, it possibly requires some protection in the flowering season - hand pollination is advisable. Plants are also possibly self-sterile. Plants in this genus are notably resistant to honey fungus[200].

#### 5.2.58 Crataegus acclivis

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 8 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus acclivis is a deciduous Tree growing to 8 m (26ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. The fruit ripens in early September; it is about 18mm long with a pleasantly sweet juicy flesh and makes an excellent dessert fruit[K]. The fruit contains up to 5 seeds in the centre, these usually stick together and so the effect is like eating a cherry with its single large seed[K].

dwatta Cardiac HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

nrakta North-eastern N. America - New York to the borders of southern Canada. ksacta Banks of streams and steep gorges[235].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to

pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to at least -18°c[202]. We have very little specific information on this plant, and it is regarded as no more than a form of C. pedicellata by most botanists[235]. However, a tree seen at Kew in early September 1997 had a good crop of almost ripe fruit. This fruit was more elongated than C. pedicellata and was also ripe about 4 weeks before that species[K]. Hybridizes freely with other members of this genus [200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 5.2.59 Crataegus submollis

Quebec Hawthorn

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 7 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus submollis is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161]. Sub-acid, dry and mealy[82]. Our experience has been that the fruit is sweet and somewhat juicy, it has a thick flesh with a nice flavour and makes an acceptable dessert fruit[K]. The fruit can also be used in making pies, preserves etc, and can be dried for later use[257]. It is about 20mm in diameter, is borne in large clusters and is easily harvested[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Hedge Hedge Plants are very tolerant of trimming and will soon resprout even if cut back into very old wood. They can be used as a hedge[50]. Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

nrakta North-eastern N. America - Quebec to Ontario, Massachusetts and New York. ksacta Wooded hillsides and

obtained from the seed husks and the bark[61]. Rich in tannin, it does not require a mordant. The bark is rich in tannin. It is used as a dye and also medicinally[178]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. Wood - soft, light, not easily cracked, of good quality. Used for cabinet making etc[46, 61].

dwatta Anthelmintic Astringent Diuretic Kidney Lithontripic Pectoral Skin TonicThe bark is anthelmintic, astringent, diuretic, lithontripic, pectoral, skin, tonic (kidnevs)[178].

nrakta E. Asia - Japan. ksacta Forests[11].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80].

nwatta Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: Protein-oilRequires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. This is the hardiest member of the genus[63], it should succeed outdoors in most parts of the country. It is also resistant to most insects[160]. The young growth in spring, however, can be damaged by late frosts. This is a form of C. ailanthifolia with a thinner shell and a better tasting nut. It is cultivated for its edible seed in Japan and has the potential for producing very superior nuts, especially if hybridized with I. cinerea[117, 160]. There are some named varieties[183]. Plants can come into bearing in 3 - 4 years from seed[63]. Even when grown on a very windy site in Cornwall, the plants flowered in their eighth year from seed (by which time they were more sheltered from the wind)[K] Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and then given some protection since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroved by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them[K]. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 5.2.47 Pinus koraiensis

Korean Nut Pine, Chinese pinenut 4 tlin 7 cyuc 4 kcak 3 tcan 2 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus koraiensis is an evergreen Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in May, and the seeds ripen in September. The species

is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Oil SeedEdible Uses: Condiment OilSeed - raw or cooked. Rich in oil[2, 11, 46, 63, 74, 81]. A soft texture with a hint of resin in the flavour, it makes a delicious snack and can also be used as a staple food[K]. The seed can also be dried and ground into a powder then used as a flavouring and thickener in soups etc[183]. Fairly large, the seeds are up to16mm x 12mm[200]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide Oil Resin Tannin WoodA tan or green dye is obtained from the needles[168]. The seeds are a source of soap and lubricating oil[266]. Tannin is obtained from the bark[266]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Yields turpentine and tar[74]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood. Used for construction and carpentry[74, 81]. The timber is used for construction, bridge building, vehicles, furniture, and wood pulp[266].

dwatta Analgesic Antibacterial Antiinflammatory Galactogogue PoulticeThe seed contains several medically active compounds and is analgesic, antibacterial and antiinflammatory[279]. It is used in Korea in the treatment of earache, epistaxis and to promote milk flow in nursing mothers[279] The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4]. The stem bark is used in the treatment of burns and skin ailments[218].

nrakta E. Asia - China, Korea, Manchuria, Siberia. ks-acta Dry mountain slopes, especially those facing north, to 2600 metres[74, 120].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Management: Standard Minor Global Crop Other Systems: Irreg. Intercrop Staple Crop: ProteinoilThrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. This species prefers a cool moist climate[81]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. This species is sometimes cultivated for its edible seed, there are some named varieties[183]. It is one of the main species utilized for its edible seeds[200], being gathered from cultivated and wild trees. Large quantities of the seeds are exported as a food crop from N. China[183]. Plants bear cones when they are 3.5 metres tall in Cornwall[59]. Trees are slow growing when young[11, 81]. Growth in the south-east of Britain is generally poor but trees in the west and north are healthy and growing well with average annual height increases of around 25cm and girth increases of 3cm or more[185]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. The cones do not open, seed is extracted by breaking up the soft scales of the cone[200]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature. many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. An evergreen. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.48 Aesculus flava

Sweet Buckeye, Yellow buckeye 4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus flava is a deciduous Tree growing to 20 m (65ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Nectar SeedEdible Uses: Seed cooked. Said to be as sweet as a chestnut[105, 177]. We have only eaten the immature seed, harvested in late August, but these were very tasty with no noticeable bitterness[K]. The seed can be up to 45mm in diameter and is easily harvested[82]. It can be dried, ground into a flour and used as gruel. The seed contains saponins and needs to be leached of these toxins before it becomes safe to eat - the North American Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and

rinsing them in a stream for 2 - 5 days[213, 229]. The resulting product is said to be tasty and nutritious[229], though most of the minerals etc would have been leached out[K]. The flowers contain a sweet nectar which is delicious when sucked out[245].

tcanta Soap WoodSaponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. Wood - very soft, light, close grained, difficult to split. It weighs 27lb per cubic foot[235]. It is used for making artificial limbs, wooden ware, pulp etc, and is occasionally sawn into lumber[46, 62, 82, 171].

nrakta Eastern N. America - Pennsylvanica to Tennessee and west to Ohio. ksacta Rich river-bottoms and mountain slopes[82]. Woodland on moist rich soils[43]

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Landscape Uses:Pest tolerant, Pollard, Specimen. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. Grows best in eastern and south-eastern areas of England probably needing a continental climate in order to thrive[126, 200]. Although the trees are very hardy when dormant, the new growth can be damaged by late spring frosts[11]. Plants grow well in a woodland situation, tolerating shading by larger trees[229]. Seedlings grow away quickly, the plants reaching maturity when about 60 - 80 years old[229]. The form Asculus flava vestita (Sarg.)Fern. is growing well at Kew Gardens. It has been seen with large crops of fruit on a number of occasions, even in cooler summers. These fruits have only been tried when immature (harvested at the end of August) but were then very tasty with no bitterness[K]. Fruits are produced more abundantly in warm summers[130]. Most members of this genus transplant easily, even when fairly large[11]. Special Features:Attractive foliage. North American native. Blooms are very showy.

## 5.2.49 Pinus albicaulis

White-Bark Pine

4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 20 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus albicaulis is an evergreen Tree growing to 20 m (65ft 7in) at slow rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in leaf all year, in flower from May to June, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Inner bark SeedEdible Uses: CondimentSeed - raw or cooked[226]. They can also be ground into a powder and then used as a flavouring in soups etc or can be added to cereal flours when making bread, biscuits, cakes etc[226]. Large and sweetly-flavoured, the oil-rich seed is up to 9 x 7mm[200] and has a thick shell[82]. It has a pleasant slightly resinous flavour[K]. Eating the raw seeds in quantity can cause constipation[257]. Inner bark[161, 177, 257]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide WoodA tan or green dye is obtained from the needles[168]. The needles contain a sub-

pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 5.2.56 Schisandra chinensis

Magnolia Vine, Wu Wei Zi 4 tlin 8 cyuc 4 kcak 2 tcan 5 dwat 9 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Schisandra chinensis is a deciduous Climber growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: GumFruit - raw or cooked[183]. Usually dried and used on journeys, it is very sustaining[74]. Rich in sugars[74], it has a sweet/sour flavour[178]. In Russia a paste made from the fruit is mixed with Actinidia arguta in order to counteract the insufficient acidity of that species[183]. The fruit is about 6mm in diameter and is borne in a grape-like bunch about 10cm long[200]. Young leaves - cooked and used as a vegetable[105, 177, 183].

tcanta Gum Hair Size WoodA viscid mucoid material is obtained from the fruit and the branches, it is used as a size for paper and as a hair dressing[178]. The dried wood is charmingly fragrant[11].

dwatta Antirheumatic Antitussive Aphrodisiac Astringent Cancer Cardiotonic Cholagogue Dysentery Expectorant Hepatic Lenitive Nervine Pectoral Sedative Stimulant Tonic UrinaryWu Wei Zi is commonly used in Chinese herbalism. where it is considered to be one of the 50 fundamental herbs[218]. It is an excellent tonic and restorative, helping in stressful times and increasing zest for life[254]. It is considered to be a substitute for ginseng and is said to be a tonic for both the male and the female sex organs[238]. The fruit is antitussive, aphrodisiac, hepatic, astringent, cardiotonic, cholagogue, expectorant, hypotensive, lenitive, nervine, pectoral, sedative, stimulant and tonic[174, 176, 178, 218]. Low doses of the fruit are said to stimulate the central nervous system whilst large doses depress it[218]. The fruit also regulates the cardiovascular system[218]. It is taken internally in the treatment of dry coughs, asthma, night sweats, urinary disorders, involuntary ejaculation, chronic diarrhoea, palpitations, insomnia, poor memory, hyperacidity, hepatitis and diabetes[238]. Externally, it is used to treat irritating and allergic skin conditions[238]. The fruit is harvested after the first frosts and sun-dried for later use[238]. The fruit

contains lignans[254]. These have a pronounced protective action on the liver. In one clinical trial there was a 76% success rate in treating patients with hepatitis, no side effects were noticed[254]. The seed is used in the treatment of cancer[218]. The plant is antirheumatic[218]. A mucilaginous decoction obtained from the branches is useful in the treatment of coughs, dysentery and gonorrhoea[218].

nrakta E. Asia - China, Japan, Korea. ksacta Mixed forests, especially on the margins, also by streams and brooks, usually on sandy soils[74].

propta Seed - best sown in the autumn in a cold frame[200, 238]. Pre-soak stored seed for 12 hours in warm water and sow in a greenhouse in the spring[238]. Germination can be slow and erratic. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first 2 years. Plant them out into their permanent positions in early summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame. Overwinter in the greenhouse and plant out in late spring[11, 78]. Good percentage[78]. Layering of long shoots in the autumn[200].

nwatta Prefers a rich well-drained moisture retentive soil[11, 200]. Prefers a slightly acid soil but tolerates some alkalinity if plenty of organic matter is added to the soil[200]. Requires some protection from the most intense sunlight[200]. Plants succeed in quite deep shade and are suitable for north-facing walls[219]. Plants are intolerant of drought[K]. The fully dormant plant is hardy to about -17°c, though the young growth in spring can be damaged by late frosts. Plants climb by twining around supports. Any pruning is best carried out in the spring[219]. The flowers are sweetly scented[245]. The leaves are also aromatic[245]. Dioecious. Male and female plants must be grown if seed is required. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2].

#### 5.2.57 Akebia x pentaphylla

4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 9 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Akebia x pentaphylla is a deciduous Climber growing to 9 m (29ft 6in). See above for USDA hardiness, It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw[200]. Sweet but insipid. The fruit has a delicate flavour and a soft juicy texture[K]. The flavour can be enhanced by the addition of a little lemon juice. Valued as a novelty, it looks somewhat like a deep-purple coloured sausage. The dried young leaves are a tea substitute.

tcanta BasketryThe peeled stems are very pliable. They can be bleached and used in basket making[46, 61].

nrakta E. Asia - Japan. ksacta Woods and thickets. A naturally occurring hybrid. A. guinata x A. trifoliata[200].

propta Seed best sown in a cold frame as soon as it is ripe. Surface sow in a light position[133]. The seed usually germinates in 1-3 months at 15°c[133]. Stored seed should be given 1 month cold stratification[113, 133] and can be very difficult to germinate. When large enough to handle, prick the seedlings out into individual pots and grow them

#### 5.2.54 Crataegus holmesiana

Holmes' hawthorn

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus holmesiana is a deciduous Tree growing to 10 m (32th) by 8 m (26th). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. An excellent dessert fruit, it has an acid yet sweet flavour, is juicy but with a mealy texture, it makes very pleasant eating[K]. Some forms have fruits with a disagreeable flavour[82]. The fruit can also be used in making pies, preserves etc, and can be dried for later use. The fruit is about 10mm in diameter[200]. A specimen at Cambridge Botanical garden has fruits up to 20mm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiac HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

nrakta Eastern N. America - Ontario to Maine, south to New York and Pennsylvania. ksacta Rich moist hillsides and the borders of streams and swamps[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all lussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hawthorns in general hybridize freely with other members of the genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish.

This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[11].

#### 5.2.55 Crataegus douglasii

Black Hawthorn

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 9 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Crataegus douglasii is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 95, 99, 101]. A very pleasant flavour with a sweet and juicy succulent flesh[46, 82, K], it makes an excellent dessert fruit and can be eaten in quantity[K]. The fruit can also be used for making pies, preserves etc, and can be dried for later uses[183]. The fruit is about 8mm in diameter and is borne in small clusters[200]. The fruits I have eaten have been considerably larger than this[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Needles WoodThe spines on the branches are used as needles for lancing boils, removing splinters etc[99]. Wood - close-grained, heavy, hard and tough. Used for tool handles etc[82, 99, 101].

dwatta Antirheumatic Astringent Cardiotonic Dysentery Hypotensive Poultice StomachicAn infusion of the shoots has been used to treat diarrhoea in children and sores in babies mouths[257]. A poultice of the chewed leaves has been applied to swellings[257]. An infusion of the bark has been used in the treatment of diarrhoea and dysentery[257]. An infusion of the sapwood, bark and roots has been used as a stomach medicine[257]. The thorns have been used as a treatment for arthritis[257]. The point of the thorn was used to pierce an area affected by arthritic pain. The other end of the thorn was ignited and burned down to the point buried into the skin. This treatment was very painful but it was said that after a scab had formed and disappeared, the arthritic pain had also disappeared[257]. The thorns have been used as probes for boils and ulcers[257]. Although no other specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Western N. America - British Columbia to Michigan, south to California. ksacta Open woods, banks of mountain streams and on rocky banks[43, 82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to

stance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc. for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - soft, light, coarse grained, brittle[82]. Used occasionally for fuel[229].

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta Western N. America - British Columbia to California. ksacta Often found on rocky ridges and bluffs, it is reduced to a prostrate gnarled mat at the highest elevations and exposures, but the best specimens are found at lower elevations in sheltered canyons[229]

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses: Specimen. Thrives in a light well-drained sandy or gravelly loam in a sunny position[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Plants often colonise exposed mountain slopes in the wild, their root system anchoring them firmly[226]. A long-lived but slow-growing tree in the wild[229]. It grows well in Britain[81], coning regularly at Kew[11], but not doing so well in the milder parts of the country[120]. It is best suited for growing in northern areas at higher elevations[120]. Trees do not produce large numbers of cones but small numbers are formed annually[229]. The cones are up to 8cm long, they ripen in late summer and do not open on the tree but fall intact to the ground[81, 82, 200, 226]. This species is the only N. American pine with this habit and it is thus considered to be a primitive species[226]. The seed is extracted by breaking up the soft scales of the cone[200]. Birds and mammals often open the cones and eat the seeds before they mature[1]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. This species is closely related to P. flexilis[11], differing mainly in the cones[226]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. An evergreen. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### **5.2.50** Morus alba

White Mulberry, Common Mulberry, 4 tlin 9 cyuc 4 kcak 4 tcan 3 dwat 18 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvif hjonli

drutta Morus alba is a deciduous Tree growing to 18 m (59ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista One report suggests that the raw fruit contains hallucinogens[62]. This fruit is frequently eaten in various parts of the world, there are even some named varieties, and no such effects have been mentioned elsewhere, nor observed by the writer when he has eaten the fruit. Possibly the unripe fruit was being referred to in the report, though even this would be surprising[K].

kcakta Edible Parts: Fruit Inner bark Leaves Manna ShootsEdible Uses: TeaFruit - raw[2, 7, 158]. A sweet taste, but the fruit is usually insipid[3, 11]. It contains about 1.5% protein, 0.5% fat, 8% carbohydrate, 0.7% malic acid[179]. Fruits of the cultivar 'Pendulum' tried at Kew in July 1994 had a pleasant flavour[K]. A richer flavour develops if the fruit is dried, it can then be used as a raisin substitute. The fruit is up to 25mm long[200]. Some caution is advised, see the notes above on toxicity. Per 100 g, the fruit is reported to contain 87.5 g water, 1.5 g protein, 0.49 g fat, 8.3 g carbohydrates, 1.4 g fiber, 0.9 g ash, 80 mg Ca, 40 mg P, 1.9 mg Fe, 174 IU vit. A, 9 ?g thiamine, 184 µg riboflavin, 0.8 mg nicotinic acid, and 13 mg ascorbic acid. Young leaves and shoots - cooked[105, 183]. A famine food, used when all else fails[177]. The leaf makes a good vegetable, it is rich in carotene and calcium[179]. Protein perparations from young mulberry leaves form an excellent supplement to proteindeficient diets[269]. The dry leaves contain 18 - 28.8% protein, 0.2 - 0.7% Magnesium, 0.8 - 13.6% soluble sugars, 0.6 - 1.4% phosphorus, 2 - 3.9% potassium, 1.4 - 2.4% calcium. 0.8 - 1.8% aluminium, 0.05 - 0.26% iron, 1.8 - 2.6% silica, and 0.3 - 0.56% sulphur[269]. The leaf also contains 10% tannin[179]. Inner bark - roasted and ground into a meal then used as a thickener in soups etc or mixed with cereals when making bread. A famine food, used when all else fails[179]. The tree is said to be a source of an edible manna[183]. Young shoots can be used as a tea substitute[183].

tcanta Biomass Dve Fibre Fodder Shelterbelt Tannin WoodA fibre is obtained from the bark of one-year old stems, it is used in weaving clothes etc[7, 74, 266]. The stem bark is fibrous and is used in China and Europe for paper making[266, 269]. The twigs are used as binding material and for making baskets[269]. A brown dye is obtained from the trunk[178]. The leaves contain 10% tannin[179]. This tree can be grown as a part of a shelterbelt. The cultivar 'Tartarica' has been especially mentioned[200], it is very suitable for northern latitudes and is much used as a sheltebelt in Russia[269]. The wood of the mulberry is a potentially excellent source of ethanol, with yields of up to 6% from sawdust treated with acid and then given four days incubation[269]. Wood - light to moderately heavy, hard, durable, fine and close-grained, though it shows a tendency to warp. Due to its elasticity and flexibility when steamed, it is valued for making sports equipment such as tennis rackets and cricket bats, being considered as good as ash (Fraxinus excelsior)[238, 269]. It is also used for boat building, furniture, agricultural implements etc[145, 149, 158, 269]. It furnishes a medium grade fuel wood[269].

dwatta Analgesic Anthelmintic Antiasthmatic Antibacterial Antirheumatic Antitussive Astringent Diaphoretic Diuretic Emollient Expectorant Hypoglycaemic Hypotensive Odontalgic Ophthalmic Pectoral Purgative Sedative Tonic UrinaryThe white mulberry has a long history of medicinal use in Chinese medicine, almost all parts of the plant are used in one way or another[238]. Recent research has shown improvements in elephantiasis when treated with leaf extract injections and in tetanus following oral doses of the sap mixed with sugar[238]. The leaves are antibacterial, astringent, diaphoretic, hypoglycaemic, odontalgic and ophthalmic[176, 218, 238]. They are taken internally in the treatment of colds, influenza, eye infections and nosebleeds[176, 238]. An injected extract of the leaves can be used in the treatment of elephantiasis and purulent fistulae[176]. The leaves are collected after the first frosts of autumn and can be used fresh but are generally dried[238]. The stems are antirheumatic, antispasmodic, diuretic, hypotensive and pectoral[176, 218, 238]. They are used in the treatment of rheumatic pains and spasms, especially of the upper half of the body, high blood pressure[176]. A tincture of the bark is used to relieve toothache[7]. The branches are harvested in late spring or early summer and are dried for later use[238]. The fruit has a tonic effect on kidney energy[218, 238]. It is used in the treatment of urinary incontinence, dizziness, tinnitus, insomnia due to anaemia, neurasthenia, hypertension, diabetes, premature greying of the hair and constipation in the elderly[176, 238]. The root bark is antiasthmatic, antitussive, diuretic, expectorant, hypotensive and sedative[176, 238]. It is used internally in the treatment of asthma, coughs, bronchitis, oedema, hypertension and diabetes[176, 238]. The roots are harvested in the winter and dried for later use[238]. The bark is anthelmintic and purgative, it is used to expel tape worms[240]. Extracts of the plant have antibacterial and fungicidal activity[218].

nrakta E. Asia - central and northern China. ksacta Not known in a truly wild situation.

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive [78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside [78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Agroforestry Services: Contour hedgerow Agroforestry Ontainebleu[11]. Services: Living fence Fodder: Bank Fodder: Insect Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Other Systems: Dyke-pondLandscape Uses:Pest tolerant, Aggressive surface roots possible, Pollard. Succeeds in a variety of soils[269], though it prefers a warm well-drained loamy soil in a sunny position[1, 11]. Plants are fairly windresistant[200], though the branches are often killed back when growing in strong maritime exposure[K]. At least some cultivars are drought resistant, the form 'Tatarica' has been especially mentioned[183]. The white mulberry is occasionally cultivated for its edible fruit, there are a number of varieties[183] and sub-species varying greatly in the quality of their fruit. The form M. alba multicaulis. (Perretot.)Loud. (synonym M. multicaulis. Perretot.) has been specially mentioned for its fruit[105]. The cultivars 'Nana' and Fegyvernekiana' are dwarf forms only making shrub size[182]. The cultivar 'Pendulum' was seen growing at Kew in July 1994 with a heavy crop of tasty fruits, the first of which were just ripening[K]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. This is a good tree for growing grapes into[20]. The grapes are difficult to pick but always seem to be healthier and free from fungal diseases[201]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Naturalizing, There are

no flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 5.2.51 Sorbus latifolia

French Hales

4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 14 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Sorbus latifolia is a deciduous Tree growing to 14 m (46ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit is usually bletted if it is going to be eaten raw[K]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit. The fruit is up to 1.5cm across[200] and is borne in bunches which makes harvesting easier[K].

nrakta Europe - France. ksacta Only found in the forest

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. Probably of hybrid origin with S. torminalis as one parent and S. aria or a species from that complex as the other parent[11]. The trees usually have apomictic flowers. They thus produce seed asexually, each seedling being a clone of the parent[11].

#### 5.2.52 Akebia guinata

Akebia, Chocolate vine, Fiveleaf Akebia, Chocolate Vine 4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 12 m hkuc pcimhmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli dvat hionli

drutta Akebia guinata is a deciduous Climber growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower for their optimal soil requirements including nutrients and from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw[2, 105, 177]. Sweet but insipid[3]. The fruit has a delicate flavour and a soft, juicy texture[K]. Lemon juice is sometimes added to the fruit to enhance the flavour[183]. The bitter skin of the fruit is fried and eaten[183]. The fruit is 5 -10cm long and up to 4m wide[200, 266]. Soft young shoots are used in salads or pickled[183]. The leaves are used as a tea substitute[105, 177, 183].

tcanta BasketryThe peeled stems are very pliable and can be used in basket making[174]. Plants have sometimes been used as a ground cover, but their method of growth does not really lend themselves to this use[208]. Scented. Landscape Uses: Arbor

dwatta Anodyne Antiphlogistic Bitter Cancer Contraceptive Depurative Diaphoretic Diuretic Emmenagogue Febrifuge Galactogogue Laxative Resolvent Stimulant Stomachic Urinary VulneraryThe stems are anodyne, antifungal, antiphlogistic, bitter, diaphoretic, diuretic, emmenagogue, febrifuge, laxative, galactogogue, resolvent, stimulant, stomachic and vulnerary[174, 178, 218, 238]. Taken internally, it controls bacterial and fungal infections and is used in the treatment of urinary tract infections, lack of menstruation. to improve lactation etc[238]. The stems are harvested in the autumn and dried for later use[238]. The fruit is antirheumatic, depurative, diuretic, febrifuge, stomachic and tonic[218]. It is a popular remedy for cancer[218]. The root is febrifuge[218]. The plant was ranked 13th in a survey of 250 potential antifertility plants in China[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods, hedges and thickets in mountainous areas[58]. Forest margins along streams, scrub on mountain slopes at elevations of 300 - 1500 metres in China[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Surface sow in a light position[133]. The seed usually germinates in 1 - 3 months at 15°c[133]. Stored seed should be given 1 month cold stratification[113, 133] and can be very difficult to germinate. When large enough to handle. prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[11, 113]. The cuttings can be slow to root[200]. Cuttings can also be taken of soft wood in spring[113]. Root cuttings, December in a warm greenhouse[113]. Layering in early spring[1]. Very easy, the plants usually self-layer and so all you need to do is dig up the new plants and plant them out directly into their permanent positions.

nwatta Requires a well-drained moisture retentive soil[200]. Prefers a good loamy soil[11]. Succeeds in acid or alkaline soils[200]. Prefers partial shade but succeeds in full sun[3, 200]. Succeeds on north facing walls[219]. Plants are fast growing and can be invasive[200]. Dormant plants are hardy to about -20°c but they can be somewhat tender when young[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species grows very well in S.W. England[11]. Plants are evergreen in mild winters[11]. Resentful of root disturbance, either grow the plants in containers prior to planting them out or plant them out whilst very young[219]. Plants are not normally pruned, if they are growing too large they can be cut back by trimming them with shears in early spring[202]. The flowers have a spicy fragrance, reminiscent of vanilla[219]. Plants are shy to fruit, they possibly require some protection in the flowering season, hand pollination is advisable[3, 11]. Plants are probably self-sterile[11, 182], if possible at least 2 plants should be grown, each from a different source. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

#### 5.2.53 Prunus cerasifera divaricata

4 tlin 8 cyuc 4 kcak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prunus cerasifera divaricata is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit raw or cooked[74]. Tastes like a Mirabelle plum[2, 11]. A very pleasant plum-like flavour when fully ripe with a mealy though juicy flesh[K]. It is high in citric acid, containing about 4.7%[74]. The fruit is about 30mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dve RootstockUsed as a rootstock for plums, peaches and apricots[74]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S.E. Europe to W. Asia. ksacta Mountain slopes in woody or shrubby thickets, on stony slopes, ravine bottoms, near water and montane river valleys to 2000 me-

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Requires a well-drained moisture retentive soil[11, 200]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Plants are hardy to about -25°c[184]. According to some botanists this plant should be named P. divaricata and P. cerasifera should be named P. divaricata cerasifera[11]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

good fuel[82]. Acorns are abundant and an excellent source of food for wildlife. Schuette's oak is considered to be a low-maintence tree with good pest resistance. A medium shade tree for moist landscape areas. Specimen or group. Lawns or parks. Street tree. Well suited to soggy soils. Riverbanks.

nrakta Naturally occurring hybrid scattered through locations where the ranges of the parent trees coincide (southern Ontario and Quebec south to Kentucky, Missouri and Oklahoma). ksacta Native Range: Garden origin

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Schuette Oak is a hybrid between Quercus bicolor (swamp white oak) and Quercus macrocarpa (bur oak). It grows best in rich, humusy, medium to wet soils, but can tolerate soggy soils to drier upland soils. Great for low and high areas on properties. Tolerates a wide range of moisture, pH, and soil types. Bloom Time: April to May. Bloom Description: Yellowish-green. Leaf: Good Fall color. Fall color is a yellowish-brown, sometimes tinged with red. Fruit: Showy. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 5.2.165 Morus rubra

Red Mulberry, Common Mulberry, White Mulberry 4 tlin 9 cyuc 3 koak 2 tcan 2 dwat 15 m hkuc hminhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Morus rubra is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the leaves or stems can cause dermatitis in some very sensitive people[226]. The milky sap in the leaves and unripe fruits can cause dermatitis, hallucinations and central nervous system disturbances[274].

kcakta Edible Parts: Fruit Leaves ShootsEdible Uses: Fruit - raw, cooked or made into preserves[2, 3, 21, 62, 149, 183]. Large and sweet with a good flavour, the fruit can be up to 3cm long[200]. The fruit can also be dried and ground into a powder[183]. This is used to make a delicious confection with almonds and other nuts[183]. The fruit is soft and juicy, when fully ripe it falls from the tree and is easily squashed[227]. Unripe fruits can cause stomach disorders[226]. Young shoots and unfolding leaves - raw or cooked. The related White Mulberry (Morus alba) has edible young leaves and shoots eaten cooked[105, 183] but we have found no information for this plant.

tcanta Fibre WoodA cloth can be made from the fibrous bark[149]. Wood - coarse-grained, light, very durable, not strong, soft, rather tough. It weighs about 45lb per cubic foot and is used for boats, fencing and cooperage[46, 61, 82, 227, 229].

dwatta Anthelmintic Cathartic Dysentery FebrifugeThe root bark is anthelmintic and cathartic[21]. A tea made from the roots has been used in the treatment of weakness, difficult urination, dysentery, tapeworms and as a panacea[222, 257]. The sap is used in the treatment of ringworm[222, 257]. Another report says that the milky juice obtained from the axis of the leaf is used[21]. The fruits are used to reduce fevers[222].

nrakta Eastern N. America - Quebec to Florida, west to Texas and South Dakota. ksacta Rich moist woods[43, 227].

Sunny places along the sides of roads[159]. Plants do not grow well on poor soils[227].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113,200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible, Pollard. Prefers a warm well-drained loamy soil in a sunny position[1, 11]. The red mulberry is sometimes cultivated for its edible fruit, there are some named varieties[183]. It is said to be of no value as a fruiting tree in Britain[1, 11]. Trees come into bearing when about 10 years old, fruiting best between the ages of 30 -85 years and declining from the age of 125 years[227]. A good plant to grow grapes into. The grapes are difficult to pick but they always seem to be healthier and free from fungal diseases[201]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious[229] Male and female plants must be grown if fruit is required. Special Features: Not North American native, Naturalizing, There are no flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.166 Vitis labrusca

Northern Fox Grape, Fox grape 4 tlin 9 cyuc 3 kcak 2 tcan 1 dwat 15 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Vitis labrusca is a deciduous Climber growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves Oil Sap ShootsEdible Uses: OilFruit - raw or dried for winter use[1, 2, 46, 61, 161]. The fruit can also be made into pies, preserves etc[183]. A distinctive musky aroma and taste that is not acceptable to many people[11, 183, 200]. The fruit is best after a frost[101]. Sweetish[43], it contains 6.6 - 16.6% sugars[179]. The fruit is up to 2cm in diameter[200] and is produced in fairly large bunches[235]. Young leaves - cooked[55, 159]. A pleasant acid flavour, they are cooked as greens or can be wrapped around other foods and then

well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Coffee Salt SweetenerSeed - cooked. The seed can be ground into a flour and used as a cereal in making bread, porridge etc[1, 4, 34, 46]. Malt is obtained by sprouting and roasting the seed, then boiling the seed. The resulting liquid is a sweet substance that is used in making beer and as a food[4, 46]. The longer the seed is roasted, the darker this liquid will be. The roasted (unsprouted) seed is used as a coffee and a salt substitute[46].

tcanta Biomass Mulch PaperThe stems, after the seed has been harvested, have many uses. They are a source of fibres for making paper, a biomass for fuel etc, they can be shredded and used as a mulch[141, 171].

dwatta Antidiarrhoeal Demulcent Nutritive UrinaryBarlev grain is an excellent food for convalescence, either in the form of porridge or as a decoction of the seed. It is soothing to the throat and provides easily assimilated nutrients[4, 254]. It can also be taken to clear catarrh. Its demulcent properties soothes inflammation of the gut and urinary tract[254]. It is commonly given to children suffering minor infections or diarrhoea and is particularly recommended as a treatment for feverish states and in catarrhal affections of the respiratory and urinary organs[4, 254]. Made into a poultice, the seed is an effective remedy for soothing and reducing inflammation in sores and swellings[254]. Modern research has shown that barley may be of aid in the treatment of hepatitis, whilst other trials have shown that it may help to control diabetes[254]. Barley bran may have the effect of lowering blood cholesterol levels and preventing bowel cancer[254].

nrakta Of uncertain origin, possibly a hybrid between H. spontaneum and a 6-rowed barley[34]. ksacta Not known in the wild. Occurs as a relict of cultivation in Britain but it does not persistf 171.

propta Seed - sow in situ in March or October and only just cover the seed. Make sure the soil surface does not dry out if the weather is dry. Germination takes place within 2 weeks.

nwatta Succeeds in most soils and in climates ranging from sub-arctic to sub-tropical[1, 171]. Easily grown in light soils[162]. Widely cultivated in temperate zones, especially in cooler or moister areas, for its edible seed[1, 50, 171]. There are many named varieties. This species is sometimes considered to be no more than a sub-species of H. vulgare[61].

#### 5.2.90 Hemerocallis exaltata

4tlin 8 cyuc4kcak0tcan 1 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis exaltata is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[116, 205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. They can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - Japan, it is only found on Tobishima Island, a small Islet off W. Japan. ksacta Meadows[187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones. preferring a rich moist soil[200, 205]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorterlived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. This species is hardy to about -15°c[187]. Hybridizes freely with other members of this genus[200]. Some roots are short and enlarged, others long with spindle-shaped tuberous ends. The plant forms a compact clump[233], but it also produces rhizomes that tend to spread[205]. Individual flowers are very short-lived, they open in the morning and wither in the evening[205]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 5.2.91 Campanula glomerata

Clustered Bellflower, Dane's blood, Clustered Bellflower  $4 ext{ tlin } 9 ext{ cyuc } 4 ext{ kcak } 0 ext{ tcan } 0 ext{ dwat } 1 ext{ m hkuc}$ 

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Campanula glomerata is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked. A mild flavour with a pleasant sweetness, it can be used as a major ingredient in salads[K]. Flowers - raw[K]. Beautiful to look at, they have a pleasant sweetness and make a very attractive decoration to a salad[K].

nrakta Most of Europe, including Britain, to temperate Asia. ksacta Grassy places on calcareous soils, particularly in chalk grassland, less commonly on sea-cliffs or in woods[17].

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c. Very easy[221]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring. Very easy[221]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy[221], larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden, Specimen. Prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Succeeds in any well-drained soil in sun or partial shade[233]. A very ornamental plant, there are several named forms[200]. This is a very vigorous species and can be invasive, spreading by means of its creeping root-stock, when well suited to its site[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. The species in this genus do not often hybridize and so seed can

generally be relied upon to come true[221]. The plants are self-fertile[221]. Special Features:Not North American native, Invasive, Attracts butterflies, Suitable for cut flowers. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread

#### 5.2.92 Myrrhis odorata

Sweet Cicely, Anise

4 tlin 8 cyuc 4 kcak 3 tcan 3 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Myrrhis odorata is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Root SeedEdible Uses: TeaLeaves - raw or cooked[2, 5, 37, 52]. Excellent raw, the leaves have a delicious sweet aniseed flavour[9] and are liked by the majority of people who try them[K]. They are also used as a flavouring for vegetables [183], and are an important ingredient of the herb mix 'bouquet garni'[244]. They can be cooked with tart fruits in order to reduce their acidity[14. 1831. The plant produces fresh leaves from late winter to early the following winter[200]. The leaves can also be dried for later use[21]. It is best to prevent the plant from flowering if the leaves are required for culinary use, because they lose their flavour when the plant is in flower[244]. Root - raw or cooked[1, 2, 5, 14, 37]. A similar flavour to the leaves[K]. So long as it is not too old, the root can be boiled and mixed with other vegetables or added to salads[9]. Seed - raw or cooked[1, 2, 183]. An aniseed flavour, it is usually used as a flavouring[14, 115] but can also be eaten raw whilst it is still green and before the fibrous coat has formed[1, 9]. It makes an excellent mouth freshener[K]. A tea is made from the leaves[183]

tcanta PolishThe leaves and the seed make good polishes for wood[4, 6, 115]. You just rub them over the wood and then rub the wood with a clean cloth to remove any greenness. It is particularly good on oak panels[5], giving a lovely glossy finish and an aromatic smell[244]. Invertabrate shelter, Nectary. Aromatic.

dwatta Antiseptic Aromatic Carminative Expectorant StomachicThe whole plant, including the seed, is aromatic, carminative, expectorant and stomachic[4]. It is useful in the treatment of coughs and flatulence, and also as a gentle stimulant for the stomach[4, 238]. The root is antiseptic and a decoction has been used to treat snake and dog bites[4, 244]. An ointment made from the roots has been used to ease gout and soothe wounds[244].

nrakta Mountainous regions of Europe, including Britain. ksacta Grassy places, hedges and woods in hilly regions, often near human habitations[4, 9, 17].

propta Seed - best sown as soon as it is ripe since stored seed is difficult to germinate[1]. The seed can be sown in an outdoor seedbed or, if supplies are limited, it can be sown in pots in a cold frame. Thin the seedlings in the outdoor bed as necessary (eat the thinnings) and transplant the young plants into their final positions in the following spring. Prick out the pot-grown seedlings into individual pots when they are large enough to handle and plant them out in spring. Division in

spring or autumn. Remove the tapering tap root and cut the remaining root into sections with at least one eye per section and replant in their permanent position.

nwatta Prefers a moist rich soil in a shady position[14, 52, 200]. Thrives in all soils[1] in sun or shade[111, 200]. This species is hardy to about -15°c according to one report[200] whilst another says that it is hardy to at least -20°c[187]. Plants often self-sow freely[200]. Sweet cicely used to be guite widely cultivated as a food plant but is now only occasionally grown in the herb garden. This is a shame since it is an extremely useful and tasty plant to grow and can provide food all year round[K]. A good bee plant[4]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.93 Astrebla squarrosa

Bull Mitchell grass

4 tlin 12 cyuc 4 kcak 1 tcan 0 dwat 1.5 m hkuc

tuni 12 cyuc 4 koak i tuan u uwa 1.5 m ikuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Astrebla squarrosa is a PERENNIAL growing to 1.5 m (5ft) by 0.1 m (0ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 10. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista None Known

kcakta Edible Parts: SeedEdible Uses: Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Cultivated in the past but largely or completely abandoned.

tcanta Providing habitat for organisms such as mammals.

dwatta None Known

nrakta Australasia. ksacta Heavy, cracking clays on plains and river flats, sometimes with Lysiphyllum or Excoecaria, or in Dicanthium-Eulalia grassland and cleared Brigalow areas; flowers after rain.

propta Wild. Seed.

nwatta Historic Crop Management: Standard Staple Crop: Balanced carbClimate: subtropical to tropical. Humidity: semi-arid. Grow on clay soils, mainly between an upper limit of 600 mm average annual rainfall, and a lower limit of 200 mm, and even below in depressions where the water concentrates following rains e.g. in Sturt's Stony Desert. Mitchell grasses are deep rooted and become dormant during drought, allowing them to survive extended periods without rainfall. Carbon Farming Solutions - Cultivation: historic crop. Cultivated in the past but largely or completely abandoned. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

#### 5.2.94 Aralia cordata

Udo

4 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 1.8 m hkuc pcimhmim cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli named varieties[183]. This hybrid combines the best qualities of each parent[200] - the aromatic kernel flavour and superior climatic adaptability of J. cinerea with the higher yields, better appearance and crackability of J. ailanthifolia cordiformis[183]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 5.2.163 Iuniperus occidentalis

Western Juniner

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 18 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli dyat hjonli

drutta Juniperus occidentalis is an evergreen Tree growing to 18 m (59ft 1in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable H: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 61, 105]. A thin dry flesh[82] with a resinous flavour[2, 82]. The fruit is sweet and nutritious[2], it can also be dried or ground into a powder and mixed with cereal flours to be made into a bread[161]. The cones are about 10mm in diameter, they take 2 years to mature[200].

tcanta Basketry Beads Fibre Fuel Incense Lighting Miscellany Tinder WoodThe bark is employed as a tinder and is also made into a slow match[216, 257]. The crushed bark was twisted into a rope, tied at intervals with vucca (Yucca species), and wrapped into a coil. The free end was set on fire and kept smouldering by blowing on it at intervals. Fire could be carried in this fashion for several hours[257]. The bark can be wound around a stick and used as a torch to provide light and carry fire to a new campsite[257]. The bark can be rubbed between the hands until it is soft and the fibres can then be woven into clothing[257]. The bark can also be rolled into rope, coiled and then sown to form sandal shoes[257]. The root fibre is used to make twined baskets[257]. The branches have been burnt as an incense and fumigant in the home[257]. The dried seeds have been used as beads or as the 'rattle' in rattles[216]. Wood - very closegrained, light, soft, exceedingly durable. It is easily worked and can be exquisitely finished. Because of its small size, however, it is mainly used for fencing, fuel[46, 61, 82, 229].

dwatta Analgesic Antiseptic Birthing aid Blood tonic Diuretic Febrifuge Laxative Miscellany Odontalgic PoulticeWestern juniper was quite widely employed as a medicinal herb by a number of native North American tribes who used it to treat a variety of complaints, especially those related to the kidneys and the skin[257]. It is rarely, if at all, used in modern herbalism. The leaves are blood tonic and laxative[216]. A decoction is used in the treatment of constipation, coughs and colds[216]. An infusion of the leaves has been taken by pregnant women prior to giving birth in order to relax the muscles[257]. A poultice of the pounded moistened leaves has been applied to the jaw to treat swollen and sore gums and toothaches[257]. The berries are analgesic, blood tonic and diuretic[257]. A decoction is used to relieve the pain of menstrual cramps and to induce urination[257]. Externally, the decoction is used as a poultice on rheumatic joints[257]. The young twigs are antiseptic, blood tonic and febrifuge[257]. A decoction is used in the treatment of kidney problems, fevers, stomach aches, smallpox, influenza and haemorrhages[257]. The branches have been used in a sweat bath to ease rheumatism[257]. A poultice of the twigs has been used as a dressing on burns and as a drawing agent on boils or splinters[257]. A decoction has been used as an antiseptic wash on sores[257]. The leaves or young twigs have been burnt and the smoke inhaled to ease the pain of headaches[257].

nrakta Western N. America - British Columbia to the Sierra Nevada. ksacta Usually found on thin rocky or sandy soils[229] on desert foothills and lower mountains[60], also on windswept peaks[82] up to elevations of 3,000 metres where they become low gnarled shrubs[229].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils, including chalk, so long as they are well drained[1, 11], preferring a neutral or slightly alkaline soil[11]. Established plants are drought tolerant, succeeding in hot dry positions[200]. Plants are slowgrowing, though they can live for 3000 years in the wild[200, 2291. They are much shorter-lived in cultivation[200], growing better in dry areas with hot summers[200]. Western Britain is generally to cool and wet for this species to thrive[200]. Plants are usually monoecious but are sometimes dioecious. Male and female plants must usually be grown if seed and fruit is required. The fruit takes two summers to ripen[229]. Plants are resistant to honey fungus[88]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

### 5.2.164 Ouercus × schuettei

Schuette's oak

4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 18 m hkuc htut cyutli tcuphja7n hwicli jlutnyik hpa7tli prik hpa7tmwatli hionli

drutta Quercus × schuettei is a deciduous Tree growing to 18 m (59ft) by 18 m (59ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: neutral soils. It cannot grow in the shade. It prefers moist or wet soil

pcista None Known

kcakta Produces large, edible acorns that are low in tannins. Seed - cooked[101, 105, 161, 257]. The seed can be ground into a powder and used in making bread, dumplings etc and as a thickener in soups[183]. Many trees have sweet seeds with little tannin and the seed can be eaten raw or cooked. If the seed is bitter then this is due to the presence of tannins, these can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Agroforestry Uses: rehabilitation of the soil. It may be either seeded or transplanted onto disturbed areas[1050]. Other Uses: The leaves of most species in this genus are more or less rich in tannins. A mulch of the leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc. Fresh leaves should be used with caution, since these can utilize some of the nitrogen in the soil and this inhibit plant growth[20, K]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark has been used as a mordant for fixing dyes[257]. The wood is hard, heavy, strong, tough, very durable, close grained. The wood is a

dwatta Anaesthetic Antiseptic Cancer StomachicThe pods have been made into a tea for the treatment of indigestion, measles, catarrh etc[222, 257]. The juice of the pods is antiseptic[222]. The pods have been seen as a good antidote for children's complaints[257]. The alcoholic extract of the fruits of the honey locust, after elimination of tannin, considerably retarded the growth, up to 63% of Ehrlich mouse carcinoma[269]. However, the cytotoxicity of the extract was guite high and the animals, besides losing weight, showed dystrophic changes in their liver and spleen[260]. The alcoholic extract of the fruit exerted moderate oncostatic activity against sarcoma 180 and Ehrlich carcinoma at the total dose 350 mg/kg/body weight/mouse. Weight loss was considerable[269]. An infusion of the bark has been drunk and used as a wash in the treatment of dyspepsia[257]. It has also been used in the treatment of whooping cough, measles, smallpox etc[257]. The twigs and the leaves contain the alkaloids gleditschine and stenocarpine[4]. Stenocarpine has been used as a local anaesthetic whilst gleditschine causes stupor and loss of reflex activity[4]. Current research is examining the leaves as a potential source of anticancer compounds[222].

nrakta Eastern N. America. Occasionally naturalized in C. and S. Europe. ksacta Usually growing singly, though occasionally forming almost pure woods, on the borders of streams and in rich woods, usually in moist fertile soils but sometimes on dry sterile gravelly hills[43, 82].

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo [78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within 2 - 4 weeks at 20°c. As soon as they are large enough to handle, prick the seedlings out into individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Agroforestry Services: Living fence Fodder: Bank Fodder: Pod Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Staple Crop: Balanced carbLandscape Uses:Aggressive surface roots possible, Specimen. Succeeds in most soils, acid or alkaline[160, 200], so long as they are well-drained[202]. Requires a sunny position[11]. Tolerates drought once established[1] and atmospheric pollution[200]. Salt tolerant[200]. The honey locust is speculated to tolerate an annual precipitation of 60 to 150cm, an annual temperature range of 10 to 21°C, and a pH in the range of 6 to 8[269]. Trees are rather tender when young, but they are hardy to about -30°c once they are established[200]. They grow best in southern Britain[11]. The honey locust is often cultivated in warm temperate zones for its edible seeds and seedpods[202], trees start to bear when about 10 years old and produce commercial crops for about 100 years[227]. Wild trees seldom live longer than 120 years[229]. Trees are shy to flower and therefore do not often produce a worthwhile crop in Britain due to our cooler summers[202]. There are some named varieties[183]. The sub-species nana produced lots of viable seed in the hot summer of 1989 at Kew[K], it also had a very good crop in 1994, 1996 and in 1999[K]. The sub-species inermis had a very good crop of pods in the autumn of 1996[K]. 'Ashworth' has pods with a very sweet pulp that has a melonlike flavour[183]. The flowers have a pleasing scent[245]. A very ornamental tree[1], the flowers are very attractive to bees[149, 269]. Trees have a light canopy, they come into leaf late and lose their leaves early[11] making them an excellent canopy tree for a woodland garden. Plants in this genus are notably resistant to honey fungus[200]. Unlike most plants in this family, honey locusts do not fix atmospheric nitrogen[160, 226]. Special Features:North American native, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones

11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.162 Juglans x bisbyi

4 tlin 8 cyuc 3 kcak 2 tcan 0 dwat 20 m hkuc

htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fvif hionli

drutta Juglans x bisbyi is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is monoecious (individual flowers are either male or female. but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed raw[183]. The shell is thin and the seed well-flavoured[183]. 200]. An edible oil is obtained from the seed, it tends to go

tcanta Herbicide OilPlants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

nrakta A hybrid of garden origin, J. cinerea x J. ailanthifolia cordiformis. ksacta Not known in the wild.

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113]. This is a hybrid species and so it might not breed true from seed.

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1. 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. A hybrid, J. cinerea x J. ailanthifolia cordiformis, it is sometimes cultivated for its edible seed, there are some

drutta Aralia cordata is a PERENNIAL growing to 1.8 m semi-shade (light woodland) or no shade. It prefers dry or (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves Root Shoots StemEdible Uses: Young branched shoots - cooked or raw[2, 46, 61, 105, 177, 279]. They can be up to 1.5 metres long and have a mild and agreeable flavour[116]. They are usually blanched and are crisp and tender with a unique lemon-like flavour[183]. They can be sliced and added to salads, soups etc[206]. The shoots contain about 1.1% protein, 0.42% fat, 0.8% soluble carbohydrate, 0.55% ash[179], Root - cooked[22, 105, 177], Used like scorzonera[2].

dwatta Analgesic Antiinflammatory Carminative Diuretic Febrifuge Stimulant Stomachic TonicThe root is sometimes used in China as a substitute for ginseng (Panax species)[218]. It is said to be analgesic, antiinflammatory, carminative, diuretic, febrifuge, stimulant, stomachic and tonic[218, 279]. The root contains an essential oil, saponins, sesquiterpenes and diterpene acids[279]. It is used in Korea to treat the common cold and migraines[279]

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and thin woods, esp. by streams and ravines, all over Japan[58,

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a good deep loam and a semi-shady position[1, 134]. Requires a sheltered position[1]. Plants are hardier when grown in poorer soils[200]. Tolerates a pH in the range 5.0 to 7.4. Dormant plants are hardy to about -25°c[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This is a commonly cultivated food crop in Japan, where it is grown for its edible shoots. There are several named varieties[2. 46, 58, 116]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

#### 5.2.95 Hemerocallis minor

Grassleaf Day Lily, Small daylily 4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis minor is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[2, 20, 46, 61, 183]. They must be consumed when very young or else they become fibrous[K]. One report says that eating these leaves appears to stimulate or intoxicate to some extent[2]. Flowers and flower buds - raw or cooked[2, 20, 46, 61]. Considered to be a great delicacy[177]. The flowers are a traditional food in China where they are steamed and then dried[266]. The flowers can be dried and used as a relish or a thickener in soups etc[178, 183]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[183, 205]. A radish-like flavour but not so sharp[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Anodyne Antidote Cancer Diuretic Febrifuge Vitamin CAnodyne, antidote, diuretic, febrifuge[178]. The juice of the roots is an effective antidote in cases of arsenic poisoning[205]. The root also has a folk history of use in the treatment of cancer - extracts from the roots have shown antitumour activity[218]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - N. China. Korea. ksacta Water meadows. elevated wet places with sandy soils, forest glades, mountain slones and scrub[74]

propta Seed - sow in the middle of spring in a green house. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year Kl. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. A very cold-hardy plant, tolerating temperatures down to about -25°c[187]. Hybridizes freely with other members of this genus[200]. A very ornamental plant, its roots are slender and not tuberous, whilst the rhizomes are not spreading[187]. The roots sometimes have bulbous swellings at their tips[205]. The flowers open in the evening and live for about 2 days[205]. The flowers have a powerful scent of honeysuckle[245]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 5.2.96 Lilium lancifolium

Tiger Lily, Devil Lily

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Lilium lancifolium is a BULB growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista The pollen is said to be poisonous, producing vomiting, drowsiness and purging[4].

kcakta Edible Parts: Flowers RootEdible Uses: Bulb -cooked[2, 4, 42, 47]. Somewhat bitterish[105]. Fairly pleasant, when properly cooked they are highly esteemed as a vegetable and somewhat resemble parsnips in flavour[183]. The bulbs are up to 8cm in diameter[266]. They are a good source of starch[105, 183]. The bulb can be dried and ground into powder. Flowers - raw or cooked. Used fresh or dried in salads, soups, rice dishes etc[183].

dwatta Antiinflammatory Cardiac Carminative Diuretic Emmenagogue Emollient Expectorant Ophthalmic Women's complaintsThe bulb is antiinflammatory, diuretic, emmenagogue, emollient and expectorant[240, 279]. They are used to relieve heart diseases, pain in the cardiac region and angina pectoris[240]. They are used in Korea to treat coughs, sore throats, palpitations and boils[279]. The flowers are carminative[240]. They are used to strengthen the eye-lid muscles and are commended in the treatment of myopic astigmatism[240]. A tincture made from the flowering plant, harvested when in full flower, is used in the treatment of uterine neuralgia, congestion, irritation and the nausea of pregnancy[4]. It relieves the bearing-down pain accompanying uterine prolapse and is an important remedy in ovarian neuralgia[4].

nrakta E. Asia - China, Japan, Korea. ksacta Long cultivated and not known in a truly wild situation, though it can naturalise in woodlands[279]. Possibly of hybrid origin involving L. leichtlinii and L. maculatum[90].

propta Seed - this species is completely sterile and does not produce seed. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]. Bulbils - gather in late summer when they start to fall off the stems and pot up immediately. Grow on in a greenhouse until large enough to go outside[200]. Plants can flower in three years from bulbils[4].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Seashore. Prefers an open free-draining humusrich loamy soil with its roots in the shade and its head in the sun[200]. Prefers a lime-free soil according to some renorts[28, 47, 143], whilst one says that it succeeds in a calcareous soil[1] and another that it succeeds in ordinary garden soil[1, 42]. Prefers a deep acid loam[47]. Likes a sunny position according to one report[143] whilst others say that it is best grown in open woodland or amongst dwarf evergreen shrubs[1]. Stem rooting, the bulbs should be planted 15 - 20cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. Plants grow well in northern gardens in Britain[90]. A sterile triploid species, probably of hybrid origin[90]. A very ornamental plant[1], it is cultivated for its edible bulb in Japan[2, 42, 163]. This species tolerates virus infections, but it can transmit them to other species in this genus and so is best grown away from any of the other species[47]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

# 5.2.97 Beta vulgaris altissima

Sugar Beet 4 tiin 8 cyuc 4 kcak 0 tcan 2 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli drutta Beta vulgaris altissima is a BIENNIAL growing to  $1.5 \, \mathrm{m}$  (5ft) by  $0.2 \, \mathrm{m}$  (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: SweetenerRoot - raw or cooked. The root contains 16 - 20% sugar and this is often extracted and used as a sweetener[142]. This plant is a major source of sugar in many temperate areas. The root can also be used as a vegetable. When cooked it is quite tender, but with some fibrous strands. It has a very sweet flavour that some people find too sweet[K]. The raw root is rather tough, but makes a pleasant addition to salads when grated finely[K]. Leaves - raw or cooked. A very acceptable spinach substitute[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K].

tcanta BiomassSugar beet has excellent potential as a biomass crop, both as a source of sugar and also using the plant residue for fuel[269].

dwatta Antitumor EmmenagogueAlthough little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water, is said to cure genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that betacvanin and anthocyanin are important in the exchange of substances of cancer cells; others note two main components of the amines, choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmenagogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and yellow jaundice, and, put into the nostrils to purge the head, clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269]. Juice of the white beet was said to clear obstructions of the liver and spleen[269]. Culpepper (1653) recommended it for treating headache and vertigo as well as all affections of the brain[269].

nrakta A cultivated form of B. vulgaris maritima that is grown for the sugar content of its root. ksacta Not known in a truly wild situation.

propta Seed - sow April in situ.

nwatta Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 -6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 6.6°C and a pH of 4.2 to 8.2[269]. Sugar beet is widely cultivated as a commercial sugar crop in temperate climates. About one third of all sugar production in the world is derived from this plant[269]. It is not usually grown on a garden scale. There are several named varieties[46].

# 5.2.98 Cryptotaenia japonica

Mitsuba, Japanese honewort 4 tlin 8 cyuc 4 kcak 0 tcan 1 dwat 1 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cryptotaenia japonica is an evergreen Perennial growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male

the genus, capable of growing in all areas of Britain[63]. It is also resistant to the attacks of most insects[160]. The young growth in spring, however, can be damaged by late frosts. This species is cultivated for its edible seed in Japan, it has the potential for producing very superior nuts, especially if hybridized with J. cinerea[117, 160]. Trees can come into bearing within 3 - 4 years from seed[63]. Plants produce a deep taproot and they are intolerant of root disturbance[1. 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 5.2.160 Carva x lanevi

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carya x laneyi is a deciduous Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[183]. Thin shelled[200]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months/Kl.

tcanta Fuel WoodWood - close grained, tough, strong, brittle. Used mainly for fuel, it burns well giving off a lot of heat.

nrakta Eastern N. America - New York State. ksacta A naturally occurring hybrid.

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the

slightly alkaline soil[200]. This is the hardiest member of the genus, capable of growing in all areas of Britain[63]. It is also resistant to the attacks of most insects[160]. The young growth in spring, however, can be damaged by late frosts. This species is cultivated for its edible seed in Japan, it has the potential for producing very superior nuts, especially if hybridized with J. cinerea[117, 160]. Trees can come into bearing within 3 - 4 years from seed[63]. Plants produce a dideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. A natural hybrid, C. cordiformis x C. ovata, it is generally faster growing, bears at an earlier age and ripens its seed earlier than C. ovata, but lacks the high quality kernel[183]. There are some named varieties[183]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have guite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes nlace[229]

#### 5.2.161 Gleditsia triacanthos

priklwishsom hpa7tmwatli xre7t hjonli

Honey Locust

4 tlin 8 cyuc 3 kcak 2 tcan 2 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flat-

drutta Gleditsia triacanthos is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a medium rate. Sea above for USDA hardiness. It is hardy to UK zone 3. It is in flower in July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The plant contains potentially toxic compounds[222].

kcakta Edible Parts: Seed SeedpodEdible Uses: Coffee Drink Gum SweetenerSeed - raw or cooked. It can contain up to 30% sugar[160]. Young seeds taste like raw peas[183]. Seeds are not always borne in maritime regions because the tree prefers long hot summers[11]. The oval seeds are about 8mm long[227]. They contain 10.6 - 24.1% protein, 0.8 - 4.3% fat, 84.7% carbohydrate, 21.1% fibre, 4% ash, 280mg calcium and 320mg phosphorus per 100g[218]. The seeds have been roasted and used as a coffee substitute[269]. Seedpods - the pulp is sweet and can be eaten raw or made into sugar[149, 159, 183]. The render young seedpods can be cooked and eaten[183]. The pulp in older pods turns bitter[227]. The seedpods are up to 40cm long and 4cm wide[227]. A sweet, pleasant tasting drink can be made from the seed pods[257]. The seed pulp has been used to make a drink[257].

tcanta Fodder Gum Soil reclamation Tannin Wood-Planted for land reclamation on mining waste[200]. The gum from the seeds has been suggested as an emulsifying substitute for acacia and tragacanth[269]. The heartwood contains  $4\cdot4.8\%$  tannin[240]. Wood - strong, coarse-grained, elastic, very hard, very durable in contact with the soil, highly shock resistant[46, 61, 82, 149]. It does not shrink much but splits rather easily and does not glue well[227]. It weighs 42lb per cubic foot[227]. Largely used for making fence posts and rails, wheel hubs, farm implements etc and in construction[46, 61, 82, 149].

Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200].

nwatta Management: Standard Regional Crop Staple Crop: Protein-oilLandscape Uses:Firewood, Specimen, Street tree. An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Tolerates a pH in the range 5.3 to 7.3. Once established, this is a very drought resistant tree[183]. It does not produce suckers[183]. Plants are fairly wind tolerant[1, 11]. A very ornamental tree[1]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. The Turkish hazel is occasionally cultivated for its edible seed[46, 61, 158]. This species is also useful in hybridizing with C. avellana in order to develop superior fruiting cultivars[183]. Special Features: Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit. and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

# **5.2.158** Juglans cathavensis

Chinese Walnut

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli fyif hjonli drutta Juglans cathavensis is a deciduous Tree growing to 20 m (65ft) by 20 m (65ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed raw or cooked[183]. Made into confections and sweetmeats[183]. A good flavour but the shell is very thick and the seed is small[11]. An edible oil is obtained from the seed[183], it tends to go rancid guickly.

tcanta Herbicide OilPlants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200].

nrakta E. Asia - China. ksacta Thickets and woods, preferring moist woods[109].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Plants produce a deep taproot

and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. A plant growing in an open sunny position at Wisley Garden in Surrey has been seen on a number of occasions bearing good crops of seed[K]. This species is closely related to J. mandschurica and is included as a synonym of that species in some modern floras[266]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K].

#### 5.2.159 Juglans ailanthifolia

Japanese Walnut

4 tlin 8 cyuc 3 kcak 5 tcan 1 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hionli

drutta Juglans ailanthifolia is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: OilSeed - raw. cooked or used in confectionery[22, 105. 177, 183]. A very good flavour[2]. The shell is easily cracked[117]. An edible oil is obtained from the seed, but it tends to go rancid quickly[183]. Young buds (flower?) and fruit stalks - cooked[105, 177, 183].

tcanta Companion Dye Herbicide Oil Tannin WoodA brown dve is obtained from the seed husks and the bark[61]. Rich in tannin, it does not require a mordant. The bark is rich in tannin. It is used as a dye and also medicinally[178]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. Wood - soft, light, not easily cracked, of good quality. Used for cabinet making etc[46, 61]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anthelmintic Astringent Diuretic Kidney Lithontripic Pectoral Skin TonicThe bark is anthelmintic, astringent, diuretic, lithontripic, pectoral, skin, tonic (kidneys)[178].

nrakta E. Asia - Japan. ksacta Forests[11].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a and female organs) and is pollinated by Insects. The plant is cakes, porridge etc[55, 183]. Very small, about 1.2mm in diself-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Root StemEdible Uses: CondimentLeaves and stems - raw or cooked[2, 52, 116]. Used as a flavouring with a parsley-like flavour if you let your imagination run away with you[K]. Seedlings and young leaves can be used in salads[206]. When cooking, the leaves should not be cooked for more than a couple of minutes or the flavour is destroyed[206]. The leaves contain about 2.3% protein, 0.23% fat, 4.4% carbohydrate, 2.1% ash[179], Root - raw or cooked[2, 52, 116, 183]. Blanched stem - a celery substitute[2, 116]. The seed is used as a seasoning.

dwatta Febrifuge Tonic Women's complaintsWomen's complaints. Used in the treatment of haemorrhages, colds, fevers etc[178]. Used as a tonic for strengthening the body[266].

nrakta E. Asia - China, Japan. ksacta Woodland in hills and mountains[52, 58].

propta Seed - sow April in a greenhouse. Germination is usually rapid, prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. The ideal temperature for sowing is about 25°c, though seed does germinate at higher and lower temperatures[206]. Seed can also be sown in early autumn[206]. Division in spring or autumn

nwatta Succeeds in most soils, preferring a moist shady position under trees where it often self-sows[52]. The leaves tend to turn yellow when plants are grown in full sun[206]. This species is not winter-hardy in all areas of Britain, though plants can tolerate short periods at temperatures down to -10°c[206]. Mitsuba is commonly cultivated as a vegetable in Japan, there are some named varieties[183]. It is usually grown as an annual[206]. It is closely allied to C. canadensis, and is considered to be no more than a synonym of that species by some botanists[200]. This plant is adored by slugs and snails and must be protected when small or when new growth is emerging in the spring[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 5.2.99 Amaranthus blitum

Slender Amaranth, Purple amaranth 4 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fvif hionli

drutta Amaranthus blitum is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from April to October, in flower in August, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

pcista No members of this genus are known to be poisonous, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: ColouringLeaves - raw or cooked as a spinach[2, 4, 55, 183]. The leaves contain about 3.88% protein, 1.1% fat, 9.38% carbohydrate, 3.2% ash, 323mg Ca, 8.3mg Fe, they are very rich in Vitamins A and C, rich in vitamin B1[179]. The leaves are used as a potherb in order to remove poison from the system[218]. Seed - cooked. Used as a cereal substitute in

ameter[266], but it is easy to harvest and very nutritious. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. An edible dye is obtained from the seed capsules[4].

tcanta DyeYellow and green dyes can be obtained from the whole plant[168].

dwatta AstringentA fluid extract of the plant is used as an astringent internally in the treatment of ulcerated mouths and throats, externally as a wash for ulcers and sores[4]. The juice of the roots is used externally to relieve headaches[272]. The plant has a folk reputation for being effective in the treatment of tumours and warts[218].

nrakta Temperate and Tropical zones. ksacta A cosmopolitan weed growing on waste ground[58, 204].

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root eas-

nwatta Often cultivated, especially the form oleraceus, the plant succeeds from the temperate zone through to the tropics. It grows best in areas where annual daytime temperatures are within the range 21 - 27°c, but can tolerate 18 - 32°c[418]. It can be killed by temperatures of 4°c or lower[418]. It prefers a mean annual rainfall in the range 1.200 - 1.500mm, but tolerates 200 - 2.700mm[418], Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Prefers a pH in the range 5.5 - 7, tolerating 4.3 to 7.5[418]. The plant has become a weed in many areas of the world outside its original range. It is classified as 'Invasive' in many Pacific Islands[305]. Plants are particularly susceptible to attacks by leaf-chewing insects[298]. Plants should not be given inorganic fertilizers, see notes above on toxicity. This plant was cultivated by the ancient Romans and Greeks for its edible leaves, there are some named varieties[183]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196 In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

#### **5.2.100** Ribes rubrum

Red Currant, Cultivated currant 4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ribes rubrum is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The fresh leaves contain the toxin hydrogen cyanide, though details of quantities are not given[240]. This substance is found in several foods, including almonds. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 2, 5, 11]. A pleasant acid flavour, it can be eaten out of hand but is more often cooked in pies, jams etc[K], There are rather a lot of seeds in each fruit[K].

tcanta Cosmetic DyeA vellow dye is obtained from the leaves[100]. A black dye is obtained from the fruit[100]. The fruit is used cosmetically in face-masks for firming up tired and lifeless skin[7].

dwatta Antirheumatic Antiscorbutic Aperient Poultice Refrigerant SialagogueThe fruit is antiscorbutic, aperient, depurative, digestive, diuretic, laxative, refrigerant and sialagogue[4, 7, 21]. The leaves contain the toxin hydrogen cyanide[240]. A concoction of them is used externally to relieve rheumatic symptoms[7]. They are also used in poultices to relieve sprains or reduce the pain of dislocations[7].

nrakta Western Europe, including Britain. ksacta Damp soils in hedges and woods, avoiding acid soils[7, 9, 17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11, 200]. Plants are guite tolerant of shade, even succeeding on a north-facing wall[200], though they do not fruit so well in such a position[11]. Prefers a pH in the range 5.5 to 6[200]. Hardy to about -20°c[200]. Red currants are often cultivated in temperate zones for their edible fruit, there are some named varieties, including forms with white fruits[4, 61]. Most cultivars are self-fertile and set a good crop on their own[200]. The fruit is produced at the base of one-year old and older wood, plants start to fruit at 3 - 4 years from seed[200]. This is an aggregate species comprising R. spicatum and R. rubrum. There is some confusion in nomenclature with some botanists only recognising 2 species, R. silvestre. (syn R. sativum) and R. spicatum (syn R. rubrum)[17, 200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

#### 5.2.101 Sium sisarum

Skirret, Suikerwortel (Netherlands), Crummock (Scotland), Zuckewurzel (Germany)

4 tlin 9 cyuc 4 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sium sisarum is a PERENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from March to November, in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: CoffeeRoot - raw or cooked[2, 4, 14, 33]. Firm, sweet and floury[27] but with a small woody core[160, K]. The roots have a very acceptable taste raw, that is somewhat like a cross between carrots and parsnip but with a nutty flavour. They can also be boiled, baked or added to soups etc[183, K]. The roasted root has been used as a coffee substitute[46, 61, 183].

nrakta Original habitat is obscure, possibly in E. Europe or Asia. ksacta Not known in a truly wild situation but found as an escape from cultivation in damp places[50].

propta Seed - sow late winter to early spring in a cold frame[1, 33]. It can be slow to germinate. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer if they are large enough. Otherwise, grow them on in a cold frame for their first winter and plant them out in the following spring. The

seed is best sown in early April in situ[1, 33]. Division in early spring just before new growth begins. Use the side roots to produce new plants[1]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Prefers a light, rich, moisture retentive soil in full sun[1, 33, 37]. Requires an abundance of moisture in the growing season or the roots will be tough[27, 37]. Plants are tolerant of some shade[244]. Plants seem to be resistant to all insects and diseases[160]. Skirret was at one time often grown for its edible root but has fallen into virtual disuse[2, 50, 61]. This is a shame since the root is very tasty, easy to grow and relatively productive[K]. The form S. sisarum sisarum should be used, its root is fleshy and succulent, S. sisarum lancifolium. (Bieb.) Thell. is sometimes offered but is unlikely to produce roots of culinary quality[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 5.2.102 Allium cepa aggregatum

Potato Onion

4 tlin 8 cyuc 4 kcak 3 tcan 3 dwat 1.2 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Allium cepa aggregatum is a BULB growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil

pcista There have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of this plant. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[4, 33]. A nice onion flavour, when chopped up finely they make a nice addition to salads and can also be used as a cooked vegetable or as a flavouring in cooked foods[K]. Some of the cultivars are considered to be gourmet onions[183]. Leaves - raw or cooked. A strong onion flavour[K]. Flowers - raw. Used as a garnish on salads. The flowers are somewhat dry and are less pleasant than many other species[K].

tcanta Cosmetic Dye Hair Polish Repellent RustThe juice of the plant is used as a moth repellent and can also be rubbed onto the skin to repel insects[7]. The plant juice can be used as a rust preventative on metals and as a polish for copper and glass[7]. A yellow-brown dye is obtained from the skins of the bulbs[141, 168]. Onion juice rubbed into the skin is said to promote the growth of hair and to be a remedy for baldness[7]. It is also used as a cosmetic to get rid freckles[7]. The growing plant is said to repel insects and moles[201]. A spray made by pouring enough boiling water to cover 1kg of chopped unpeeled onions is said to increase the resistance of other plants to diseases and parasites[201].

dwatta Anthelmintic Antiinflammatory Antiseptic Antispasmodic Carminative Diuretic Expectorant Febrifuge Hypoglycaemic Hypotensive Lithontripic Skin Stomachic TonicAlthough rarely used specifically as a medicinal herb, the onion has a wide range of beneficial actions on the body and when eaten (especially raw) on a regular basis will promote the general health of the body. The bulb is anthelmintic, anti-inflammatory, antiseptic, antispasmodic, carminative, diuretic, expectorant, febrifuge, hypoglycaemic, hypotensive, lithontripic, stomachic and tonic[4, 7, 21]. When used regularly in the diet it offsets tendencies towards angina, arteriosclerosis and heart attack[254]. It is also useful in preventing oral infection and tooth decay[254]. Baked onions can be used as a poultice to remove pus from sores[254]. Fresh onion juice is a very useful first aid treatment for bee and wasp stings, bites, grazes or fungal skin complaints[7, 201]. When warmed the juice can be dropped into the ear to

and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Closely related to T. intonsa[11]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.156 Quercus stellata

Post Oak

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli hgattcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus stellata is a deciduous Tree growing to 20 m (65ft 7u) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[61, 63, 105]. A sweet taste[159]. The seed is up to 25mm long and 18mm wide[82, 200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed from some trees might contain bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[177, 257].

tcanta Disinfectant Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - very heavy, hard, close grained, very durable in contact with the soil but difficult to cure. It weighs about 52lb per cubic foot. It is largely used for fencing, lumber, furniture and fuel[46, 61, 82, 149, 159, 171, 227].

dwatta Antiaphonic Astringent Disinfectant Dysentery Emetic Febrifuge TonicThe bark is astringent, disinfectant, emetic, febrifuge and tonic[257]. An infusion is used in the treatment of chronic dysentery, indigestion, asthma, lost voice and intermittent fevers[257]. The bark can be chewed to treat mouth sores[257]. An infusion of the bark can be used as a wash on sore and chapped skin[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Massachusetts to New York, Iowa, Florida and Texas. ksacta Rocky or sandy ridges and outcrops, also in dry woodlands in a variety of soils including gravelly, sandy, poor upland soils and heavy moist loamy soils, where it reaches its greatest height[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A slow-growing drought resistant tree, it takes 20 - 30 years before it produces seed[229]. It then usually produces a good crop of seeds every 2 - 4 years[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.157 Corylus colurna

Turkish Hazel, Chinese hazelnut, Turkish Filbert, Turkish

4 tlin 7 cyuc 3 kcak 3 tcan 1 dwat 20 m hkuc

hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyif hjonli

drutta Corylus columa is a deciduous Tree growing to 20 m (65ft) by 7 m (23ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pft: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[2, 22, 46, 105]. Rich in oil. As nice a flavour as C. avellana, the common hazel nut[146, 158]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

tcanta Oil WoodWood - firm, durable, moderately hard Used for furniture, turnery etc[74, 158].

dwatta TonicThe seeds are tonic[240].

nrakta S.E. Europe to W. Asia. ksacta Shady mixed forests, 1000 - 1800 metres in E. Asia[74]. Found at altitudes up to 3000 metres in the Himalayas where it is found mainly on northerly aspects and in shady places[146, 158].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3- 4 months cold stratification[164]. Germinates in 1- 6 months at  $20\,^{\circ}\text{c}[164]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Inner bark SeedEdible Uses: Condiment GumInner bark - raw or cooked[257]. Mucilaginous[105, 161, 213]. Best harvested in the spring[257]. The inner bark can be eaten fresh, but is more often dried, ground into a powder and either used as a thickener in soups or cooked[63, 64, 105, 226, 257]. Rich in oil, the seed has a slightly resinous flavour. Quite small, it is only about 8mm long[200]. The seed can be crushed into a meal and used in making bread etc[213]. The resin has been chewed as a gum[226, 257]. Young male cones have been chewed for the juice[257]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Basketry Cosmetic Dye Fuel Gum Herbicide Insulation Resin Shelterbelt Strewing Tinder WoodA tan or green dye is obtained from the needles[168]. A yellow dye can be made from the pollen[226]. A blue dye can be made from the roots[257]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. The branches are used as a strewing herb[99]. A decoction of the plant tops has been used as a conditioning wash to give a person a fair and smooth skin[257]. A fairly wind-tolerant tree, it can be used in shelterbelt plantings[200]. This tree is a source of resin, though it is not exploited commercially [64, 171]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4]. 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative, adhesive etc[257]. It burns well and so has been used to make torches[257]. The root fibres have been used in making baskets[257]. Material for insulation and a tinder are also obtained from the tree[99]. The cones make a quick fire, whilst the scales from the trunk bark burn easily, give off no smoke and cool quickly[213]. Wood - light, strong, finegrained and pleasantly aromatic, the wood can vary from soft to hard[1, 46, 82, 171, 226, 229]. An important lumber tree, it is used for making furniture, boxes, toys etc[1, 46, 82, 171, 226, 229], and it is also used for fuel[99]. For reasons that are unclear, some tree stumps contain high concentrations of pitch - this makes them very rot-resistant and inflammable and therefore useful for fence posts and kindling[226].

dwatta Antiseptic Diuretic Febrifuge Ophthalmic Pectoral Poultice Rubefacient Salve Skin Vermifuge Vulnerary-Ponderosa pine was employed medicinally by several native North American Indian tribes, who valued it especially for its antiseptic and vulnerary properties, using it to treat a range of skin problems, cuts, wounds, burns etc[257]. It was also valued for its beneficial effect upon the respiratory system and was used to treat various chest and lung complaints[257]. The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters. poultices, herbal steam baths and inhalers[4]. The branches are used in herbal steam baths as a treatment for muscular pains[257]. A decoction of the plant tops has been used in the treatment of internal bleeding and high fevers[257]. An infusion of the dried buds has been used as an eye wash[257].

nrakta Western N. America - British Columbia to N. Mexico. ksacta Found in a variety of soils from sea level to 2800 metres[229], though mainly inland and in drier areas[60]. The best growth is from trees growing in deep well-drained

soils[229].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81]

nwatta Industrial Crop: Hydrocarbon Management: Standard Regional TimberThrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Seedlings strongly dislike growing in the shade[60] and are unable to succeed under the canopy of the parent trees[226]. Plants are fairly wind tolerant[200]. Extensively used in cool temperate forestry[200], this species is occasionally planted for timber in central and southern Europe[50]. Growth can be quite fast when young but it soon drops of and averages around 30cm per year[185]. The best trees in Britain are found in a belt running from Kent through the Midlands to N. Wales and also in S. Scotland[185]. Trees live 300 - 600 years in the wild[229], they seem to be long-lived and healthy in Britain[185]. Seed production commences when the tree is about 20 years old[229]. There are usually several years of low to medium yields between each year of high yields[229]. The cones are 8 - 15cm long, they open and shed their seed whilst still attached to the tree and then soon fall from the tree[82, 226]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.155 Tilia chinensis

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Tilia chinensis is a deciduous Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw[K]. A tea is made from the flowers. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta FibreA fibre is obtained from the inner bark and used for making sandals, nets etc[178].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta E. Asia - China. ksacta Woods in W. Szechwan, 2300 - 3000 metres[109].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy

treat earache[254]. It also aids the formation of scar tissue on wounds, thus speeding up the healing process, and has been used as a cosmetic to remove freckles[7].

nrakta Not known in wild. ksacta Not known in wild.

propta Seed - sow spring in a cold frame. Seed is seldom produced by this plant[4]. Division in late summer. Harvest the bulbs as the foliage dies down and store them in a cool place. In areas with mild winters the bulbs are traditionally replanted on the shortest day of the year, but in colder areas it is best to wait until late winter or even early spring[4]. Plant the bulbs only just below the soil surface[4].

nwatta Prefers a sunny sheltered position in a light welldrained fertile soil[1] but tolerates most soils. Tolerates a pH in the range 4.5 to 8.3. The potato onion was at one time fairly widely grown as a vegetable, but it has now fallen into virtual disuse[16]. There are still some named forms available[183]. This is a genuinely perennial form of A. cepa, the bulb grows deeper in the soil and divides to produce a number of underground bulbs each vear in much the same way as shallots. Large bulbs divide to form 5 - 15 bulbs whilst smaller bulbs grow into one large bulb[160]. According to one report, the bulbs should be planted fairly deeply[1], whilst another report says that they should be planted just below soil level[4]. Onions grow well with most plants, especially roses, carrots, beet and chamomile, but they inhibit the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 12 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones. 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

#### 5.2.103 Morus alba multicaulis

White Mulberry

4 tlin 8 cyuc 4 kcak 0 tcan 3 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Morus alba multicaulis is a deciduous Tree growing to 18 m (59ft 1in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Fruit - raw[2, 7, 158]. Sweet but usually insipid[3, 11]. It contains about 1.5% protein, 0.4% fat, 7.8% carbohydrate, 0.7% malic acid[179]. A richer flavour develops if the fruit is dried, it can then be used as a raisin substitute. The fruit is up to 25mm long[200]. Some caution is advised, see the notes above on toxicity. Young leaves and shoots cooked[105, 183]. A famine food, it is only used when all else fails[177]. A good vegetable, it is rich in carotene and calcium[179]. The leaf also contains 10% tannin[179]. Inner bark - roasted and ground into a meal then used as a thickener in soups etc or mixed with cereals when making bread. A famine food when all else fails[179]. The tree is said to be a source of an edible manna[183]. Young shoots can be used as a tea substitute[183].

tcanta Dye Fibre WoodA fibre is obtained from the bark of one-year old stems, it is used in weaving[7, 74]. A brown dye is obtained from the trunk[178]. The leaves contain 10% tannin[179]. Wood - hard, durable, fine and close-grained. Used for boat building, furniture etc[145, 149, 158].

dwatta Analgesic Antiasthmatic Antirheumatic Antitussive Astringent Diaphoretic Diuretic Emollient Expectorant Hypoglycaemic Hypotensive Odontalgic Sedative Urinary-The white mulberry has a long history of medicinal use in Chinese medicine, almost all parts of the plant are used in one way or another[238]. Recent research has shown improvements in elephantiasis when treated with leaf extract injections and in tetanus following oral doses of the sap mixed with sugar[238]. Analgesic, emollient, sedative[7]. 176]. The leaves are antibacterial, astringent, diaphoretic. hypoglycaemic, odontalgic and ophthalmic[218, 238]. They are taken internally in the treatment of colds, influenza, eve infections and nosebleeds[238]. The leaves are collected after the first frosts of autumn and can be used fresh but are generally dried[238]. The stems are antirheumatic, diuretic. hypotensive and pectoral[218, 238]. A tincture of the bark is used to relieve toothache[7]. The branches are harvested in late spring or early summer and are dried for later use[238]. The fruit has a tonic effect on kidney energy[218, 238]. It is used in the treatment of urinary incontinence, tinnitus, premature greying of the hair and constipation in the elderly[238]. The root bark is antitussive, diuretic, expectorant and hypotensive[238]. It is used internally in the treatment of asthma, coughs, bronchitis, oedema, hypertension and diabetes[238]. The roots are harvested in the winter and dried for later use[238]. Extracts of the plant have antibacterial and fungicidal activity[218].

nrakta E. Asia - central and northern China. ksacta Not known in a truly wild situation.

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. This variety of M. alba is said to have superior fruits[105]. According to many botanists it is no more than a clone of the species[200]. This is the form most commonly cultivated in India, where it is fast growing and adapted to field culture. It gives a high yield of large, tender, thick leaves[269]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any running should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. A good tree for growing grapes into[20]. The grapes are difficult to pick but always seem to be healthier and free from fungal diseases[201]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.104 Pastinaca sativa

Parsnip, Wild parsnip

4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Pastinaca sativa is a BIENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is fardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the sap can cause photosensitivity and/or dermatitis in some people[65, 76, 218]. Parsnip is said to contain the alleged 'psychotroph' myristicine[218].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentRoot - raw or cooked[2, 4, 5, 9, 27, 183]. When well grown, the cooked root has a very tender texture, though it is rather chewy raw[K]. It is best harvested after there have been some autumn frosts because it will have developed a sweeter flavour[61]. The root is delicious baked, it can also be used in soups etc and can be added to cakes, pies and puddings[183]. Leaves and young shoots - cooked with other greens as a vegetable or added to soups etc[9, 183]. Used in early spring[9]. The seed is used as a condiment[9]. Similar in taste to dill[183].

tcanta Insecticide RepellentThe leaves and roots are used to make an insect spray[20]. Roughly chop the leaves and roots, put them in a basin with enough water to cover. leave them overnight then strain and use as an insecticide against aphids and red spider mite[201].

dwatta Poultice Women's complaintsA tea made from the roots has been used in the treatment of women's complaints[222]. A poultice of the roots has been applied to inflammations and sores[222]. The root contains xanthotoxin, which is used in the treatment of psoriasis and vitiligo[222]. Xanthotoxin is the substance that causes photosensitivity (see note above on toxicity)[222].

nrakta Europe, including Britain, from Norway south and east to Spain, the Caucasus and Altai. ksacta Roadsides and grassy waste places, especially on chalk and lime-

propta Seed - sow from late winter to late spring in situ. Seed can be slow to germinate, especially from the earlier sowings[200], it is best to mark the rows by sowing a few radishes with the parsnips. The seed has a short viability. very few will still be viable 15 months after harvesting[200].

nwatta Succeeds in most ordinary well-drained soils[16]. Requires an open situation[37]. Prefers a deep rich soil that is not too stiff[1]. The parsnip is often cultivated in the temperate zone for its edible root, there are a number of named varieties[46, 183, 200]. Normally cultivated as a winter root crop, some cultivars are faster to mature and can be available in late summer[200]. The roots are very frost hardy and can be left in the ground to be harvested as required, though they can also be lifted in the autumn and stored for a few months[200]. The flowers are very attractive to hover flies and predatory wasps[201]. Plants have very few insect pests, though they are sometimes attacked by carrot root fly[201]. Growing onions with the parsnips can reduce the damage[201]. Roots of the wild form can guite guickly be increased in size by selective breeding and good cultivation, it is possible to obtain good sized roots in only 6 years. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil reguirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 5.2.105 Rumex alpinus

Alpine Dock, Munk's rhubarb 4 tlin 8 cvuc 4 kcak 1 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rumex alpinus is a PERENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista Plants can contain guite high levels of oxalic acid. which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[1, 2, 5, 21, 22, 46, 183]. They can also be dried for

later use[12]. A strong flavour, the leaves can be used in salads in late autumn to the spring, but are better cooked like spinach[K]. The fresh leaves can be available for most months of the year, only dying down for a short period in severe winters[K]. The leaves often become bitter in the summer[K]. In taste trials, this has proved to be a very popular autumn and spring cooked leaf, making an excellent spinach[K].

tcanta DyeDark green to brown and dark grey dyes can be obtained from the roots, they do not need a mordant[168].

dwatta Astringent LaxativeThe root is astringent and laxative[4, 9]. It has a regulatory effect on the digestive system, similar to but weaker than rhubarb (Rheum rhaponticum)[4]. It can act either as a laxative or a cure for diarrhoea according to dosage[4]. The root is harvested in early spring and dried for later use[4].

nrakta C. and S. Europe to W. Asia. Naturalized in Britain[17], ksacta Along the banks of streams and by the sides of roads, it is also found near human habitations, in hilly areas[9].

propta Seed - sow spring in a cold frame. The seed can also be sown as soon as it is ripe when it will germinate rapidly and will provide edible leaves from early spring the following year. When they are large enough to handle. prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Division is easy at almost any time of the year, though the plants establish more rapidly in the spring[K]. Use a sharp spade or knife to divide the rootstock, ensuring that there is at least one growth bud on each section of root. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta A very easily grown and tolerant plant[K], it succeeds in most soils, preferring a moist moderately fertile well-drained soil in a sunny position[200]. Hardy to about -20°c[187]. Alpine dock was at one time cultivated for its edible leaves, though it has now fallen out of favour to be replaced by less strong-tasting plants[2, 200, K]. This is a pity because it is a very productive and useful vegetable and can produce its leaves all through the winter if the weather is not too severe[K]. A very important plant for the caterpillars of many species of butterflies[30].

#### 5.2.106 Rosa villosa

Apple Rose

4 tlin 8 cyuc 4 kcak 1 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Rosa villosa is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is selffertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit SeedEdible Uses: TeaFruit raw or cooked[2, 3, 46, 61, 105]. A pleasant acid pulp, the fruit can also be used in preserves, jams etc[183]. The fruit is about 30mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Rich in vitamin C, there is 1303mg per 100g (fresh weight) of fruit[142]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The leaves are used as a tea substitute[46, 61, 183]. A pleasant tasting fruity-flavoured tea is made from the dried fruit[21, 46].

dwatta Cancer Vitamin CThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bioactive compounds. It is also a fairly good source of essential

form of liniment plasters, poultices, herbal steam baths and semi-shade (light woodland) or no shade. It prefers dry or inhalers[4].

nrakta Western N. America - Alberta to California. ksacta Often forming open forests in the sub alpine to alpine zones, often in semi-arid areas[60, 82]. Usually found on dry rocky ridges and peaks[229].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses:Pest tolerant, Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. A fairly wind-resistant species[200], the plants often colonise exposed mountain slopes in the wild. their deep taproot anchoring them firmly[226, 229]. A very cold-tolerant plant when fully dormant[120]. A long-lived but slow-growing tree in the wild[229]. Growth in Britain can be fairly fast, over 30cm a year has been recorded[185]. It is slow to get started but then grows away guite well[120]. It only makes a small tree in cultivation[81]. Seed production in the wild consists of a cycle of one good year followed by several years of low crops[229]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. The branches are very flexible[120]. The cones are 7 - 25cm long, they open and shed their seed whilst still attached to the tree[82, 226]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. This species is closely allied to P. albicaulis[11], differing mainly in the cones[226]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attracts birds, Attractive foliage, North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the numher of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. An evergreen. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.153 Tilia tomentosa

Silver Lime

4 tlin 7 cyuc 3 kcak 2 tcan 1 dwat 25 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tilia tomentosa is a deciduous Tree growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in

pcista The flowers are toxic to bumble bees[11].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaYoung leaves - raw or cooked[179]. The dried leaves are sometimes used as an adulterant for marjoram (Origanum majorana)[183]. A tea can be made from the flowers. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2]

tcanta FibreA fibre is obtained from the tough inner bark It can be made into diverse items such as mats, shoes and coarse cloth[229]

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and seda-

nrakta S.E. Europe. ksacta Oak and mixed woods[74].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Lavering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immedi-

nwatta Landscape Uses:Firewood, Pollard, Screen, Specimen, Street tree. Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. According to another report this species succeeds in a hot dry position. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. This species thrives in southern England[11], though it prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. The fragrant flowers of this tree are toxic to bees[188]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Rarely produces suckers. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, Attractive foliage, Not North American native, Fragrant flowers, Attractive flowers or blooms.

# 5.2.154 Pinus ponderosa

Ponderosa Pine, Washoe pine 4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 25 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus ponderosa is an evergreen Tree growing to 25 m (82ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year. in flower in June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female. but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

place[229]. Special Features: North American native, Wetlands plant, Inconspicuous flowers or blooms.

#### 5.2.151 Quercus palustris

Pin Oak, Swamp Oak

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 25 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ouercus palustris is a deciduous Tree growing to 25 m (82ft) by 8 m (26ft) at a fast rate. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[159]. The seed is about 15mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Ink Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A black ink is made from the galls[226]. Wood - strong, hard, coarse grained, heavy, often knotty owing to the persistence of many small limbs[46, 61, 82, 171, 227]. It weighs 43lb per cubic foot[227]. It is occasionally used for shingles, clap-boards, furniture, wooden nails etc and as a fuel[46, 61, 82, 171, 227, 229].

dwatta Astringent Dysentery StomachicAn infusion of the inner bark has been used to treat intestinal pains[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta North-eastern and Central N. America - Massachusetts to Michigan, Virginia and Arkansas. ksacta Deep rich soils[227, 229] in swampy woods and bottoms at low elevations[43]. Often found in wet, poorly drained claypan soils typical of floodplains, tolerating short periods of spring flooding[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Average germination rate is about 68%[227]. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Withstands atmospheric pollution[227]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A fairly fast growing tree[200], it is occasionally cultivated for timber in eastern central Europe[50]. It coppices fairly well[227]. The tree seldom lives longer than 150 - 200 years

352

better quality seeds are produced if cross-pollination takes in the wild, commencing to bear seeds when 15 - 25 years old[229]. Seed production is cyclic, a year of high yields being followed by 2 - 3 years of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. There are some named varieties selected for their ornamental value[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. This species has a relatively shallow tap-root, making it easier to transplant[226]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

#### 5.2.152 Pinus flexilis

Limber Pine, Rocky Mountain White Pine 4 tlin 7 cyuc 3 kcak 3 tcan 2 dwat 25 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus flexilis is an evergreen Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not selffertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Inner bark SeedEdible Uses: CondimentSeed - raw or cooked[2, 105, 161, 177, 257]. The oil-rich seed has a delicious flavour with a hint of resin[K]. The seeds can also be ground into a powder and used in making bread, biscuits, as a thickener in soups etc[226]. A reasonable size, the seed is up to 11mm x 9mm[200], with a thick shell[82]. Inner bark[105, 161]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide Shelterbelt WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their hows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - light, soft, close-grained. It is occasionally made into lumber and is also used for general carpentry[46, 61, 82].

dwatta Antiseptic Diuretic Rubefacient VermifugeThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the

fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Caucasus, W. Asia to Iran, ksacta Woods, hedgerows, scrub etc[17].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most well-drained soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Formerly cultivated for its edible fruit which, from selected plants, can be 4cm wide[11]. There are some named varieties, 'Wolley Dod' has large fruits with a good flavour[183]. The flowers are semi-double, heavily scented and sweetly fragrant[183]. The foliage has an aroma like ripe apples[245]. Plants often produce suckers[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

#### 5.2.107 Allium senescens

German Garlic

4 tlin 10 cvuc 4 kcak 0 tcan 2 dwat 0.5 m hkuc htut cyutli hgatkyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Allium senescens is a BULB growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2, 46, 61, 105]. An onion substitute[22, 177]. The small bulbs are formed in clusters on a rhizome and are up to 10mm in diameter[200]. Leaves - raw or cooked[105, 177]. A fairly strong onion flavour with a slight bitterness, but acceptable raw[K]. We use them in salads or as a flavouring in cooked foods[K]. Flowers - raw or cooked An attractive garnish in salads[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta C. Europe to Siberia, China and Korea, ksacta Dry, usually rocky places[50]. Forests, dry stony slopes, steppes, saline meadows and gravelly places at elevations of 500 - 800 metres in northern China[266].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta Landscape Uses:Alpine garden, Border, Container, Massing, Rock garden, Specimen. Prefers a sunny position in a light well-drained soil[1]. Established plants are fairly drought tolerant[190]. A very ornamental plant[42]. it is frequently confused with A. montanum[1]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses. carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Fragrant foliage. Attracts butterflies. Suitable for cut flowers. Suitable for dried flowers

#### 5.2.108 Hemerocallis citrina

329

4 tlin 8 cvuc 4 kcak 2 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Hemerocallis citrina is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. The flowers can be dried and used as a thickener in soups etc. The slender trumpets vary from 12 - 17cm long[205]. There can be from 7 to 65 buds on a flowering stem[205]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked[205]. The flavour is somewhat radish-like but not so sharp[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, ksacta Forest margins, grassy fields and slopes along valleys from near sea level to 2000 metres[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[200]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Plants are hardy to at least -20°c[187]. Widely cultivated in China for its edible flowers, especially in Hunan province[266]. Hybridizes freely with other members of this genus[200]. This species is said to be self-incompatible[127, 205]. Many of the plants in cultivation under this name are H. thunbergii[205]. The sub-species H. citrina vespertina (Hara.) Erhardt. is a very free-flowering form, producing up to 75 buds per scape and capable of flowering from July to October if the weather is suitable[205]. The plant forms a loose spreading clump[K]. The roots form pseudobulbs[205]. Plants take a year or two to become established after being moved[1]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. Individual flowers are very short-lived, they open in the late afternoon and die in the morning[200]. However, plants produce a succession of flowers for several weeks of the summer. The number of flowers on a scape varies from 7 to 65[205]. The flowers have a lemony scent[205]. Another report says that they have a pronounced honeysuckle scent[245].

#### 5.2.109 Hemerocallis lilioasphodelus

Yellow Day Lily

4 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flat-

priklwis hpa7tmwatli fyifxre7t hjonli

drutta Hemerocallis lilioasphodelus is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves Root ShootsEdible Uses: Leaves and young shoots - raw or cooked like asparagus or celery[85, 105, 183]. They must be consumed when very young or else they become fibrous[K]. Flower buds - raw or cooked. They taste somewhat like green beans[85, 105]. They contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Flowers - raw or cooked[85, K]. They can be dried and used as a thickener in soups etc[183]. If the flowers are picked just as they start to wither they can be used as a condiment[85]. The flowers are a traditional food in China where they are steamed and then dried[266]. Root - cooked[85, 105]. They taste like a blend of sweet corn and salsify[183]. We have found them to be tender but fairly bland with a slight sweetness[K]. The swollen roots are quite small and are only really worthwhile using if the plant is being dug up for divisions or some other reason[K].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208].

dwatta Antidote Cancer Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. The root also has a folk history of use in the treatment of cancer - extracts from the roots have shown antitumour activity[218]. A tea made from the boiled roots is used as a diuretic[205].

nrakta Original habitat is obscure, possibly China. An occasional garden escape in Britain, ksacta Rocky mountain woods, wet meadows and riversides on foothills of the S.E.

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones. preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88, 111]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Plants are very cold-hardy, tolerating temperatures down to about -25°c[187]. A very vigorous plant, spreading by underground rhizomes[1]. The plant has a fibrous root system with occasional spindle-like swellings[205]. Cultivated as a food and medicinal plant in Japan[127]. Individual flowers are short-lived, they open at night and last for 20 - 76 hours. The plant produces a succession of blooms over a period of about 2 months[205]. The flowers are fragrant[205]. The flowers have a honeysuckle-like scent and this can pervade the air for a considerable distance when warmed by the summer sunshine[245]. Hybridizes freely with other members of this genus[200]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. The plant is heat tolerant in zones 12 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 5.2.110 Balsamorhiza deltoidea

Deltoid Balsamroot

330

4 tlin 8 cyuc 4 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Balsamorhiza deltoidea is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

Trees are late coming into leaf (usually late May to June) x J. regia, sometimes cultivated for its edible seed, there are and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Special Features: North American native, Attracts butterflies, Inconspicuous flowers or blooms.

#### 5.2.149 **Juglans intermedia**

Hind's Black Walnut, Northern California walnut, Paradox hybrid walnuH

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 30 m hkuc

htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hionli

drutta Juglans intermedia is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is monoecious (individual flowers are either male or female but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed raw[183]. An edible oil is obtained from the seed, it tends to go rancid quickly.

tcanta Herbicide OilPlants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200].

nrakta A hybrid of garden origin, J. regia x J. nigra. ksacta Not known in the wild.

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate [78, 80]. This species is a natural hybrid and may not breed true from seed.

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. A hybrid, J. nigra

some named varieties[183].

#### 5.2.150 Carva cordiformis

Bitternut, Bitternut hickory, Swamp Hickory 4 tlin 9 cvuc 3 kcak 0 tcan 1 dwat 25 m hkuc

htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carva cordiformis is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to October, in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed raw or cooked[161, 177]. Thin shelled but bitter and astringent[82, 183]. Even squirrels tend to pass it over[226]. The seed is about 3cm long[229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel Oil Rootstock WoodAn oil expressed from the seeds has been used as an illuminant in oil lamps[229]. Often used as a potted stock for grafting varieties of pecans (C. illinoensis)[227]. Wood - heavy, very hard, strong, elastic, tough, close grained[82, 227, 229]. It weighs 47lb per cubic foot[227]. Although the wood tends to be brittle, it has an amazing quality of shock-resistance and is used for hoops, tool handles etc, though it is considered to be inferior to other hickories[82, 227, 229]. A very good fuel, burning well and giving off a lot of heat[229].

dwatta Antirheumatic Diuretic LaxativeThe oil from the seeds has been used in the treatment of rheumatism[226]. The bark is diuretic and laxative[257].

nrakta Eastern N. America - Maine to Quebec and south to Florida. ksacta Low wet to dry woods, stream banks and borders of swamps[43, 82], tolerating a range of soils[229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. This is the hardiest and best growing member of this genus in Britain[11], unfortunately the seed is bitter[82]. Hybridizes in the wild with C. illinoensis[43]. Hybridizes with other members of this genus[200]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have guite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of

out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K].

nwatta Prefers a good well-drained slightly acid loam but succeeds in dry soils and in hot sunny sites[1, 11, 188. 200]. Once established, it is very drought tolerant[11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11. 200]. Although it is very winter-hardy, this species only really thrives in areas with hot summers[200]. A tree at Kew in 1985 was 15 metres tall and thriving[11]. At one time widely cultivated in N. America for its edible seed, it is now virtually extinct in the wild due to chestnut blight[11]. There are some named varieties[183]. Trees are possibly becoming resistant, some suckering stands in America are producing fruit[11]. Suckers often reach 4 - 6 metres tall before succumbing to blight, but they rarely manage to produce fruit[229]. An excellent soil-enriching understorey in pine forests[200]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus[200]. Plants in this genus are notably resistant to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.147 Juglans regia fallax

Walnıı

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 30 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Jugians regia fallax is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[46, 61, 105]. Thin shelled[200]. An edible oil is obtained from the seed, it tends to go rancid quickly.

tcanta Herbicide OilPlants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots also produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[2001.

nrakta E. Asia - S. China to the Himalayas. ksacta Forests in mountain regions[46].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. The dormant plant is very cold-tolerant, but the young growth in spring, however, can be damaged by late frosts. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately

plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potential spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. This plant is cultivated for its edible seed in China[46, 61]. This species is notably susceptible to honey fungus[200].

#### 5.2.148 Carya glabra

Sweet Pignut, Pignut hickory, Broom Hickory, Pignut Hickory

4 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 30 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvif hionli

drutta Carya glabra is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to October, in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Sap SeedEdible Uses: Seed - raw or cooked[61, 101, 161]. Very variable in quality, some are sweet and pleasant whilst others are bitter and astringent[1, 2, 11, 46, 63, 183]. In general it is inferior to other hickories[117, 159]. The nut is rather small[K], has a very thick shell and contains very little edible matter[82, 226]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. Sap - tapped in spring and used as a refreshing drink. Sweet[101].

tcanta Fuel WoodWood - hard, strong, tough, very flexible. It weighs 51lb per cubic foot[235]. An excellent timber, it is used for tool handles, agricultural implements etc[46, 61, 82]. A very good fuel, burning well and giving off a lot of heat[46, 61, 82].

nrakta Eastern N. America - Ontario to Florida. ksacta Dry woods and on slopes[43, 229]. The best specimens are found in deep moist well-drained soils[229].

propta Seed - requires a period of cold stratification seed given 3 months cold stratification had a 91% germination rate[113]. Best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give some protection from the cold for at least the first winter. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

mwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Succeeds in drier soils than most members of this genus[200]. Slow growing[200]. Sometimes cultivated for its edible seed, there are some named varieties[63]. Trees take 25 - 30 years before they commence bearing seeds and peak production does not begin until they are about 80 years old[229]. Trees thrive in Britain, often bearing fruit[11]. Trees are planted for timber in Germany[50]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200].

kcakta Edible Parts: Leaves Root Seed ShootsEdible Uses: CoffeeRoot - raw or cooked[22, 46, 61, 105, 106]. A sweet taste when cooked[161]. Young shoots - raw[46, 105, 161]. Seed - raw or cooked. It can be ground into a powder and made into a bread[46, 105, 161]. The ground seeds can be formed into cakes and eaten raw[257]. The roasted root is a coffee substitute[177].

dwatta MiscellanyA decoction of the split roots has been used in the treatment of coughs and colds[257].

nrakta Western N. America - British Columbia to California. ksacta Open places but not on thin soils[60].

propta Seed - sow early spring in a greenhouse and only just cover the seed. Germination usually takes place within 2 - 6 days at 18°c. Either sow the seed in individual pots or pot up the seedlings as soon as they are large enough to handle and plant them out into their permanent positions in the summer[134]. Division in spring. Very difficult since the plant strongly resents root disturbance[134]. It is probably best to take quite small divisions, or basal cuttings, without disturbing the main clump. Pot these up into individual pots and keep them in light shade in the greenhouse until they are growing away well. Plant them out in the summer if they have grown sufficiently, otherwise over-winter them in the greenhouse and plant out in late spring.

nwatta Requires a deep fertile well-drained loam in full sun[134, 200]. Plants strongly resent winter wet[134, 200]. Hardy to at least -25°c[200]. Plants are intolerant of root disturbance and should be planted into their permanent positions whilst still small[134].

#### 5.2.111 Dichelostemma pulchellum

Wild Hyacinth

4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dichelostemma pulchellum is a CORM growing to 0.6 m (2ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcåkta Edible Parts: Flowers RootEdible Uses: Corm - raw or cooked[22, 61, 161, 183]. A sweet flavour[46], it may seem rather flat at first, but the taste quickly grows on one[95]. A slow baking develops the sweetness of the corm[95]. The corm can be dried and ground into a powder then used as a thickener in soups or mixed with cereal flours to make bread etc[257]. The corm is usually harvested in the spring[257]. Flowers - raw[257]. A nice decoration in the salad bowl[183].

tcanta AdhesiveThe corms have been rubbed on metate into an adhesive and then spread on baskets to close the interstices and prevent small seeds falling through the gaps[257].

nrakta South-western N. America - California. ksacta Plains and hillsides[71] on dry open ridges and grassy meadows to 1800 metres[42].

propta Seed - best sown as soon as it is ripe in a free-draining compost in a cold frame[200]. Sow stored seed in spring in a cold frame[175]. Seedlings are prone to damping off and so should be kept well ventilated[175]. Germinates in 1 - 3 months at 15°c[175]. If the seed is sown thinly enough, it can be grown on for its first year without transplanting and then the dormant bulbs can be planted 2/3 to a pot. Otherwise prick out the seedlings when large enough to handle, planting them 2/3 to a pot. Grow on the plants in a greenhouse for at least two years before planting out in late spring after the last expected frosts. Division in autumn of offsets that have reached flowering size[1]. Dig up the clumps of bulbs and replant the larger ones into their permanent positions. It is best to pot up the smaller ones and grow them on for a year in a cold frame before planting them out.

nwatta Easily grown in a well-drained rich sandy loam[1], it likes plenty of moisture whilst in growth followed by a warm dry period in late summer to autumn in order to fully ripen its bulb[200]. Plants are susceptible to rot in wet soils[200]. This species is hardy to between -5 to -10°c, it may require protection in severe winters[90]. This can be

done by applying a good organic mulch such as dry bracken in late autumn and removing it in early spring. Alternatively, you can cover the ground with a cloche or other device. A very ornamental plant, it can flower in 2 years from seed.

# 5.2.112 Triteleia grandiflora

Wild Hyacinth, Largeflower triteleia, Howell's triteleia 4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 0.7 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Triteleia grandiflora is a BULB growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[207, 257]. A sweet nut-like flavour[212], they can be used like potatoes. Said by some people to be the tastiest of the North American edible bulbs[207]. At their best when slow roasted for an hour when they become rather sweet[183]. Young seedpods-cooked as a potherb[183, 207]. An excellent green[212].

nrakta Western N. America - British Columbia and south to Oregon and Utah. ksacta Dry to moist soils, often in rocky areas, meadows, or open woods of valleys, hills and in mountains to about 2700 metres[212].

propta Seed - best sown as soon as it is ripe in a cold frame. Alternatively, the seed can be sown in spring in a cold frame. Germination usually takes place within 1 - 3 months at 15°c. Sow the seed thinly so that there is no need to prick them out and grow the seedlings on in the pot for their first year. Give an occasional liquid feed to ensure that they do not become mineral deficient. Seedlings are prone to damping off so be careful not to overwater them and keep them well ventilated. When they become dormant, pot up the small bulbs placing about 3 in each pot. Grow them on in the greenhouse for another year or two until the bulbs are about 20mm in diameter and then plant them out into their permanent positions when they are dormant in the autumn. Division of flowering size bulbs in autumn. Dig up the clumps of bulbs, replanting the larger ones direct into their permanent positions. It is best to pot up the smaller ones and grow them on in a greenhouse for a year before planting them out when they are dormant in early autumn.

nwaita Requires a rich well-drained sandy loam[1]. Likes plenty of moisture whilst in growth followed by a warm dry period in late summer and autumn[200]. Succeeds outdoors in a very sheltered warm position. Plants grow in patches in the wild and these can cover considerable areas[212]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is a corm swelling at the stem base [1-2].

#### 5.2.113 Bunium bulbocastanum

Pig Nut, Earth-nut

4 tlin 8 cyuc 4 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hionli

drutta Bunium bulbocastanum is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist

kcakta Edible Parts: Leaves RootEdible Uses: CondimentRoot - raw or cooked[46, 61, 115]. A delicious taste

very much like sweet chestnuts when cooked[2, K], but the tubers are very small and fiddly to harvest[183]. Seed and flowers. Used as a flavouring[61, 183], they are a cumin substitute[46]. Leaves - raw or cooked. They are used as a garnish and a flavouring in much the same way as parsley[46, 61, 183].

dwatta AstringentAstringent[61].

nrakta Western and Southern Europe, including Britain, from the Netherlands to Italy. ksacta Rough grassland and banks on chalk[17].

propta Seed sow spring in a cold frame. The seedlings only have one cotyledon[17]. Germination is usually free and quick, prick out the seedlings into individual pots as soon as they are large enough to handle and grow on for their first season in pots. Plant them out into their final positions when dormant in the autumn. The seed can also be sown in situ, but this is best done only if you have lots of seed since far fewer plants will result. Division in spring or autumn.

nwatta See the plants native habitat for ideas on its cultivation needs. The pig nut has at times been cultivated for its edible root[61]. Although quite small in the wild, there is a potential to improve the size of this root through selective breeding and cultivation. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

#### 5.2.114 Fritillaria camschatcensis

Kamchatka Lily, Kamchatka fritillary 4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Fritillaria camschatcensis is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Root SeedpodEdible Uses: Bulb raw, cooked or dried for later use[2, 46, 105, 183]. A staple food in areas where it grows wild[177], when cooked it tastes like baked chestnuts[74]. One report says that the bulbs have a slightly bitter taste, even after cooking[256]. The best-tasting bulbs are said to come from coastal areas where the plants are occasionally covered with salt water[254]. A pudding is made by mixing the bulbs with the fruit of Empetrum nigrum[183]. The bulb is also dried and ground into a powder, then used as a flour or starch for making breads and soups[183]. The bulb is best if harvested in the autumn[172], it resembles a cluster of cooked rice grains[207]. The green seedpods can be eaten raw or cooked. They are somewhat bitter[1721].

nrakta Northern N. America - Washington to Alaska and eastwards to Siberia and Japan. ksacta Moist areas from sea level to 600 metres[60] in open woods and sub-alpine meadows[90].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta A woodland plant, preferring a moraine or rock garden[1]. Easily grown in a light moist but well-drained sandy woodland soil[42, 163, 200]. Prefers a moist peaty soil and partial shade and must not be allowed to become dry[90].

Another report says that it prefers a sunny position [42] whilst yet another says that it succeeds in full sun or light shade in a rich soil[200]. The plants often grow close to the sea and survive periodic inundation with salt water[256]. The dormant bulb is very hardy and has withstood soil temperatures down to -20°c, though the embryonic flower shoot will be damaged at temperatures around -15°c[214]. A very ornamental plant[1], it is very variable in size and flower colour[90]. The flowers are sweetly scented[245]. Plants flower within 3 5 years from seed[164]. The plant is heat tolerant in zones 8 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.115 Balsamorhiza hookeri

Balsam Root, Hooker's balsamroot, Hairy balsamroot, Idaho balsamroot, Rabbithead balsamroot, Negle

4 tlin 8 cyuc 4 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Balsamorhiza hookeri is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

kcakta Edible Parts: Root SeedEdible Uses: Root - raw or cooked[2, 46, 106, 183, 257]. A sweet and agreeable taste when cooked[61, 105]. Seed - raw or cooked[105, 161]. It can be ground into a powder and formed into cakes for eating raw or made into a bread[257].

dwatta Stomachic Women's complaintsA decoction of the root has been used for stomach problems, bladder complaints and female complaints[257. The sub-species B. hookeri hirsuta has been specified for these uses[257].

nrakta Western and Central N. America ksacta Dry rock outcrops in foothills and lowlands[60].

propta Seed - sow early spring in a greenhouse and only just cover the seed. Germination usually takes place within 2 - 6 days at 18°c. Either sow the seed in individual pots or pot up the seedlings as soon as they are large enough to handle and plant them out into their permanent positions in the summer[134]. Division in spring. Very difficult since the plant strongly resents root disturbance[134]. It is probably best to take quite small divisions, or basal cuttings, without disturbing the main clump. Pot these up into individual pots and keep them in light shade in the greenhouse until they are growing away well. Plant them out in the summer if they have grown sufficiently, otherwise over-winter them in the greenhouse and plant out in late spring.

nwatta Requires a deep fertile well-drained loam in full sun[134, 200]. Plants strongly resent winter wet[134, 200]. Hardy to at least -25°c[200]. Plants are intolerant of root disturbance and should be planted into their permanent positions whilst still small[134].

## 5.2.116 Allium canadense

Canadian Garlic, Meadow garlic, Fraser meadow garlic, Hyacinth meadow garlic

4 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Avoid in patients with kidney or liver disease. Avoid if taking warfarin as can interfere with anticoagulant therapy [301].

kcakta Edible Parts: SeedEdible Uses: CoffeeThe roasted seed is used as a coffee substitute[2, 7]. Seed cooked. It can be dried, ground into a powder and used as a gruel[7, 46, 55, 61]. The seed is quite large, about 3cm in diameter, and is easily harvested. It is usually produced in abundance in Britain. Unfortunately the seed is also rich in saponins, these must be removed before it can be used as a food and this process also removes many of the minerals and vitamins, leaving behind mainly starch. See also the notes above on toxicity. The seed contains up to 40% water, 8 -11% protein and 8 - 26% toxic saponins[218]. The following notes apply to A. californica, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213].

tcanta Dye Soap Starch Tannin WoodSaponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. The seed contains variable amounts of saponins, up to a maximum of 10%[240]. A starch obtained from the seed is used in laundering[100]. The bark and other parts of the plant contain tannin, but the quantities are not given[223]. A yellow dye is obtained from the bark[4]. The flowers contain the dyestuff quercetin[223]. Wood - soft, light, not durable. Of little commercial value, it is used for furniture, boxes, charcoal[2, 11, 46, 61].

dwatta Alterative Analgesic Antiinflammatory Antirheumatic Astringent Bach Diuretic Dysentery Expectorant Febrifuge Haemostatic Malaria Narcotic Tonic Vasoconstrictor VulneraryHorse chestnut is an astringent, antiinflammatory herb that helps to tone the vein walls which, when slack or distended, may become varicose, haemorrhoidal or otherwise problematic[254]. The plant also reduces fluid retention by increasing the permeability of the capillaries and allowing the re-absorption of excess fluid back into the circulatory system[254]. This plant is potentially toxic if ingested and should not be used internally without professional supervision[254]. Alterative, analgesic, haemostatic and vulnerary[165, 218]. The bark is anti-inflammatory, astringent, diuretic, febrifuge, narcotic, tonic and vasoconstrictive[4, 7, 222]. It is harvested in the spring and dried for later use[4]. The plant is taken in small doses internally for the treatment of a wide range of venous diseases, including hardening of the arteries, varicose veins, phlebitis, leg ulcers, haemorrhoids and frostbite[238, 254]. It is also made into a lotion or gel for external application[254]. A tea made from the bark is used in the treatment of malaria and dysentery, externally in the treatment of lupus and skin ulcers[4, 222]. A tea made from the leaves is tonic and is used in the treatment of fevers and whooping cough[222, 240, 254]. The pericarp is peripherally vasoconstrictive[7]. The seeds are decongestant, expectorant and tonic[7, 21]. They have been used in the treatment of rheumatism, neuralgia and haemorrhoids[4]. They are said to be narcotic and that 10 grains of the nut are equal to 3 grains of opium[213]. An oil extracted from the seeds has been used externally as a treatment for rheumatism[254]. A compound of the powdered roots is analgesic and has been used to treat chest pains[257]. The buds are used in Bach flower remedies - the keywords for prescribing it are 'Failure to learn by experience', 'Lack of observation in the lessons of life' and hence 'The need of repetition' [209]. The flowers are used in Bach flower remedies - the keywords for prescribing it are 'Persistent unwanted thoughts' and 'Mental arguments and conversations'[209]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Aesculus hippocastanum for chronic venous insufficiency in the legs (see [302] for critics of commission E).

nrakta Europe - N. Greece and Albania. Naturalized in Britain[17], ksacta Mountain woods[50].

propta Seed - best sown outdoors or in a cold frame

as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Landscape Uses:Firewood, Pollard, Specimen, Street tree. Prefers a deep loamy well-drained soil but is not too fussy tolerating poorer drier soils[11, 200]. Tolerates exposed positions and atmospheric pollution[200]. A very ornamental and fast-growing tree[1, 4], it succeeds in most areas of Britain but grows best in eastern and southeastern England[200]. Trees are very hardy when dormant, but the young growth in spring can be damaged by late frosts. The flowers have a delicate honey-like perfume[245]. Trees are tolerant of drastic cutting back and can be severely lopped[200]. They are prone to suddenly losing old heavy branches[98]. The tree comes into bearing within 20 years from seed[98]. Most members of this genus transplant easily, even when fairly large[11]. Special Features: Attractive foliage, Not North American native, Naturalizing, Blooms are very showy.

#### 5.2.146 Castanea dentata

American Sweet Chestnut

4 tlin 8 cyuc 3 kcak 3 tcan 1 dwat 30 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Castanea dentata is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Oil SeedEdible Uses: Chocolate Coffee OilSeed - raw or cooked[2, 62, 63, 102, 117]. Rather on the small side, but these are the sweetest seeds of any species in this genus[183]. The seed contains about 7% fat, 11% protein[159]. It can be dried, ground into powder and then be added to cereals when making bread, cakes etc[213]. A delicious oil can be extracted from the seed by crushing the nuts, boiling them in water and then skimming off the oil as it comes to the surface[213]. It can be used as a topping for various puddings[213]. The roasted nut can be used as a coffee substitute and a chocolate substitute can also be made from it[183] (no further details).

tcnnta Dye Oil Tannin WoodThe bark is a good source of tannin[46, 61, 171, 223]. The dried leaves contain 9% tannin[213]. The wood and the seed husks also contain tannin[223]. The husks contain 10 - 13% tannin[223]. A brown dye is obtained from the bark[257]. Wood - soft, not strong, light, very durable, liable to warp. It weighs 28lb per cubic foot. Easy to split, it is used for making cheap furniture, fence posts, in construction etc[61, 82, 117, 171, 229, 235].

dwatta Astringent ExpectorantA warm water infusion of the leaves has been used to calm the respiratory nerves and promote expectoration[213, 257]. The infusion has also been used in the treatment of whooping cough but modern opinion is that the leaves are no more than a mild astringent[213].

nrakta Eastern N. America - Maine and Ontario to Michigan, Georgia and Arkansas. ksacta Dry, gravelly or rocky, mostly acid soils[43]. This species is virtually extinct in America due to chestnut blight[11].

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them

nrakta E. Asia - Himalayas from Kashmir to S.E. Tibet. ksacta Forests, 1500 - 3000 metres in the Himalayas[51].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate [78, 80, 113].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. The dormant plant is guite coldtolerant, but the young growth in spring, however, can be damaged by late frosts. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. This plant is cultivated for its edible seed in W. Himalayas[51]. This species is notably susceptible to honey fungus[200].

## 5.2.144 Carva tomentosa

Mockernut. White Heart Hickory. Mockernut Hickory 4 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 30 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carva tomentosa is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to November, in flower in June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Sap SeedEdible Uses: Seed - raw or cooked[1, 43, 101, 159]. A delicious sweet taste but the thick, hard shell makes extraction very difficult[2, 183, 226]. The kernel is quite small considering the size of the nut[226]. Even squirrels leave the seed to accumulate under trees[117, 183]. The seed can be up to 6cm long[229]. The seed ripens in late autumn and, when stored in its shell in a cool place. will keep for at least 6 months[K]. Sap - used as a drink. Tapped in spring, it has a sweet flavour[101].

tcanta Dye Fuel Repellent WoodA black dye is obtained by boiling the bark in a vinegar solution[229]. A beige dye is extracted from the leaves and twigs, cream of tartar is reguired as a mordant[226]. A yellow dye is obtained from the bark when alum is used as a mordant[226]. The inner bark has been used to finish baskets and to make chair bottoms[257]. The leaves have been scattered about to repel insects[257]. Wood - close-grained, tough, elastic, very heavy. hard[61, 82, 227, 229]. It weighs 51lb per cubic foot[227]. The wood has excellent bending qualities and can withstand compression better than most other woods[229]. One of the best hickory woods, it is an important commercial timber and is used for vehicle parts, tool handles, fuel etc[61, 63, 82, 227, 229].

dwatta Astringent Detergent The inner bark is astringent and detergent[257]. It has been used as a dressing for cuts and has also been chewed to treat sore mouths[257]

nrakta Eastern N. America - Massachusetts to Ontario, south to Florida and Texas. ksacta Mainly along ridges, dry hills and hillsides, growing best in rich well-drained soils[229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is

nwatta Landscape Uses: Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Succeeds in poor soils[63] and in drier soils than many other members of the genus[200]. Generally a slow growing tree[200] though it is fast when young[149]. Trees respond well to coppicing [149]. A very ornamental and long-lived tree[1, 227], it is guite successful in Britain[137] and has been planted on an experimental scale for its timber in Germany[50]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees in the wild commence fruiting when about 20 years old, with an optimum seed bearing age from 40 -150 years, though they often live for 300 - 500 years[229]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June)[137], but lose their leaves later in the autumn than other Carva species 229]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:North American native, Attractive flowers or

### 5.2.145 Aesculus hippocastanum

Horse Chestnut, European Horsechestnut, Common Horsechestnut

4 tlin 7 cyuc 3 kcak 3 tcan 4 dwat 30 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus hippocastanum is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The seed is rich in saponins[10, 21, 65]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove

drutta Allium canadense is a BULB growing to 0.5 m 5.2.117 Vaccinium praestans (1ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[46, 61, 62, 177]. It can be used as a vegetable, or as a flavouring in soups and stews, and can also be pickled[2]. The bulb is up to 30mm in diameter, it is crisp, mild and with a pleasant flavour[183]. Used as a leek substitute according to one report[22], it is a garlic substitute according to others[55, 159, K], Leaves - raw or cooked[55, 62, 177]. A delicious mild flavour, they are available from early spring until the autumn[K]. They make a very acceptable salad and can also be used as a greens or as a flavouring in cooked foods[K]. Flowers - raw. A little bit stronger flavour than the leaves, especially as the seeds begin to form, they can be used as a flavouring and garnish on salads[K]. Some forms of this species produce bulbils. These top-setting bulbils make a fine onion flavoured pickle[62, 105, 183]. They are said to have a superior flavour to other pickled onions[2].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20]. The plant can be rubbed on exposed parts of the body to protect them from insect bites and the bites of scorpions, lizards etc[257].

dwatta Antiasthmatic Carminative Cathartic Diuretic Expectorant StimulantThe plant is antiasthmatic, carminative, cathartic, diuretic, expectorant and stimulant[257]. A tincture is used to prevent worms and colic in children, and also as a remedy for croup[257]. Although no other specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels. act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta N. America - New Brunswick to Minnesota, south to Florida and Colorado ksacta Sandy soils in low woods, thickets and meadows[43, 274].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required. Bulbils planted in situ

nwatta Prefers a sunny position in a light well-drained soil[1]. A moisture loving plant according to another report[42]. The bulbs should be planted fairly deeply[1]. Bulbs grow to a good size under cultivation[183]. Some forms of this species produce many bulbils and are considered to be a pernicious weed in some areas of America[159], there is some risk that they could spread aggressively in Britain[203]. A. canadense mobilense. (Reg.)F.M.Ownb. is a form that does not produce bulbils and is much better behaved[200]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc., and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

Kamchatka Bilberry

4 tlin 8 cvuc 4 kcak 4 tcan 0 dwat 0.2 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium praestans is a deciduous Shrub growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 105]. The taste is sweet and fragrant, somewhat like a strawberry[11]. A delicious flavour[183]. The fruit is about 12mm in diameter[200].

tcanta A good ground cover for cool moist shady ar-

nrakta Northern N. America to N.E. Asia. ksacta Mossy bogs, swampy woods (often on rotting fallen tree trunks), elevated places and slopes in northern Asia[74].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 3cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113]. Larger divisions can be planted out direct into their permanent positions, but we have found that in general it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. In this country, plants grow better in northern England and Scotland, in southern England they need a position with plenty of light but little direct sun[11]. Plants in this genus are notably resistant to honey fungus[200]

#### **5.2.118** Stachys affinis

Chinese Artichoke, Artichoke betony 4 tlin 8 cvuc 4 kcak 0 tcan 1 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stachys affinis is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from May to November, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Tubers raw or cooked[1, 2, 4, 16, 33]. Ouite a pleasant mild flavour and easily digested[46], but fairly small and fiddly[K], they are about 5 - 8cm long and 2cm wide[200, 206]. A nutty artichoke-like flavour[183], it can be eaten raw on its own, be added to salads or be lightly cooked[K]. The tubers quickly discolour when exposed to the air[200] and are said to lose their flavour if they are peeled[183]. It is best to harvest them as required[206]. Yields are about 1kg per square metre[200]. Leaves - cooked. A famine food, they are only used when all else fails[179].

dwatta AnodyneThe dried and powdered root is anodyne[218]. The entire plant has been used in the treatment of colds and pneumonia[266].

nrakta E. Asia - China, Japan. ksacta Wet and submersed areas; 0-3200 m. Gansu, Hebei, Nei Mongol, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Xinjiang[266]

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth has been made, it is possible to plant them out during the summer, otherwise grow them on in pots for their first summer, leaving the tubers in the pots to overwinter in a cold frame and then plant out in late spring when in active growth. Seed is rarely if ever produced on plants growing in Britain. Division. The tubers can be harvest and replanted at any time whilst they are dormant. They do start into growth fairly early in the year so it is better to have moved them by the end of March[K].

nwatta Prefers a well-drained soil in a sunny position[16]. Thrives in an ordinary garden soil[1], preferring one that is not too heavy 16, 331. It grows best in a soil that has been well fed and does not dry out in the growing season[16]. Plants seem to withstand even water-logged conditions in the winter[206]. The Chinese artichoke is occasionally cultivated for its edible tubers, they are planted out in March and harvested from October onwards[1, 58, 61]. Although top growth is killed back by frost, the tubers are very hardy and can be left in the ground over winter to be harvested as required[200]. It is virtually impossible to find all the tubers, there are always some left behind that will grow the following season[K]. Plants are very tolerant of high summer temperatures[206]. The tubers begin to sprout at temperatures above about 5°c[206]. Plants take 5 - 7 months to develop their tubers[206]. Plants rarely flower in Britain[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.119 Valerianella locusta

Corn Salad, Lewiston cornsalad 4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Valerianella locusta is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Young leaves - raw[1, 2, 4, 5, 12, 27, 33, 37]. A very mild flavour, with a delicate quality that makes them seem to melt in the mouth, they can be added in quantity to salads[183]. The leaves can be available all year round from successional sowings and will only require protection in the colder winters[K]. Flowers and flowering stems - raw[183].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Cultivated ground, waste places, hedgebanks, dunes etc, usually on dry soils[9, 17].

propta Seed - in order to obtain a continuous supply of salad leaves, it is best to sow the seed successionally from early spring to late summer in situ. A late summer sowing might also succeed, and this would supply edible leaves in the winter.

nwatta A very easily grown plant, it prefers a fairly rich light soil[1, 37] though it tolerates most soils and wet or dry conditions[52]. Prefers a sunny position but tolerates some shade in summer[K]. This shade, plus an adequate supply of water, will slow down the plant's tendency to run to seed[200]. Late sowings will benefit from a sheltered sunny

position and perhaps some protection in the winter. Often cultivated on a garden scale for its edible young leaves which, by successional sowing, can be available for most of the year although they will require protection in severe winters. There are several named varieties[183]. The plants do tend to run quickly to seed in the summer though. If allowed to flower, plants will often maintain themselves by self-sowing[K].

### 5.2.120 Beta vulgaris cicla

Spinach Beet

4 tin 8 cyuc 4 kcak 0 tcan 2 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Beta vulgaris cicla is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers most soil

kcakta Edible Parts: Leaves StemEdible Uses: Leaves and leaf stems - raw or cooked like spinach[2, 16, 27, 33]. A very good spinach substitute, the leaves are large and easily harvested, yields are high[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K]. Flowering stem - cooked. A broccoli substitute[K].

dwatta Although little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water, is said to cure genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that betacyanin and anthocvanin are important in the exchange of substances of cancer cells; others note two main components of the amines, choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmenagogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and yellow jaundice, and, put into the nostrils to purge the head. clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269]. Juice of the white beet was said to clear obstructions of the liver and spleen[269]. Culpepper (1653) recommended it for treating headache and vertigo as well as all affections of the brain[269].

nrakta A cultivated form of B. vulgaris maritima that is grown for its edible leaves. ksacta Not known in a truly wild

propta Seed - sow in situ in early April for the summer crop and again in early July to August for the winter and spring crop. It is also possible to obtain an earlier crop by sowing the seed in a tray in a greenhouse in March and planting out in April/May(264].

nwatta A very easily grown plant, it succeeds in sun or light shade in moist soils but prefers a rich well-drained light neutral to alkaline soil[33, 37]. Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 - 6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity[269]. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 26.6°C and a pH of 4.2 to 8.2[269]. Plants are tolerant of saline soils and respond positively if salt is added to non-saline soils at a rate of about 30g per square metre[264]. Spinach beet is often cultivated by gardeners for its edible leaves[16], it does not make a very good

used to make basket splints[257]. This species can successfully establish itself in recently cleared areas and partially open woodlands[229]. It can therefore be used as a pioneer species to speed the regeneration of woodland[K]. Woodnot strong, close grained, hard, very heavy[46, 82, 227]. It weighs 38lb per cubic foot[227]. The grain of some old specimens is undulated, this gives beautiful effects of light and shade on polished surfaces[4]. The wood is commonly used for making furniture, turnery, pulp, etc[46, 82, 227].

dwatta Antispasmodic Astringent Dysentery OphthalmicThe bark has astringent properties and has been used as an application for sore eyes[4]. The inner bark was used according to one report[257]. An infusion of the bark has been used to treat cramps and dysentery[257].

nrakta Eastern N. America - Quebec to Florida, west to Texas, Minnesota and Ontario. ksacta Usually found in swamps and uplands, it also occasionally grows on dry rocky hillsides and sand dunes[43, 82].

propta Seed - best sown as soon as it is ripe in the spring in a cold frame. It usually germinates immediately and by the end of summer has formed a small tree with several pairs of leaves[82]. Stored seed quickly loses its viability. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive

nwatta Landscape Uses:Firewood, Aggressive surface roots possible, Specimen, Street tree, Woodland garden. Of easy cultivation, it prefers a good moist well-drained soil[11. 98], though this species succeeds in wetter soils than most other members of the genus. Grows well in heavy clay soils. Dislikes chalk according to one report[98], whilst others say that it does less well on chalk[200], often becoming chlorotic as a result of iron deficiency. Prefers a sunny position but tolerates some shade. Tolerates atmospheric pollution[200]. A fast-growing tree for the first 20 - 30 years of its life, it may live for 75 - 100 years[229]. Red maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. A variable species with several sub-species [227], there are also many named varieties that have been selected for their ornamental value[200]. This species is often confused with A. saccharinum[11]. Special Features: Attracts birds, North American native. Naturalizing, Wetlands plant, Attractive flowers or blooms

#### 5.2.142 Tilia amurensis

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tilia amurensis is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw[K]. A famine food, it is only used when all else fails[177]. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

the product railed because the paste decomposes readily[2].

tcanta FibreThe fibrous inner bark is used for making sandals etc[151].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta E. Asia - Korea, Manchuria, S.E. Siberia. ksacta Grows in woods in N. Korea[151].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immedi-

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils [11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers [200]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. This species is closely related to T. cordata[200]. It is also closely related to Tilia japonica. differring in having smaller leaves and bracts, and shorter cyme[266]. Lime trees tend to hybridise freely if other members of the genus are growing nearby [238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.143 Juglans regia kamaonia

Walnı

4 tlin 8 cvuc 3 kcak 0 tcan 3 dwat 30 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Juglans regia kamaonia is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[51, 177, 272]. An edible oil is obtained from the seed, it tends to go rancid quickly[51].

tcanta Herbicide Oil Tannin WoodThe bark and the unripe rind of the fruit are good sources of tannin[51, 272]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots also produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. Wood - hard, strongly grained, polishes well. Used for making furniture, carved work, veneers etc[51, 272].

dwatta Alterative Anthelmintic Antirheumatic Astringent Detergent TonicThe bark, leaves and fruit are used medicinally[51]. No more details are given in this report but another report on Indian medicinal plants gives the following uses for J. nigra (and almost certainly refers to this subspecies):- The bark is anthelmintic and detergent[240]. The leaves are anthelmintic, astringent and tonic[240]. A decoction is considered to be specific in the treatment of strumous sores[240]. The fruit is alterative[240]. It is used in the treatment of rheumatism[240].

VermifugeThe bark and leaves are alterative, anodyne, astringent, blood tonic, detergent, emetic, laxative, pectoral and vermifuge[4, 222, 257]. Especially useful in the treatment of skin diseases, black walnut is of the highest value in curing scrofulous diseases, herpes, eczema etc[4]. An infusion of the bark is used to treat diarrhoea and also to stop the production of milk, though a strong infusion can be emetic[21, 257]. The bark is chewed to allay the pain of toothache and it is also used as a poultice to reduce the pain of headaches[222, 257]. The juice from the fruit husk is applied externally as a treatment for ringworm[222, 257]. The husk is chewed in the treatment of colic and applied as a poultice to inflammations[222]. The burnt kernels, taken in red wine, are said to prevent falling hair, making it fair[269]. Green husks are supposed to ease the pain of toothache[269]. A tea made from the leaves is astringent[222]. An infusion has been used to lower high blood pressure[257]. It can be used as a cleansing wash[21]. The pulverized leaves have been rubbed on the affected parts of the body to destroy ringworm[257]. The oil from the ripe seeds has been used externally in the treatment of gangrene, leprosy, and wounds[269]. The sap has been used to treat inflamma-

nrakta Eastern N. America - Massachusetts to Florida, west to Texas and Minnesota. ksacta Rich fertile woods and hillsides[43, 82] in deep well-drained soils[229].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113].

nwatta Industrial Crop: Dye Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: Protein-oilLandscape Uses:Firewood, Aggressive surface roots possible, Specimen. Requires a deep well-drained loam and a sunny position sheltered from strong winds[1. 11]. Prefers a slightly alkaline soil[200]. Plants are best suited to deep, rich, slightly acid or neutral soil, with good drainage, but will not succeed on infertile upland soil or on soils with poor drainage[269]. The black walnut grows best areas with an annual precipitation from 30 to 130cm, an annual temperature in the range of 7 to 19°C and a pH from 4.9 -8.2[269]. The dormant plant is very cold hardy, but the young growth in spring, however, can be damaged by late frosts. The Black walnut is one of most valuable natural forest trees in the United States[269]. A very ornamental and fast growing plant[1, 200], it is sometimes cultivated in N. America for its edible seed. Whilst potential yields of 7.5 tonnes per hectare have been postulated, it is more feasible to expect annual yields of around 2.5 tonnes per hectare[269]. Good seed crops are usually produced every other year, though some plants fruit well annually whilst others produce god crops every third year[269]. The average weight of a seed from wild trees is about 17g, though there are many named varieties and the weight of their seeds varies from 20 - 30g[183, 269]. There are breeding programmes that are seeking to develop cultivars with thinner shells[226]. Trees in the wild commence bearing seeds when about 12 years old[227]. Black walnut trees mature their fruit rather generally throughout the plants natural range where there is a growing season of about 150 days and an average summer temperature of 16.5°C[269]. Trees do not fruit very freely in Britain unfortunately[1, 11]. They grow well in the eastern half of the country but often do not thrive in the west[98]. Trees have been extensively planted for timber in parts of C. and E. Europe[50]. This species hybridizes with J. regia[149], some named cultivars have been developed from this cross for their seed. Plants produce a deep taproot which makes them very drought resistant when established, though they are intolerant of root disturbance[1, 11, 269]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. The black walnut is selffertile, but the sequence of male and female blooming, called dichogamy, can and often does minimize chances of a tree shedding pollen on its own pistils. In different trees pollen may be shed before the receptivity period of female flowers, or at same time, or after pistil receptivity. For greatest possible nut production, plant trees of 2 or more cvs, as different cvs have overlapping pollen-receptivity periods and can pollinate each other[269]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots also produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. Beans, peas and tomatoes are also particularly sensitive to these secretions and will not grow in the rooting zone[200]. Trees cast guite a dense shade so, along with their other antisocial tendencies, are not very friendly trees for a woodland garden[K]. The bruised leaves have a pleasant sweet though resinous smell[245]. Special Features: Attracts birds. North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.141 Acer rubrum

Red Maple, Drummond's maple, Swamp Maple 4 tlin 10 cyuc 3 kcak 3 tcan 1 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Acer rubrum is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness, It is hardy to UK zone 3. It is in flower from March to April, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It refers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner bark Leaves Sap SeedEdible Uses: SweetenerThe sap contains sugar and this can be used as a drink or be concentrated into a syrup by boiling off the water[2, 11, 74, 159]. The syrup is used as a sweetener on many foods. This species only yields about half the quantity obtained from the sugar maple (A. saccharum)[4]. It makes a good maple syrup although the yield is comparatively small[183]. It can be harvested in late winter, the flow is best on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Inner bark - cooked[105, 177]. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[161]. Self-sown seedlings, gathered in early spring, are eaten fresh or dried for later use[213]. Seeds - cooked. The wings are removed and the seeds boiled then eaten hot[213]. The seed is very small, about 5mm long, and is produced in small clusters[K].

tcanta Basketry Companion Dye Pioneer Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. The boiled inner bark yields a purple colour[4, 57, 82]. Mixed with lead sulphate this produces a black dye which can also be used as an ink[4]. The dye is dark blue according to another report[95]. The wood is

commercial crop since the leaves quickly droop after being harvested and so do not stand the journey to market. This plant is a good hot weather substitute for spinach[183]. The leaves are available all year round from successional sowings if the winters are not too severe[K]. In severe winters it is possible to dig up some plants and move them to a protected area such as a greenhouse in order to produce fresh leaves[1]. Plants usually self-sow freely if they are well-sited and the ground is disturbed by hoeing etc[K]. A good companion for dwarf beans, onions and kohl rabi[18], though the growth of spinach beet is inhibited by runner beans, charlock and field mustard[18].

#### 5.2.121 Balsamorhiza sagittata

Oregon Sunflower, Arrowleaf balsamroot 4 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Balsamorhiza sagittata is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves Root Seed Shoots StemEdible Uses: CoffeeRoot - raw or cooked[46, 61, 106, 161, 257]. The root has a thick crown that is edible raw[213]. Roots have a sweet taste when cooked[2, 183]. A long slow baking is best, the Flathead Indians would bake them in a fire pit for at least 3 days[183]. The roots are resinous and woody with a taste like balsam[212]. Young shoots - raw or cooked[161, 257]. Added to salads or used as a potherb[183]. The large leaves and petioles are boiled and eaten[207]. When eaten in large quantities they act like sleeping pills to cause sleepiness[257]. The young flowering stem can be peeled and eaten raw like celery[183, 257]. Seed - raw or cooked[2, 94, 101, 161]. A highly prized source of food[257]. It can be roasted, ground into a powder and used with cereals when making bread[183, 257]. The raw seed can also be ground into a powder then formed into cakes and eaten without cooking[257]. The seed is rich in oil[213]. Oil. The seed was a prized source of oil for many native North Americans[257]. The roasted root is a coffee substitute[177, 183].

tcanta Hair InsulationThe large hairy leaves are used as an insulation in shoes to keep the feet warm[99]. An infusion of the root has been rubbed into the scalp to promote hair growth[257]

dwatta Antirheumatic Diaphoretic Diuretic Dysentery Febrifuge Odontalgic Poultice Skin Stomachic VulneraryOregon sunflower was guite widely employed as a medicinal herb by various native North American Indian tribes who used it to treat a variety of complaints, but especially stomach problems[257]. It is little used in modern herbalism. The root is antirheumatic, diuretic, cathartic, diaphoretic, febrifuge and vulnerary[94, 257]. An infusion of the leaves, roots and stems has been used as a treatment for stomach pains, colds. whooping cough, TB, fevers and headaches[257]. A decoction of the root has been taken at the beginning of labour to insure easy delivery[257]. The juice from the chewed root is allowed to trickle down the throat to treat sore mouths and throats whilst the root has also been chewed to treat toothaches[257]. The smoke from the root has been inhaled as a remedy for body aches such as rheumatism[257]. The root is chewed or pounded and used as a paste on wounds. blisters, bites, swellings and sores[207, 257]. A poultice made from the coarse, large leaves has been used to treat severe burns[257]. An infusion of the leaves has been used as a wash for poison ivy rash and running sores[257]. The seeds have been eaten as a treatment for dysentery[257].

nrakta Western N. America - South Dakota to British Columbia, south to California and Colorado. ksacta Open hillsides and flat land up to moderate elevations, especially on deep soils[60].

propta Seed - sow early spring in a greenhouse and only just cover the seed. Germination usually takes place within 2 - 6 days at 18°c. Either sow the seed in individual pots or pot up the seedlings as soon as they are large enough to handle and plant them out into their permanent positions in

the summer[134]. Division in spring. Very difficult since the plant strongly resents root disturbance[134]. It is probably best to take quite small divisions, or basal cuttings, without disturbing the main clump. Pot these up into individual pots and keep them in light shade in the greenhouse until they are growing away well. Plant them out in the summer if they have grown sufficiently, otherwise over-winter them in the greenhouse and plant out in late spring.

nwatta Requires a deep fertile well-drained loam in full sun[134, 200]. Plants strongly resent winter wet[134, 200]. Hardy to at least -25°c[200]. Plants are intolerant of root disturbance and should be planted into their permanent positions whilst still small[134]. They withstand heavy grazing in the wild[212]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.122 Beta vulgaris flavescens

Swiss Chard

4 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hionli

drutta Beta vulgaris flavescens is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta  $\bar{E}$ dible Parts: Leaves StemEdible Uses: Leaves - raw or cooked like spinach[2, 16, 27, 33]. A very good spinach substitute, the leaves are large and easily harvested, yields are high[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K]. Leaf stems - cooked. The steamed stems retain their crispness and have a delicious flavour, they are considered to be a gournet vegetable[K]. Flowering stem - cooked. A broccoli substitute[16].

tcanta CompanionAgroforestry Uses: Beet is said to be a good companion for dwarf beans, onions and kohl rabi[18], though the growth of spinach beet is inhibited by runner beans, charlock and field mustard[18].

dwatta Antitumor EmmenagogueAlthough little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water, is said to cure genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that betacyanin and anthocyanin are important in the exchange of substances of cancer cells; others note two main components of the amines, choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmenagogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and yellow jaundice, and, put into the nostrils to purge the head, clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269]. Juice of the white beet was said to clear obstructions of the liver and spleen[269]. Culpepper (1653) recommended it for treating headache and vertigo as well as all affections of the brain[269].

nrakta A cultivated form of B. vulgaris maritima that is grown for its leaves and petioles. ksacta Not known in a truly wild situation

propta Seed - sow in situ in early April for the summer crop and again in early July to August for the winter and spring crop. It is also possible to obtain an earlier crop by

sowing the seed in a tray in a greenhouse in March and planting out in April/May[264].

nwatta A very easily grown plant, it succeeds in sun or light shade in moist soils but prefers a rich well-drained light neutral to alkaline soil[33, 37]. Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 - 6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity[269]. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 26.6°C and a pH of 4.2 to 8.2[269]. Plants are tolerant of saline soils and respond positively if salt is added to non-saline soils at a rate of about 30g per square metre[264]. Plants frequently self-sow if they are happy. sometimes too freely[K]. Swiss chard is sometimes cultivated by gardeners for its edible leaves and stems[16], it does not make a very good commercial crop since the leaves quickly droop after being harvested and therefore do not make the trip to market. The leaves are a good hot weather substitute for spinach[183] and can be available all year round if the winters are not too severe[K]. In severe winters it is possible to dig up some plants and move them to a protected area such as a greenhouse in order to produce fresh leaves[1]. A good companion for dwarf beans, onions and kohl rabi[18]. Its growth is inhibited by runner beans, charlock and field mustard[18].

#### 5.2.123 Beta vulgaris craca

4 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Beta vulgaris craca is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[2, 16, 27, 132]. Well-grown roots are sweet and tender, especially when young, and can be grated and used in salads. Beetroots are traditionally boiled until tender then pickled in vinegar and used in salads. The roots can also be cooked and used as a vegetable, they are sweet and delicious when baked[K]. The root contains up to 8% sugar[143]. The root is tasteless when grown on very wet soils and dry when grown on clay soils[132]. Immature roots can be harvested in the summer and early autumn for immediate use. these are usually much more tender than the older roots[K]. Mature roots can be left in the ground all winter and harvested as required, though they might suffer damage in severe winters[K]. Alternatively, they are harvested in late autumn or early winter and will store for up to 6 months in a cool but not dry frost-free place[K]. Leaves - raw or cooked like spinach[183]. A reasonable spinach substitute, though harvesting leaves from growing plants can reduce yields of the roots[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K]. A nutritional analysis is available[218].

dwatta Antitumor Carminative Emmenagogue Haemostatic Stomachic TonicAlthough little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. The root of white-rooted forms contain betaine which promotes the regeneration of liver cells and the metabolism of fat cells[254]. The root of redrooted forms contains betanin - an anthocyanin similar to those found in red wine - which is partly responsible for red beet's immune-enhancing effect[254]. The root is carminative, haemostatic, stomachic and a tonic for women[218]. The root can be used as part of the diet, or the juice can be extracted and used as a health-promoting drink[254]. At least one litre of the juice from red-rooted forms must be taken each day in order to stimulate the immune system[254]. The juice is prescribed by herbalists as part of a cancertreatment regime[254]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water, is said to cure genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that betacyanin and anthocvanin are important in the exchange of substances of cancer cells: others note two main components of the amines. choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmenagogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and vellow jaundice, and, put into the nostrils to purge the head, clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269].

nrakta A cultivated form of B. vulgaris maritima that is grown for its edible root. ksacta Not known in a truly wild

propta Seed - pre-soaking for 12 hours in warm water prior to sowing encourages mare rapid and even germination[264]. For the earliest crop, ready to harvest in late spring, sow the seed in situ in late February or early March, giving it some protection such as a cloche. The first outdoor sowings can be made in March in situ to provide a crop from early summer onwards. For both of these sowings it is important to choose varieties that are resistant to bolting in case there is a cold spell in the spring. Sowings for the main crop can be made in April to early June to provide roots for autumn, winter and early spring use. Late sowings of fast maturing varieties can be made in June and early July in order to provide fresh young roots in the autumn.

nwatta A very easily grown plant, it succeeds in sun or light shade in moist soils but prefers a rich well-drained light neutral to alkaline soil[33, 37]. Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 - 6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity[269]. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 26.6°C and a pH of 4.2 to 8.2[269]. Plants are tolerant of saline soils and respond positively if salt is added to non-saline soils at a rate of about 30g per square metre[264]. Beetroot plants are generally hardy in Britain and can be left outdoors in the soil in most winters, though prolonged cold weather or severe winters can damage the roots. If the plants are exposed to prolonged temperatures below -10°c they will quickly run to seed[200]. This also applies to the young plants of most beetroot varieties if they are sown in early spring - a short period where temperatures fall below zero can fool the plant into believing that there has been a winter and it will then try to flower and produce seed. There are, however, come varieties, such as 'Bolthardy', that are more resistant to bolting and so more suited to these early sowings[200, 264]. The beetroot is widely cultivated. especially in temperate zones, for its edible root. There are two basic forms, those with rounded roots and those with elongated roots with many named varieties of each form. The roots can be available all year round from successional sowings. A fast-growing plant, some cultivars can produce a root ready for harvesting within 7 weeks from sowing the seed[264]. Most beetroot seed is actually a cluster of several seeds, though monogerm varieties have been produced that only have one seed - these monogerm varieties are less likely to require thinning once they have germinated[264]. A good companion for dwarf beans, onions and kohl rabi[18, 201]. Its growth is inhibited by runner beans, charlock and field mustard[18, 201].

# 5.2.124 Hemerocallis thunbergii

4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatwood is an excellent fuel, burning well and giving off a lot of heat[229]. It produces an excellent charcoal[229]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Analgesic AntirheumaticThe fresh small shoots have been steamed to make an inhalant for treating headaches[257]. A decoction of the bark has been taken internally to treat rheumatism and also used as a poultice on rheumatic joints[257].

nrakta Eastern N. America - Ouebec to Ontario, south to Florida, Kansas and Texas, ksacta Dry upland slopes, rich deep moist soils and well drained soils of lowland and vallevs[43, 62, 82].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Management: Standard Regional Crop Staple Crop: OilLandscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Succeeds in drier soils than most members of this genus[200]. Slow growing[200]. A very ornamental but slowgrowing tree[1, 11, 227], it grows well in Britain, especially when young[11, 137], and does well in Cornwall[59]. The tree has a loose grey bark that comes away in broad flakes and gives the tree its common name[11]. The shagbark hickory is occasionally cultivated for its edible seed, there are some named varieties[183]. It tends to be low-yielding[117] and is said to be of no value in Britain as a commercial nut crop[11]. Trees take 15 years to come into flower from seed[117]. This species is the fastest growing hickory in N. America, it can fruit in ten years from seed[137]. Recommended cultivars (these are often hybrids with C. cathayensis or C. laciniosa) include:- Shagbarks - 'I Yoder No. 1', heavy cropping and early[200]. 'Porter'. 'Weschcke', a very thin shell and regular cropper[200]. 'Wilcox', an excellent producer[200]. Shellbarks (these are more likely to be hybrids with C. laciniosa) - 'Favette', thin shelled[200]. 'Henry', a very large nut[200]. Cultivated as a timber tree in C. Europe[50]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. The leaves are aromatic[245]. Special Features: North American native. Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates

that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a nonsuckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.140 Juglans nigra

Black Walnut

4 tlin 9 cvuc 3 kcak 4 tcan 3 dwat 30 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Juglans nigra is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The plant has occasionally been known to cause contact dermatitis in humans[274].

kcakta Edible Parts: Oil Sap SeedEdible Uses: Oil SweetenerSeed - raw or cooked. A sweet, rich distinctive delicious flavour it makes an excellent dessert nut and is also widely used in confections, cakes etc[2, 34, 82, 183]. The kernel is hard to extract and the oil it contains quickly turns rancid[101, 159]. The unripe fruits can be pickled[183]. The seed is borne in solitary fruits or in pairs and is 3 - 4cm in diameter [82, 229]. The nuts can leave a permanent stain on clothing[226]. An edible oil is obtained from the seed[101, 183]. A sweet taste but it tends to go rancid quickly[159]. Used as a seasoning in bread, squash and other foods[183]. The tree yields a sweet sap that can be drunk or concentrated into syrup or sugar[101, 102, 183]. It is tapped in spring.

tcanta Beads Compost Dye Filter Herbicide Insecticide Oil Repellent Tannin WoodA brown dve is obtained from the nuts, husks and bark[14, 57, 101, 159]. It does not require a mordant[169]. The husks can be dried for later use[169]. A brown dye is obtained from the leaves and stems[168]. It does not require a mordant[168]. The dve turns black if it is prepared in an iron pot[168]. The leaves can be dried for later use[169]. The husks are rich in tannin[226]. The green fruit husks can be boiled to provide a yellow dye[269]. The husks can be made into a high quality coal (does the report mean charcoal?[K]) and is then used as a filter[226]. It was used in gas masks[226]. The woody shells on the fruits have been used to make jewellery[269]. Insects are said to avoid the walnut tree, hence it is often used as a poor man's insect repellent. When rubbed on faces, walnut leaves are said to repel flies[269]. The leaves repel fleas and have been used as a strewing herb[20, 201, 257]. They are also used as an insecticide against bed bugs[222]. The ground up husks are also insecticidal[226]. The leaves produce substances that depress the growth of other plants. These substances are washed onto the ground by rain and inhibit the growth of plants beneath the tree[18, 20, 159]. The roots also produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. An alternative ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. Wood - very ornamental, heavy, hard, strong, close-grained, very durable. Easily worked, it glues well, does not warp, shrink or swell much and takes a good polish. It weighs 38lb per cubic foot. A very valuable timber tree and possibly the most sought after wood in N. America, it is used in cabinet making, the interior finishes of houses, furniture, airplanes. ship building, veneer etc[1, 46, 61, 82, 101, 149, 227, 229, 235, 269]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Alterative Anodyne Antiinflammatory Astringent Blood purifier Detergent Eczema Laxative Leprosy Pectoral what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177]. They can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked. A pleasant nutty flavour. This sub-species has a fibrous root system[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Attractive flowers. dwatta Antidote Diuretic Vitamin CThe juice of the roots

dwatta Antidote Duretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - Japan. ksacta Grassy places near the sea[58, 187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[200] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Plants are hardy to about -15°c[187]. The plant has a fibrous root system[205]. Individual flowers are shortlived, opening in the morning and withering in the evening. The plant, however, produces a succession of flowers over a period of about 6 weeks[205]. Hybridizes freely with other members of this genus[200]. Unlike the type species, this form does produce viable seed[187]. Plants take a year or two to become established after being moved[200]. They can then spread quite freely[K]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 5.2.138 Tilia heterophylla

White Basswood, American basswood 4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tilia heterophylla is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw. A nice mild flavour with a slightly mucilaginous texture[K]. They go well in a mixed salad, though I have found that on their own they tend to leave a slightly rough feeling in the throat[K]. The dried flowers make a refreshing tea substitute[159]. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta Fibre WoodA fibre is obtained from the tough inner bark It can be made into diverse items such as rope, mats, shoes and coarse cloth[229, 257]. Wood - soft, light, weak, straight grained[229, 235]. It weighs 26lb per cubic foot[235]. Widely used in interior finishing, cabinet making, woodenware, paper making and for piano keyboards[229].

dwatta Antispasmodic Diaphoretic Dysentery Poultice SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226]. A decoction of the inner bark

has been used in the treatment of dysentery[257]. A decoction of the bark, mixed with cornmeal, has been used as a poultice in the treatment of boils[257]. A decoction of the inner bark and twigs has been used during pregnancy to treat heartburn, weak stomach and weak bowels[257].

nrakta Eastern N. America - New York to Florida. ks-acta Buffs and slopes of ravines and by streams[159]. Found in rich woods in the Appalachians[43].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediatelv[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils [11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. A moderately fast growing and long-lived species in the wild[229]. It prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. It is fairly susceptible to forest fires because it has a thin bark[229]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Closely related to T. americana[11]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

#### **5.2.139** Carya ovata

Shagbark Hickory

4 tlin 8 cyuc 3 kcak 4 tcan 1 dwat 30 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carya ovata is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to October, in flower in June, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Sap SeedEdible Uses: MilkSeed-raw or cooked and used in pies, cakes, bread etc[2, 4, 61, 62, 183]. Sweet and delicious[1, 117, 183]. The seed can be ground into a meal and used to thicken soups etc[183]. A nut milk can be prepared from the seed and this is used as a butter on bread, vegetables etc[183]. The shell is normally thick and hard[101] but in selected cultivars it can be thin[159]. The seed ripens in late autumn and can be stored for up to 2 years in a cool cellar[117]. The seed is up to 4cm long[229]. Sap - sweet[257]. It is tapped in spring[101] and can be made into a syrup[226].

tcanta Dye Fuel WoodA yellow dye is obtained from the inner bark[226]. Wood - close-grained, tough, elastic, heavy and very hard. It weighs 52lb per cubic foot[227]. An excelent quality wood, it is used for tool handles, wheel spokes, sporting goods, baskets etc[46, 61, 63, 82, 227, 229]. The

priklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis thunbergii is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[205]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds-raw or cooked[105, 177]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Attractive Flowers. dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - N. China, Japan, Korea. ksacta Mountains in C. and S. Japan [58].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. Plants take a year or two to become established after being moved[200]. They increase by means of runners[205] and form loose spreading clumps[K]. The roots are not swollen[233]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. The fragrant flowers are very short-lived, they open in the late afternoon and die in the morning[200, 205]. However, plants produce a succession of flowers for several weeks of the summer, each scape carrying between 4 and 20 blooms[205].

#### 5.2.125 Aralia nudicaulis

Wild Sarsaparilla

4 tlin 8 cyuc 4 kcak 3 tcan 3 dwat 0.4 m hkuc pcimhmim cyutli tcup hwicli hyishrasjlutnyik hpa7tli flat-

priklwis hpa7tmwatli xre7t hjonli

drutta Aralia nudicaulis is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit Leaves Root ShootsEdible Uses: Condiment TeaThe rootstock is used as a flavouring[102], it is a substitute for sarsaparilla[43] and is also used for making 'root beer'[183]. It is also used as an emergency food[177] (usually mixed with oil[257]), having a sweet spicy taste and a pleasant aromatic smell[4]. A nutritious

food[207], it was used by the Indians during wars or when they were hunting since it is very sustaining[213]. Young shoots - cooked as a potherb[207]. A refreshing herbal tea is made from the root[183]. Pleasantly flavoured[222, 238]. The roots are boiled in water until the water is reddish-brown[256]. A jelly is made from the fruit[207]. The fruit is also used to make wine[257]. The fruit is about 6mm in diameter[200]. The fruit is a round, purplish-black berry.

tcanta Groundcover. Wildlife - food source. A specialist nectary plant [1-2].

dwatta Alterative Diaphoretic Diuretic Eczema Homeopathy Pectoral StimulantWild sarsaparilla is a sweet pungent tonic herb that acts as an alterative. It had a wide range of traditional uses amongst the North American Indians and was at one time widely used as a substitute for the tropical medicinal herb sarsaparilla[222, 257]. The root is alterative, diaphoretic, diuretic, pectoral and stimulant[4, 21, 213, 222]. The herb encourages sweating, is stimulating and detoxifying and so is used internally in the treatment. of pulmonary diseases, asthma, rheumatism, stomach aches etc[4, 213, 238, 254, 257]. Externally it is used as a poultice in treating rheumatism, sores, burns, itchy skin, ulcers and skin problems such as eczema[4, 222, 254]. The root is collected in late summer and the autumn and dried for later use[4, 213]. A drink made from the pulverised roots is used as a cough treatment[213]. A poultice made from the roots and/or the fruit is applied to sores, burns, itchy skin, ulcers, swellings etc[213, 222]. A homeopathic remedy made from the roots is important in the treatment of cystitis[238].

nrakta N. America - Newfoundland to Manitoba, south to N. Carolina and Missouri. ksacta Moist, shady, rocky woods[4, 21].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3- 5 months of cold stratification. Germination usually takes place within 1-4 months at  $20^{\circ} {\rm C}[134]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are  $25{\rm cm}$  or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings  $8{\rm cm}$  long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a good deep loam and a semi-shady position[1, 134]. Requires a sheltered position[1]. Plants are hardier when grown in poorer soils[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.126 Hemerocallis dumortieri

Dumortier's daylily

4 tlin 8 cyuc 4 kcak 3 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis dumortieri is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves ShootsEdible Uses: Leaves and young shoots - cooked[105, 177, 183]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[105, 177, 205]. The flowers are crisp and juicy with a pleasant sweetness and no unpleasant after-taste[K]. They can be dried and used as a thickener in soups etc[183]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked.

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205]. Plants form a slowly spreading clump and are suitable for ground cover when spaced about 45cm apart each way[208]. The dead leaves should be left on the ground in the winter to ensure effective cover[208].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - Japan, Korea, ksacta Meadows in the mountains of N. and C. Japan[58, 187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[200]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. This species is hardy to about -20°c[187]. Hybridizes freely with other members of this genus[200]. Individual flowers only live for one day[205]. The flowers are sweetly scented[245]. Plants form a tight clump that spreads slowly[K]. The roots are cylindrical[205]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 5.2.127 Campanula rapunculus

Rampion

4 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 0.9 m hkuc

hmimhtut cyutli tcup hwicli hrasilut hpa7tli priklwis hpa7tmwatli fyifxre7t hionli

drutta Campanula rapunculus is a BIENNIAL growing to 0.9 m (3ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root raw or cooked[2, 5, 33, 37, 100, 183]. A very nice sweet flavour[27], reminiscent of walnuts[2]. They are best mixed with other root vegetables and used in winter salads[2, 9]. Leaves - raw or cooked as a potherb[2, 5, 9, 27, 33, 37, 100, 183]. A fairly bland flavour, with a hint of sweetness, they are quite acceptable raw in salads[K]. The leaves are rich in vitamin C, they make an acceptable winter salad[4]. Young shoots in spring can be blanched and cooked like asparagus[183].

nrakta Europe - Mediterranean. Introduced in Britain[17]. ksacta Hedgerows, woodland edges, fields etc[9], usually on gravelly soils in Britain[17].

propta Seed - surface sow May/June in situ. The seed usually germinates in 2 - 4 weeks at 18°c[138].

nwatta An easily cultivated plant, it prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 4, 200], though it succeeds in most good soils[4]. Tolerates a pH in the range 4.8 to 7.5. Plants

are hardy to at least -15°c[200]. Plants often self-sow in the garden[271]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Rampion was formerly often cultivated for its edible root, though it has fallen into virtual disuse[4]. When grown for its edible root, the plant should not be allowed to flower[4]. Plants can be grown in a meadow[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.128 Chenopodium bonus

Good King Henry

4 tlin 8 cyuc 4 kcak 1 tcan 2 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Chenopodium bonus-henricus is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponing are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers Leaves SeedEdible Uses: Young leaves - raw or cooked[2, 5, 7, 9, 12, 33]. The leaves wilt quickly after picking and so they need to be used as soon after harvesting as possible[264]. They can be used as a potherb[4]. The leaves are best in spring and early summer, the older leaves become tough and bitter[200]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Young leaves can be chopped and used as a small part of mixed salads, though we are not enamoured by their flavour Kl. The cooked leaves make an acceptable spinach substitute, but are best mixed with nicer leaves[K]. The leaves are a good source of iron[244]. Young flowering shoots - cooked[2, 27, 132, 264]. When grown on good soil, the shoots can be as thick as a pencil[4]. When about 12cm long, they are cut just under the ground, peeled and used like asparagus[183]. A very pleasant spring vegetable[K]. The plant is sometimes blanched by excluding the light in order to produce a longer and more succulent shoot, though this practice also reduces the quantity of vitamins in the shots[264, Kl. Young flower buds - cooked[33, 183]. Considered to be a gourmet food[183], though they are rather small and harvesting any quantity takes guite a while[K]. Seed - ground and mixed with flour then used in making bread etc. The seed is small and fiddly but is easily harvested[K]. It should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins[K].

tcanta DyeGold/green dyes can be obtained from the whole plant[168]

dwatta Emollient Laxative VermifugeThe herb is emollient, laxative and vermifuge[7, 154]. This remedy should not be used by people suffering from kidney complaints or rheumatism[7]. A poultice of the leaves has been used to cleanse and heal chronic sores, boils and abscesses[4, 7]. The seed is a gentle laxative that is suitable for children[7].

nrakta Most of Europe, including Britain, north to Scandanavia, W. Asia, N. America. ksacta Rich pastures, farmvards, roadsides etc[17].

nrakta S. Europe - Greece. ksacta Dry places in mountain regions in bushy places and on stony ground[50, 148].

propta Seed - sow early spring at 10 - 13°c and only just cover the seed. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late spring. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings of young barren shoots in June. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 -10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a rather dry, warm, well-drained soil in full sun, but is not fussy as to soil type, thriving on chalk[1, 27]. Prefers slightly alkaline conditions[200]. Tolerates poor soils[24]. Dislikes wet soils[37]. Often cultivated as a culinary herb, this is a sub-species from Greece, its flowers are white and it has a stronger fragrance. It is more commonly grown commercially because of its stronger fragrance. There are some named forms[183]. Plants growing near the sea have the most fragrance[7]. A good companion plant, improving the flavour of nearby plants. The flowers are very attractive to bees and butterflies[5, 30]. A good companion for the cucumber family[14], it is beneficial to all nearby plants[20]. The whole plant is strongly aromatic. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 10 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

Apple Mint, Bowles' Mint 4 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha x villosa alopecuroides is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil can cause abortions so some caution is advised

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked[14]. A strong spearmint flavour, they are used as a flavouring in salads or cooked foods[183], this is also the main species that is used to make mint sauce. A herb tea is made from the fresh or dried leaves[21, 183].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. The plant repels insects and was formerly used as a strewing herb[14, 18, 20]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative FebrifugeApple mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Central and southern Europe, including Britain, Mediterranean region, Azores.. ksacta Roadsides and in ditches in the S. and W. of England[5, 17]. Probably a hybrid, M. spicata x M. suaveolens.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. Prefers a slightly acid soil[16]. A sunny position is best for the production of essential oils, but the plant also succeeds in partial shade. Apple mint is commonly grown in the herb garden. There is at least one named variety, 'Bowles mint' is said to be a superior form and it is the form usually cultivated commercially for mint sauce. Unlike most members of the genus, this species is resistant to the disease 'rust'[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a strong aroma of spearmint. The flowers are very attractive to bees and butterflies[24]. A good companion for growing near cabbages and tomatoes, help-5.2.136 Mentha x villosa alopecuroides ing to keep them free of insect pests[14, 20]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 5.2.137 Hemerocallis littorea

Coastal Day Lily

4 tlin 8 cyuc 4 kcak 2 tcan 1 dwat 0.9 m hkuc hmimhtut cyutli kyuctcup hwicli hrasilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis littorea is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil Suitable nH· mildly acid neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic[127, 137]. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear thriving on chalk[1, 27]. Prefers slightly alkaline conditions[200]. Tolerates poor soils[24]. Dislikes wet soils[37]. Hardy to about -20°c[187]. Oregano has a long history of culinary and medicinal use and is often cultivated in modern gardens as a culinary herb, there are some named varieties[183, 187, 238, 244]. Plants growing near the sea have the most fragrance[7]. A good companion plant, improving the flavour of nearby plants[201]. The flowers are very attractive to bees and butterflies[5, 30]. A good companion for the cucumber family[14], it is beneficial to all nearby plants[20]. The whole plant has a sweet yet slightly pepperv aroma[245]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Attracts butterflies. Suitable for cut flowers. Suitable for dried flowers, Fragrant flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

#### 5.2.134 Malva neglecta

Dwarf Mallow, Common mallow 4 tin 8 cyuc 4 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Malva neglecta is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista When grown on nitrogen rich soils (and particularly when these are inorganic), the plant tends to concentrate high levels of nitrates in its leaves[76]. The leaves are perfectly wholesome at all other times.

kcakta Edible Parts: Leaves SeedEdible Uses: Egg TeaLeaves and young shoots - raw or cooked[2, 9, 13, 74, 85]. A mild pleasant flavour[K], they are said to be highly nutritious[222]. They can be added in quantity to salads, and make an excellent lettuce substitute, they can also be cooked as greens[183, K]. The leaves are mucilaginous, when cooked in soups etc they tend to thicken it in much the same way as okra (Abelmoschatus esculenta)[222]. Some people find this mucilaginous texture unpleasant, especially if the leaves are cooked[K]. Immature seeds - raw or cooked[74, 85, 183]. A pleasant nutty flavour, they are nice as a nibble but too small for most people to want to collect in quantity[K]. A decoction of the roots is used as an egg-white substitute for making meringue[183]. The roots are brought to the boil in water and then simmered until the water becomes quite thick. This liquid can then be whisked in much the same way as egg whites[K]. A tea can be made from the dried leaves[85, 183].

tcanta Dye TeethCream, yellow and green dyes can be obtained from the plant and the seed heads[168]. The root is used as a toothbrush[74].

dwatta Antiinflammatory Antiphlogistic Astringent Demulcent Diuretic Emollient Expectorant Laxative Poultice Purgative Salve UrinaryAll parts of the plant are antiphlogistic, astringent, demulcent, diuretic, emollient, expectorant, laxative, salve[9, 222, 238]. The leaves and flowers can be eaten as part of the diet, or a tea can be made from the leaves, flowers or roots[222]. The leaves and flowers are the main part used, their demulcent properties making them valuable as a poultice for bruise, inflammations, insect bites etc. or taken internally in the treatment of respiratory system diseases or inflammation of the digestive or urinary systems[222, 238]. They have similar properties, but are considered to be inferior to the marsh mallow (Althaea officinalis), though they are stronger acting than the common mallow (M. sylvestris). They are seldom used internally[4]. The plant is an excellent laxative for young children[7].

nrakta Most of Europe, including Britain, south and east to N. Africa and Asia. ksacta Waste and cultivated

ground[17], usually on dry soils, frequently in coastal habitats, on dry walls or as a weed of cultivated ground[200].

propta Seed - sow early spring or autumn in situ. Germination should take place within 2 weeks. The seed germinates in the autumn in the wild.

nwatta A very easily grown plant, succeeding in ordinary garden soil, though it prefers a reasonably well-drained and moderately fertile soil in a sunny position. It also succeeds in dry soils. At one time this plant was often cultivated for its edible leaves[2]. Plants seem to be immune to the predations of rabbits[233]. Prone to infestation by rust fungus.

#### 5.2.135 Origanum vulgare hirtum

Greek Oregano

4 tlin 8 cyuc 4 kcak 3 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Origanum vulgare hirtum is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - raw or cooked as a potherb[5, 52, 183]. Oregano is an important flavouring herb in Mediterranean cookery, and is often used dried rather than fresh[238]. This sub-species has a much stronger flavour than the type[238]. The leaves are used as a flavouring for salad dressings, vegetables and legumes, and are frequently included in strongly flavoured dishes with chillies, garlic, onions etc[2, 13, 21, 27, 183, 238]. A nutritional analysis is available[218]. Much of the commercially available dried oregano does not come from this plant but from a number of different, often unrelated plants[238]. These include Lippia graveolens, L. palmeri and Origanum syriacum[238]. A herb tea is made from the dried leaves and flowering stems[183, 207, 238].

tcanta Dye Essential RepellentAn essential oil from the plant is used as a food flavouring, in soaps and perfumery[115, 171]. A red or purple dye is obtained from the flowering tops[4, 7, 13, 100], it is neither brilliant nor durable[115]. The plant repels ants[46]. A useful ground cover for sunny positions, forming a slowly spreading clump[197, K].

dwatta Antiseptic Antispasmodic Carminative Cholagogue Diaphoretic Emmenagogue Expectorant Stimulant Stomachic TonicOregano has been used as a culinary and medicinal herb for thousands of years. It has a beneficial effect upon the digestive and respiratory systems and is also used to promote menstruation[254]. It should not be used medicinally by pregnant women though it is perfectly safe in small amounts for culinary purposes[254]. The leaves and flowering stems are strongly antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, emmenagogue, expectorant, stimulant, stomachic and mildly tonic[4, 7, 9, 21, 254]. The plant is taken internally in the treatment of colds, influenza, mild feverish illnesses, indigestion, stomach upsets and painful menstruation[238]. It is strongly sedative and should not be taken in large doses, though mild teas have a soothing effect and aid restful sleep[244]. It should not be prescribed for pregnant women[238]. Externally, oregano is used to treat bronchitis, asthma, arthritis and muscular pain[238]. The plant can be used fresh or dried - harvest the whole plant (but not the roots) in late summer to dry and store for winter use[244]. Oregano is often used in the form of an essential oil that is distilled from the flowering plant[4]. A few drops of the essential oil, put on cotton wool and placed in the hollow of an aching tooth, frequently relieves the pain of toothache[4, 207]. This plant is one of the best natural antiseptics because of its high thymol content[7]. The essential oil is used in aromatherapy to treat the same kinds of complaints that the herb is used for [238].

propta Seed - sow spring in a cold frame. Germination can be slow, but usually a high percentage will germinate [K]. These seeds germinate best at 20C. Cold stratification of up to 9 weeks at 4C prior to exposure at 20C will increase the germination rate. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions in the summer. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Historic Grain Crop Management: Standard Staple Crop: Balanced carbPrefers a fertile humus rich soil in a sunny position[9, 16, 200]. The plant produces a better quality harvest in the summer if it is grown in light shade[264, K]. A very easily grown plant, it tolerates considerable neglect and succeeds in most soils and situations[16, 33, K]. Good King Henry was at one time frequently cultivated in the garden as a perennial vegetable, but it has fallen out of favour and is seldom grown at present[4, 46]. About thirty plants can produce a good supply of food for four people[264]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.129 Campanula takesimana

Korean Bellflower

4 tlin 8 cyuc 4 koak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula takesimana is a PERENNIAL growing to  $0.5~\mathrm{m}$  (1ft 8in), by  $0.5~\mathrm{m}$  (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is selffertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw or cooked[K]. A mild flavour with a subtle sweetness, especially in the spring and early summer they taste just like lettuce and are a pleasant addition to mixed salads[K]. In the height of summer, the leaves often develop a slightly bitter flavour, especially if the plant is growing in a sunny position[K]. Flowers - raw. Beautiful to look at, the flowers have a delicate sweetness and are a pleasant addition to salads[K]. Roots - raw, cooked or dried for later use. Known as 'do-ra-jee' in Korea, where they are eaten as a delicacy. The roots are a bit small and fiddly to utilize, though they are said to have a simply delicious flavour.

nrakta E. Asia - Korea. ksacta Not known

propta Seed - surface sow May/June in situ. The seed is in short supply it would be best to sow it in pots in a cold frame in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early sumer, after the last expected frosts. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Succeeds in most well-drained soils[233]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. This species is closely related to C. punctata[233, 271]. The plant spreads freely at the roots and can become rampant in lighter soils, though it is easily controlled by hoeing (or eating!)[233, 271, K]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.130 Rumex acetosella

Sheeps Sorrel, Common sheep sorrel 4 tlin 8 cyuc 4 kcak 1 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rumex acetosella is a PERENNIAL growing to  $0.3 \, \mathrm{m}$  (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root SeedEdible Uses: DrinkLeaves - raw or cooked[4, 12, 55, 62, 183]. A delicious lemon-like flavour, most people consider them too strong to use in quantity, but they are excellent as a flavouring in mixed salads[K]. The leaves should only be used in small quantities due to the oxalic acid content. The leaves can be used as thickeners in soups etc[102], they can also be dried for later use[12]. Root - cooked. It can be dried, ground into a powder and made into noodles[105]. Seed - raw or cooked[172]. Easy to harvest, but the seed is rather small and fiddly to use[K]. A drink similar to lemonade (but without the fizz) is made by boiling up the leaves[102].

tcanta DyeDark green to brown and dark grey dyes can be obtained from the roots, they do not need a mordant[168]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astringent Diuretic Poultice UrinarySheep's sorrel is a detoxifying herb, the fresh juice of the leaves having a pronounced diuretic effect[254]. Like other members of the genus, it is mildly laxative and holds out potential as a long term treatment for chronic disease, in particular that of the gastro-intestinal tract[254]. The plant is also part of a North American formula called essiac which is a popular treatment for cancer. Its effectiveness has never been reliably proven or disproven since controlled studies have not been carried out. The other herbs included in the formula are Arctium lappa, Ulmus rubra and Rheum palmatum[254], The whole plant, used in the fresh state, is diaphoretic, diuretic and refrigerant[222]. A tea made from the leaves is used in the treatment of fevers, inflammation and scurvy[222]. The leaf juice is useful in the treatment of urinary and kidney diseases[4]. A leaf poultice is applied to tumours, cysts etc, and is a folk treatment for cancer[222]. A tea made from the roots is astringent and is used in the treatment of diarrhoea and excessive menstrual bleeding[222].

nrakta Cetral and southeastern Europe, including Britain, as far north as Scandanavia and Iceland. ksacta Heaths and acid grasslands[17]. A weed of acid soils[17, 55].

propta Seed - sow autumn or spring in situ. Division in spring.

nwatta Succeeds in most soils[37], preferring a moist moderately fertile well-drained soil in a sunny position[200]. Although a plant of acid soils, it can tolerate some alkalinity[17]. A good food plant for the caterpillars of many species of butterflies[24, 30], it grows well in the summer meadow[24]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat

former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

#### 5.2.131 Hemerocallis yezoensis

4 tlin 8 cyuc 4 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis yezoensis is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - cooked[105, 177]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked[205]. The flowers can be dried and used as a thickener in soups etc. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan, Korea. ksacta Grassy places and marshy meadows near the sea[187].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil and a sunny position[111] but tolerating partial shade[88]. Plants flower less freely in a shady position though the flowers can last longer in such a position[205]. Grows well in heavy clay soils. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. A very cold-hardy plant, tolerating temperatures down to about -25°c[187]. The roots are slender and not swollen[187]. The scapes carry between 4 and 12 blooms[205]. Hybridizes freely with other members of this genus[200]. It is closely related to H. vespertina Hara.[58]. Plants take a year or two to become established after being moved[200]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]

#### 5.2.132 Linum usitatissimum

Flax. Common flax

4 tlin 8 cyuc 4 kcak 4 tcan 3 dwat 0.7 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Linum usitatissimum is a ANNUAL growing to 0.7 m (2ft 4in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the

shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seed of some strains contain cyanogenic glycosides in the seed though the toxicity is low, especially if the seed is eaten slowly. It becomes more toxic if water is drunk at the same time[76, 222]. The cyanogenic glycosides are also present in other parts of the plant and have caused poisoning to livestock[240]. Contraindicated with a stricture of the oesophagus in no bowel movement conditions and acute gut inflammatory diseases. Contraindicated in pregnancy. Some suggestion it should be avoided with prostate gland diseases [301].

kcakta Edible Parts: Oil Oil SeedEdible Uses: Coffee Gum Oil OilSeed - raw or cooked[61]. The seed contains 30 - 40% oil, which comprises mainly linoleic and linolenic acids[238]. The seed also contains cyanogenic glycosides (prussic acid). In small quantities these glycosides stimulate respiration and improve digestion, but in excess can cause respiratory failure and death[238]. Cultivars low in these glycosides have been developed and large quantities of the seed would need to be eaten to achieve a harmful dose. The seed is used in breads and cereals, it can also be sprouted and used in salads[183]. The seed is hard to digest and provokes flatulence[4]. A nutritional analysis is available[218]. The roasted seed is said to be a coffee substitute[183]. A herbal tea can be brewed from the seed[183]. An edible oil is obtained from the seed[183, 269], though it needs to be properly refined before it can be eaten. Some caution is advised in the use of the seeds for food since some varieties of this plant contain toxins.

tcanta Biomass Fibre Gum Insulation Oil Oil SizeA fibre is obtained from the stem[6, 7, 13, 57, 89]. It is of very high quality and is used in making cloth, sails, nets, paper, insulating material etc. The best quality flax fibre is used for making cloth. It is soft, lustrous and flexible, although not so flexible or elastic as cotton or wool[269].. It is stronger than cotton, rayon or wool, but weaker than ramie[269]. Lower quality fibre is used in manufacturing of towelling, matting, rugs, twines, canvas, bags, and for quality papers such as printing currency notes[269]. The plant is harvested just after it flowers[115]. The yield is 0.5 to 0.9 tonnes of fibre per hectare. When used for paper making, the stems are harvested in late summer or autumn when they are two thirds yellow and are then retted[189]. The fibre is then stripped from the stem. cooked for two hours or more with lye and then heaten in a Hollander beater[189]. The lower quality flax straw from seed flax varieties is used in the manufacture of upholstery tow, insulating material, rugs, twine, and paper. Some of the better quality straw is used in the manufacture of cigarette and other high-grade papers[269]. The seed contains 38 -40% of a drying oil[141]. It has a very wide range of applications. The paint and varnish industries consume about 80% of all the linseed oil produced. The remainder is used in items such as furniture polish, enamels, linoleum, oilcloth, printer's inks, soap making and patent leather[46, 57, 169, 244, 269]. It is also used as a wood preservative and as a waterproofing for raincoats, slickers, and tarpaulins[269]. The oil is also used in a spray on concrete roads to prevent ice and snow from sticking - it has the additional benefit of helping to preserve the concrete and prevent surface cracking and wear[269]. Yields of over 4 tonnes of seed per hectare have been recorded in N. America, but yields of 2 tonnes or less are more common[269]. A mucilage from the soaked or boiled seeds is used as a size for linen warps[169].

dwatta Analgesic Cancer Cardiotonic Demulcent Emollient Expectorant Laxative Nervine Pectoral Resolvent Urinary VDLinseed has a long history of medicinal use, its main effects being as a laxative and expectorant that soothes irritated tissues, controls coughing and relieves pain[238]. The seed, or the oil from the seed are normally used[238]. The seed is analgesic, demulcent, emollient, laxative, pectoral and resolvent[4, 9, 21, 46, 165, 218, 240]. The crushed seed makes a very useful poultice in the treatment of ulceration. abscesses and deep-seated inflammations[4, 244]. An infusion of the seed contains a good deal of mucilage and is a valuable domestic remedy for coughs, colds and inflammation of the urinary organs[4]. If the seed is bruised and then eaten straight away, it will swell considerably in the digestive tract and stimulate peristalsis[9] and so is used in the treatment of chronic constipation[238]. The oil in the seed contains 4% L-glutamic acid, which is used to treat mental deficiencies in adults[218]. It also has soothing and lubricating properties, and is used in medicines to soothe ton-sillitis, sore throats, coughs, colds, constipation, gravel and stones[4, 244]. When mixed with an equal quantity of lime water it is used to treat burns and scalds[244]. The bark and the leaves are used in the treatment of gonorrhoea[240]. The flowers are cardiotonic and nervine[240]. The plant has a long history of folk use in the treatment of cancer[218]. It has been found to contain various anticancer agents[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Linum usitatissimum for constipation, inflammation of the skin (see [302] for critics of commission E).

nrakta Possibly native to Europe. A rare casual in Britain, the original habitat is obscure. ksacta Not known in the wild.

propta Seed - sow early to late spring in situ. Do not transplant the seedlings[238].

nwatta Prefers a light well-drained moderately fertile humus-rich soil in a sunny sheltered position[200]. Plants grow best in a well-drained, loamy soil, those overlying a clay subsoil produce the best results[269]. They prefer a pH in the range of 5 - 7[269]. Very light highly fertile soils are not desirable as they produce tall rank growth tending to lodge[269]. Plants are more sensitive to salt than most field crops[269]. Prefers a cool moist climate during the growing season, dry weather making the plants short and woody[61, 269]. A very greedy plant, depleting the soil[4, 123] and requiring a rich, well prepared soil if it is to do well[123]. Plants help to break up organic matter and prepare the soil for following crops[201]. Cultivars selected for seed production succeed under a fairly wide range of conditions, but those selected for fibre production require abundant moisture and cool weather during the growing season, and warm dry weather during harvesting, especially where water-retting is practiced[269]. The crop requires 15 - 20cm of rainfall if spread evenly over growing season, with 2.5 cm falling just before or after planting[269]. The plant needs a relatively long ripening period between flowering and harvesting. Warm, dry weather is desirable at the heading stage to cause plants to branch and produce seed; after vegetative growth, dry weather is required for curing the seed[269]. Linseed has a very long history of cultivation in temperate climates with evidence to show that it was being grown in Egypt over 5,000 years ago[269]. It fell into almost complete disuse in Britain in the 20th century as artificial fibres were increasingly used, but it is once again coming into prominence both as a fibre and as an oilseed crop(1995)[K]. Linseed is grown for its edible seed, the oil from the seed and for the fibres obtained from the stems[46]. There are many named varieties, though these usually fall within with two classes. One class, generally known as flax, does not branch much and is grown mainly for the fibre in its stem, whilst the other class, known as linseed, branches much more freely and is grown mainly for its seed. Although classified as a species, linseed is possibly an ancient cultigen derived in cultivation from L. bienne[17, 238]. Flax crops take 3 - 4 months to reach maturity, though autumn or early spring sown crops can take 6 - 7 months[269]. Lolium specis (Rye grasses) and Phleum species (Timothy grass) have allelopathic effects on Linum, reducing its carbohydrate synthesis[269]. Linseed is a good companion plant for potatoes and carrots but is inhibited by Camelina sativa[18, 20].

# 5.2.133 Origanum vulgare

Oregano, Pot Marjoram 4 tlin 10 cyuc 4 kcak 5 tcan 3 dwat 0.6 m hkuc

4 tiin 10 cyuc 4 kcak 5 tcan 3 dwat 0.6 m nkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Origanum vulgare is a PERENNIAL growing to 0.6 m (2ft) by 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light

woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: Condiment TeaLeaves - raw or cooked as a potherb[5, 52, 183]. Oregano is an important flavouring herb in Mediterranean cookery, and is often used dried rather than fresh[238]. The leaves are used as a flavouring for salad dressings, vegetables and legumes, and are frequently included in strongly flavoured dishes with chillies, garlic, onions etc[2, 13, 21, 27, 183, 238]. A nutritional analysis available[218]. Flowers, usually appear in late spring, are edible. Much of the commercially available dried oregano does not come from this plant but from a number of different, often unrelated plants[238]. These include Lippia graveolens, L. palmeri and Origanum syriacum[238]. A herb tea is made from the dried leaves and flowering stems[183, 207, 238].

tcanta Dye Essential Parasiticide Repellent StrewingAn essential oil from the plant is used as a food flavouring, in soaps and perfumery[115, 171]. The herb contains 0.15 - 0.4% essential oil[218] and makes good herbal pillows and baths[244]. The plant was formerly used as a strewing herb[201]. The essential oil has also been used to kill lice, though some caution is advised since it can cause skin irritations[238]. A red or purple dye is obtained from the flowering tops[4, 7, 13, 100], it is neither brilliant nor durable[115]. The plant repels ants[46]. The growing plant repels many insect pests so it is a good plant to grow in the vegetable area[201]. A useful ground cover for sunny positions, forming a slowly spreading clump[197, K]. Plants should be spaced about 30cm apart each way[208].

dwatta Antirheumatic Antiseptic Antispasmodic Aromatherapy Carminative Cholagogue Diaphoretic Emmenagogue Expectorant Odontalgic Parasiticide Stimulant Stomachic TonicOregano has been used as a culinary and medicinal herb for thousands of years. It has a beneficial effect upon the digestive and respiratory systems and is also used to promote menstruation[254]. It should not be used medicinally by pregnant women though it is perfectly safe in small amounts for culinary purposes[254]. The leaves and flowering stems are strongly antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, emmenagogue, expectorant, stimulant, stomachic and mildly tonic[4, 7, 9, 21, 2541. The plant is taken internally in the treatment of colds. influenza, mild feverish illnesses, indigestion, stomach upsets and painful menstruation[238]. It is strongly sedative and should not be taken in large doses, though mild teas have a soothing effect and aid restful sleep[244]. It should not be prescribed for pregnant women[238]. Externally, oregano is used to treat bronchitis, asthma, arthritis and muscular pain[238]. The plant can be used fresh or dried - harvest the whole plant (but not the roots) in late summer to dry and store for winter use[244]. Oregano is often used in the form of an essential oil that is distilled from the flowering plant[4]. A few drops of the essential oil, put on cotton wool and placed in the hollow of an aching tooth, frequently relieves the pain of toothache[4, 207]. This plant is one of the best natural antiseptics because of its high thymol content[7]. The essential oil is used in aromatherapy to treat the same kinds of complaints that the herb is used for [238].

nrakta Most of Europe, including Britain, to north and west Asia. ksacta Dry grassy areas and scrub, usually on calcareous soils[9, 17].

propta Seed - sow early spring at 10 - 13°c and only just cover the seed. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late spring. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings of young barren shoots in June. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 -10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Seashore. Requires a rather dry, warm, well-drained soil in full sun, but is not fussy as to soil type,

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik development[1, 63, 137, 200]. Slow growing[200]. Plants hpa7tmwatli fvifxre7t hjonli are strongly tap-rooted and should be planted in their per-

drutta Viola mirabilis is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Cleistogomy self-pollinating without flowers ever opening). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[105]. When added to soup they thicken it in much the same way as okra[85, 159]. A tea can be made from the leaves[85].

dwatta CardiacCardiac[61].

nrakta Europe through northern Asia to China, Japan and Korea. ksacta Woodlands on base rich soils in most of Europe[50]. Broad-leaved forests, needle-leaved and broadleaved mixed forests, forest margins, thickets and grassy slopes in China[266]

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5[200]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159].

# 5.2.247 Carva glabra megacarpa

Coastal Pignut Hickory

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carya glabra megacarpa is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105]. A sweet flavour. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months/Kl.

nrakta Eastern N. America - New York to Illinois and Florida. ksacta Dry woods and slopes[82].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection. from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best

are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have guite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

#### 5.2.248 Artemisia tridentata

Sage Brush, Big sagebrush, Bonneville big sagebrush 4 tlin 10 cyuc 3 kcak 5 tcan 2 dwat 2.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Artemisia tridentata is an evergreen Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower in October, and the seeds ripen from October to November. The species is hernaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: Leaves SeedEdible Uses: Condiment TeaLeaves - cooked[61]. The subspecies A. tridentata vaseyana has a pleasant mint-like aroma whilst some other subspecies are very bitter and pungent[164]. The leaves are used as a condiment and to make a tea[257]. Seed - raw or cooked. Oily[46, 61]. It can be roasted then ground into a powder and mixed with water or eaten raw[84, 106, 161, 257]. The seed is very small and fiddly to use[K].

tcanta Basketry Disinfectant Dye Fibre Friction sticks Fuel Hair Miscellany Paper Repellent Stuffing TinderAn infusion of the leaves is used as a hair rinse, it treats dandruff and falling hair[84, 106, 168]. An infusion of the plant repels insects[99], it is also disinfectant and so is used for washing walls, floors etc[99]. A yellow to gold dye is obtained from the leaves, buds and stems combined [168]. The fibrous bark is used for weaving mats, baskets, cloth etc., or as a stuffing material in pillows etc and as an insulation in shoes to keep the feet warm[99, 257]. A fibre obtained from the inner bark is used for making paper[189]. The fibres are about 1.3mm long[189]. The stems are harvested in late summer, the leaves removed and the stems steamed until the fibre can be stripped off. The fibre is then cooked for two hours with lye before being ball milled for 4 hours. The resulting paper is a light tan/gold colour[189]. A bunch of the leafy stems can be tied together and used as a broom[257]. The shredded bark is a fine tinder for starting fires[99, 257]. The stems make good friction sticks for making fires[257]. The seeds are used during celebrations because, when thrown into a fire, they explode like crackers[257]. Wood - hard, dense[229]. It burns rapidly and well, even when green, and has a pleasant aromatic smell[212]. Sagebrush provides food and habitat for a variety of species, such as sage grouse, pronghorn antelope, gray vireo, pygmy rabbit, and mule deer.

dwatta Antirheumatic Antiseptic Digestive Disinfectant Febrifuge Miscellany Ophthalmic Poultice Sedative SkinSage brush was widely employed by many native North American Indian tribes who used it to treat a wide range of disorders[257]. It is little used in modern herbalism, though it certainly merits further investigation[K]. The plant is antirheumatic, antiseptic, digestive, disinfectant, febrifuge,

baked, when they impart a pleasant flavour[183]. Young tendrils - raw or cooked[55, 85, 159]. Sap. Best harvested in the spring or early summer, it has a sweet flavour and makes a pleasant drink[101]. The sap should not be harvested in quantity or it will weaken the plant[K]. An oil is obtained from the seed[46, 61]. This would only really be a viable crop if large quantities of grapes were being grown for wine.

tcanta Dye Miscellany Oil RootstockA yellow dye is obtained from the fresh or dried leaves[168]. The plant is used as a rootstock for the common grape, V. vinifera, especially in areas where phylloxera disease is prevalent[61].

dwatta Miscellany Poultice UrinaryThe leaves are hepatic[257]. An infusion has been used in the treatment of diarrhoea, hepatitis, stomach aches, fevers, headaches and thrush[222, 257]. Externally, the leaves are poulticed and applied to sore breasts, rheumatic joints and headaches[222, 257]. The wilted leaves have been applied as a poultice to the breasts to draw away soreness after the birth of a child[257. An infusion of the bark has been used to treat urinary complaints[257].

nrakta Eastern N. America - Maine to S. Carolina and Tennessee. Locally naturalized in Europe[50]. ksacta Wet or dry thickets and woodland borders[43].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Lavering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. Plants climb by means of tendrils[182], they grow particularly well into elm trees[18]. The flowers have the sweet scent of mignonette[245]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Cultivated for its edible fruit in N. America, where it can produce yields of up to 17 tonnes per hectare[183]. It is the parent of several named varieties[1. 43, 183]. However, it is of no value as a fruit bearer in Britain, requiring hotter summers than are usually experienced in this country in order to ripen its fruit[11]. Another report says that this species is of interest for its hardiness and its ability to produce crops in cooler climates[200]. Resistant to Phylloxera disease, a disease that almost destroyed the European grape crops. This species can be used as a rootstock in areas where the disease is prevalent[61] and can also be used in breeding programmes with V. vinifera in order to impart resistance to that species[183]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

## 5.2.167 Vitis labruscana

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis labruscana is a deciduous Climber growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit ravor dried for winter use[11, 177]. A 'foxy' flavour that is not normally relished in Europe[11]. However, the fruit is larger and less 'foxy' than V. labrusca[11]. The fruit is about 25mm in diameter[200] and is carried in fairly large bunches. The fruit is commonly used for making wine in N. America[11]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils -raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168]. Greenish-blue and dark blue dyes can be obtained from the fruit skins of the cultivar 'Concord'[168].

nrakta A hybrid of garden origin, V. labrusca x V. vinifera[11]. ksacta Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. This is a hybrid species and so seed is unlikely to breed true. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. Cultivated for its edible fruits, used mainly for making wine, in Eastern N. America[11]. There are many named varieties. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey funqus[200].

#### 5.2.168 Hydrangea anomala

Hydrangea

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 12 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli drutta Hydrangea anomala is a deciduous Climber grow-

artuta Hydrangea anomaia is a deciduous Climber growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Leaves SapEdible Uses: Condiment SweetenerLeaves - cooked. A cucumber taste[183]. The Japanese crush the leaves and use them fresh with miso[177, 183]. A boiled concoction of the leaves is used to make a syrup[177, 183]. The sweet sap is used as a drink[183].

tcanta PaperThe bark is a paper substitute[146, 158]. The sub-species H. anomala petiolaris can be used as a ground cover plant in a shady position[188]. It is best spaced about 1.8 metres apart each way[208].

dwatta The leaves are used medicinally [266]. No further information is given.

nrakta E. Asia - China to the Himalayas, ksacta Shady ravines to 2100 metres in the Himalayas[158]. Dense to sparse forests in valleys, along stream banks, or on rocky mountain slopes at elevations of 500 - 2900 metres[266].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Basal softwood cuttings of non-flowering shoots[200]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses:Arbor, Espalier. Tolerates most soils[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Although the dormant plant is guite hardy in Britain, the young growth in spring can be damaged by late frosts. A fast-growing self-clinging climbing plant[208], attaching itself by means of aerial roots[200], and growing up walls or tree trunks on any aspect. The plants may need initial support, however[200]. Plants are growing well on a wall at Kew[11]. Grows well on north walls but prefers a sunnier position[208]. Closely related to H. petiolaris[11]. H. petiolaris is normally treated as no more than a sub-species of this species[200]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Blooms are very showy.

# 5.2.169 Viburnum rufidulum

Southern Black Haw, Rusty blackhaw 4 tlin 8 cyuc 3 koak 0 tcan 1 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum rufidulum is a deciduous Shrub growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fleshy fruit has a sweet taste, somewhat like raisins[274], but it is nearly all seed[43, 159]. The taste is best after a frost. The ellipsoid fruit is up to 15mm long and contains a single large seed[229].

tcanta WoodWood - fine-grained, heavy, hard, strong, with a disagreeable odour[227]. Of no particular value[227]. dwatta AntispasmodicThe bark is antispasmodic and has been used in the treatment of cramps and colic[254].

nrakta Southern N. America - Virginia to Florida, west to Texas, Oklahoma and Kansas. ksacta Moist woods and thickets[43, 159]. By the sides of streams, hillsides, roadsides, woodland margins and clearings[229]. Also found in dry upland woods[82]

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can

be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. A fast-growing but short-lived species in the wild[229]. Plants grow well but do not flower very freely in Britain[11]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200].

#### **5.2.170** Sorbus aria

Whitebeam, Chess-apple 4 tlin 8 cyuc 3 kcak 4 tcan 1 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Sorbus aria is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked and used in preserves etc. The fruit is usually bletted if it is going to be eaten raw[2, 3, 5, 105, 115, 183]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit[K]. Fruit from some trees has a pleasant mild flavour and a mealy texture, we like eating small quantities of it. The fruit can also be dried and ground into a powder and mixed with cereals such as wheat[2, 46, 66]. The fruit is about 10 - 12mm across[200].

tcanta Pioneer Shelterbelt WoodVery tolerant of exposed maritime conditions, it makes a good windbreak tree near the coast[75, 200]. A useful pioneer species, especially on chalky soils and in windy situations[186, K]. Wood - hard, heavy, close grained. Used for beams etc[11, 115].

dwatta Diuretic Emmenagogue LaxativeBoth the flowers and the fruit are mildly diuretic, laxative and emmenagogue[9]. An infusion is used in the treatment of painful menstruation, constipation and kidney disorders[9].

nrakta Central and S. Europe, from Britain and France to Spain, east to Macedonia and Transylvania. ksacta Woods and scrub, usually on chalk or limestone[3, 9, 13, 17].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates acid sands and thin

## 5.2.244 Berberis x stenophylla

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis x stenophylla is an evergreen Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A delicious sub-acid flavour, though there are a lot of seeds to relatively little flesh[K]. Children generally love this fruit, along with some adults, though most adults seem to prefer it cooked in pies, preserves etc[K]. The fruit is not always very freely borne, growing the plants near to B. darwinii (which is one of its parents) seems to increase the yield[K]. The fruits are about 7mm long[200].

tcanta Dye Hedge HedgePlants are very tolerant of trimming and can be grown as a medium-size hedge. Their long arching branches look especially nice if the plants are allowed to grow as an untrimmed informal hedge that is very resistant to maritime exposure[29, 75]. It succeeds on top of Cornish hedges. The prickles make it impenetrable though it can be invasive. There are some named varieties of prostrate growth that are suitable for use as a ground cover[208]. 'Corallina' and 'Prostrata' have been especially mentioned[208]. A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A garden hybrid, B. darwinii. x B. empetrifolia. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. This plant does not breed true from seed because it is a hybrid species. Most of the seedlings revert back to one of the parents, usually B. darwinii[11]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel. October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Tolerates maritime exposure[75, 200]. Fairly slow growing[75]. Plants are hardy to about -15°c[184]. A very ornamental plant[1], there are many named varieties[182]. Plants sucker freely, forming thickets[182]. A good bee plant[108], the flowers are very fragrant. Plants can be pruned back quite severely, they resprout well from the base[200].

# 5.2.245 Juglans mandschurica

Manchurian Walnut 4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Juglans mandschurica is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is polinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil Oil SeedEdible Uses: Oil OilSeed - raw or roasted[183]. The kernels are well filled but difficult to extract because the shell is thick[74, 117, 183]. An edible oil is obtained from the seed[105, 183], it tends to go rancid quickly.

tcanta Herbicide Miscellany Oil Oil Rootstock String WoodThe seed contains up to 52% oil and, as well as being edible, it has industrial uses[74]. A rope is made from the bark of young trees[74]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The inner bark is used to make heel pieces for straw shoes[151]. Sometimes used as a rootstock to confer greater cold resistance[183]. Wood - hard, durable. Used for veneer, furniture etc[46, 61, 74].

dwatta Cancer MiscellanyThe cotyledons are said to be a cure for cancer[218].

nrakta E. Asia - Manchuria. ksacta Mixed woods in rich soils, also by mountain streams[74]. Mixed forests on mountain slopes or in valleys at elevations of 500 - 2800 metres[266]

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. A very hardy and ornamental tree[1], it is recommended for cultivation in severe cold climates[183]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroved by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. Closely allied to J. cathavensis[11].

# 5.2.246 Viola mirabilis

wonder violet 4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat m hkuc the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Succeeds in all but the very poorest acid soils[186]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to at least -18°c[202]. Hybridizes freely with other members of this genus and with C. laevigata in the wild[186, 200]. There are many named forms selected for their ornamental value[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. In heavier shade they quickly become drawn and leggy, eventually dying[186]. An important food plant for the caterpillars of many lepidoptera species[30], there are 149 insect species associated with this tree[24]. Plants are susceptible to fireblight[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and

#### 5.2.242 Scirpus lacustris

Bulrush

4tlin 8 cyuc 3 kcak 0 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scirpus lacustris is a PERENNIAL growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is polinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Leaves Pollen Root Seed StemEdible Uses: Root - raw or cooked[2, 85, 95, 183]. Rich in starch, it can be dried and ground into a powder or made into a syrup[13, 85, 95, 183]. The buds at the end of the rhizomes are crisp and sweet, making excellent eating raw[183]. Young shoots - raw or cooked[85, 183]. Used in spring. Seed - ground up into a powder and mixed with flour for use in making cakes etc[85, 183]. The seed is small and rather fiddly to harvest and utilize. Base of mature stems - raw or cooked. Somewhat tough[85]. Pollen - raw or cooked. Rich in pollen, it is mixed with flour and used in making cakes etc[85, 183].

tcanta Paper Thatching WeavingThe stems are frequently used for making matting, chair bottoms etc and thatching[1, 4, 23, 85, 100, 115]. They were at one time

imported in large quantities for this purpose[4]. The pith of the stems is used in paper making[100].

dwatta Astringent Cancer DiureticThe roots are astringent and diuretic[240]. They were formerly employed medicinally but have fallen into disuse[4]. This plant is a traditional medicine for cancer[218].

nrakta Europe, incl Britain, south and east from Lapland to Africa and Asia. N. and C. America, Polynesia. ksacta Bogs, shallow pond margins, rivers and lakes, usually where there is abundant silt, in acid or calcareous conditions[1, 17].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer

nwatta Succeeds in any wet to moisture retentive soil, pond margins and shallow water in full sun or shade[1, 200]. Plants can succeed in fairly deep water. Hardy to about - 25°c[187]. Some named forms have been selected for their ornamental value[187].

# 5.2.243 Claytonia megarhiza

Alpine Spring Beauty 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flat hpa7tmwatli xre7t hionli

drutta Claytonia megarhiza is an evergreen Perennial growing to 0.2 m (oft 8in) by 0.1 m (oft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from April to July, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Root - raw or cooked[2, 62, 85, 161]. Peeled, then boiled or baked[183]. The root is long, fleshy and up to 2.5cm thick[183, 200]. Leaves and flowering tops - raw or cooked as a potherb[85, 172, 183]. Succulent, juicy and mild in flavour[183]. Flowers - raw.

nrakta Western N. America - Washington and south-wards, ksacta Gravelly soils, rock crevices and high montane regions[60]. Talus, scree and gravelly slopes at elevations of 2000 - 4000 metres[270].

propta Seed - surface sow on a peat based compost in spring in a cold frame. Germination usually takes place within  $2 \cdot 4$  weeks at  $10^{\circ}$ c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out in late spring or early summer after the last expected frosts. Division of offsets in spring or autumn.

nwatta Prefers a damp peaty soil and a position in full sun[1, 164]. Requires a very well-drained lime-free soil[164, 2001. A very cold hardy plant, succeeding outdoors in all parts of Britain, but it is liable to rot if the soil is wet[60. 200]. A good plant for the rock garden[60]. Plants are prone to aphis infestation[188]. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

chalky soils[98, 200]. Does well on heavy clays[200]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Very tolerant of atmospheric pollution and of exposed maritime positions[186]. The whitebeam is one of the first colonizers of chalk scrub[186]. As well as being a good pioneer species for this situation, it will often survive through the development to woodland[186]. There are several named varieties selected for their ornamental value[188]. Trees cast a fairly dense shade when mature[186]. Regenerating well after cutting, it is suitable for coppicing[186]. The fruit is very attractive to birds[11]. Plants are susceptible to fireblight[188]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 5.2.171 Cercis canadensis

Redbud, Eastern redbud, Mexican redbud, Texas redbud 4 tlin 9 cyuc 3 kcak 2 tcan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatpriklwisslio hpa7tmwatli xre7t hionli

drutta Cercis canadensis is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant is reported to contain a toxic saponin[274]. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish [K].

kcakta Edible Parts: Flowers Leaves SeedpodEdible Uses: CondimentFlowers - raw[46, 61, 94, 183] or pickled[2, 105, 149]. A nice refreshing acid taste, the flowers are rich in vitamin C and make a pleasant addition to salads[183, K]. They can also be used as a caper substitute[183]. On a zero moisture basis, the seed contains 22.9 - 27.5% protein, 7.7 - 8.8% fat and 3% ash[218]. (This report does not say if the seed is edible[K]). There is some evidence that both the young seed pods (eaten like snow peas) and the young leaves can be eaten.

tcanta Basketry WoodThe bark of young shoots is used in basket making[94, 106]. Wood - heavy, hard, not strong, close grained, takes a very fine polish[82, 94]. It weighs 40lb per cubic foot[235].

dwatta Astringent Cancer Dysentery Febrifuge Pectoral Vitamin CA tea made from the inner bark is highly astringent[46, 61, 94, 149, 222]. Used in the treatment of fevers, diarrhoea and dysentery, it is also a folk remedy for leukaemia[222]. A cold infusion of the roots and inner bark have been used to treat various chest complaints including whooping cough and congestion[257].

nrakta Eastern and Central N. America - New York to Florida, west to Texas and Wisconsin[222]. ksacta Rich woods, ravines and borders of streams[43, 82]. It often forms a distinct understorey in woodlands[229].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Pre-soak stored seed for 24 hours in warm water then cold stratify for 3 months[113]. Sow spring in the greenhouse[78]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants resent root disturbance and are best planted out in their permanent positions as soon as possible[11]. Cuttings of half-ripe wood, July/August in a frame[200].

nwatta Landscape Uses:Border, Standard, Specimen, Street tree, Woodland garden. Succeeds in most soils and pH types, but dislikes growing in wet soils, especially when these are of clay[200]. Prefers a deep sandy loam and a very sunny position[11, 98, 182]. Succeeds in light shade[200] Dislikes drought[200]. Although the dormant plant is coldhardy, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A fast-growing but short-lived tree in the wild[229]. It does not flower freely in Britain[188]. There is at least one named form, selected for its ornamental value[188]. This spcies is the state tree of Oklahoma[274]. The flowers are produced on the branches of the previous or earlier years, and also on the trunk of the plant[82]. Plants are susceptible to coral spot fungus, especially when growing in areas with cooler summers where the wood is not fully ripened[11]. Plants in this genus are notably resistant to honey fungus[200]. A good bee plant[149]. Resents root disturbance, plants should be planted into their permanent positions as soon as possible, preferably in May, and should be kept well watered until established[11, 188]. This species is one of the few members of the family Leguminosae that do not fix atmospheric nitrogen[226]. Special Features: North American native, Attracts butterflies, Blooms are very showy. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down

# 5.2.172 Smilax rotundifolia

Horse Brier, Roundleaf greenbrier, Brambles 4 tin 9 cyuc 3 kcak 0 tcan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Smilax rotundifolia is a deciduous Climber growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Leaves RootEdible Uses: Drink-Root - cooked[2, 102, 161, 257]. Rich in starch[105]. The root can be dried and ground into a powder that is used in making cakes, puddings, sweet drinks etc[46, 183], it can also be made into a jelly or eaten in soups[159]. A beer resembling root beer or sarsaparilla is made from the roots[183]. Young shoots - raw or cooked[62, 102, 105, 159]. They can be added to salads or cooked like asparagus[183].

dwatta Birthing aid Poultice RubefacientThe stem prickles have been rubbed on the skin as a counter-irritant to relieve localised pains, muscle cramps and twitching[222]. A tea made from the leaves and stems has been used in the treatment of rheumatism and stomach problems[222]. The parched and powdered leaves have been used as a dressing on burns and scalds[257]. The wilted leaves have been used as a poultice on boils[222, 257]. A tea made from the roots is used to help the expelling of afterbirth[222]. Reports that the roots contain the hormone testosterone have not been confirmed, they might contain steroid precursors, however[222].

nrakta Eastern N. America - Nova Scotia to Florida, west to Texas and Illinois. ksacta Moist to dryish thickets and

woods[43]. Considered to be an obnoxious pest in America[43].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most soils in sun or semi-shade[1, 200]. A very free growing plant, it can be used to clamber over large trees, shrubs or tree stumps[1, 200]. Hardy to about -20°c[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features:North American native, Invasive, Naturalizing, Attractive flowers or blooms.

# 5.2.173 Sorbopyrus auricularis

Bollwyller Pear

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sorbopyrus auricularis is a deciduous Tree growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from May to November, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit has a dry and sweet yellowish flesh[11, 200]. Rather like a small pear, it has a very nice flavour when fully ripe[K]. The fruit is up to 5cm long[200].

nrakta A bi-generic hybrid of garden origin. ksacta Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe if this is possible, otherwise in late winter. The plant produces very little fertile seed, and this does not breed true[200], though some interesting plants might be produced[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Grafting is the best method of propagating this plant. This is best carried out in early spring, though budding can be carried out in the summer.

nwatta Succeeds in a well-drained moisture-retentive soil in an open sunny position[200]. Succeeds in light shade but fruits less well in such a position. This species is a bigeneric hybrid of garden origin between Sorbus aria and Pyrus communis[183].

#### 5.2.174 Taxus cuspidata

Japanese Yew

4 tlin 7 cyuc 3 kcak 2 tcan 4 dwat 10 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Taxus cuspidata is an evergreen Tree growing to 10 m (32ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy)

and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous[1, 4, 7, 10, 19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or made into jam[105, 183]. Very sweet and gelatinous, most people find it delicious though some find it sickly. The fruit is a fleshy berry about 8mm in diameter and containing a single seed[200]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm, if the seed has been bitten into, however, it could cause some problems.

tcanta Dye WoodA brown dye is obtained from the heart-wood[46, 61]. Red according to another report[266]. An oil is extracted from the seeds[266]. Wood - hard, strong, elastic, fine grained, takes a beautiful polish. Used for furniture, bows etc[1, 46, 61]. The wood is used in building construction, furniture manufacture and as a carving material[266].

dwatta CancerModern research has shown that yew trees contain the substance 'taxol' in their shoots and bark. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[218, 238]. This remedy is very toxic and, even when used externally, should only be used under the supervision of a qualified practitioner[238]. See also the notes above on toxicity. A compound used to treat diabetes is extracted from the wood, bark, leaves, and roots[266].

nrakta E. Asia - China, Japan, eastern Russia. ksacta Mountains throughout Japan[58]. Acid soils in cold, humid places at elevations of 500 - 1000 metres in Heilongjiang, E Jilin, Liaoning and Shaanxi provinces, China[266].

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded

nwatta Landscape Uses: Hedge, Screen, Superior hedge, Specimen. Thrives in almost any soil, acid or alkaline, as long as it is well-drained[1, 200]. Succeeds in dry soils[188]. Very shade tolerant[81]. The dormant plant is hardy to about -35°c[200] but it requires more summer heat and humidity than T. baccata and is rarely more than a shrub in Britain[81]. Young shoots can be damaged by late spring frosts. The foliage may turn reddish-brown in cold winters[81]. There are several named varieties selected for their ornamental value[188]. Plants produce very little fibrous root and should be planted in their final positions when still small[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if fruit and seed is required. Female plants fruit freely in Britain if they are pollinated[11, 185]. Special Features:Not North American native, All or parts of this plant are poisonous, Inconspicuous flowers or blooms.

# 5.2.175 Malus sylvestris

Crab Apple, European crab apple 4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 10 m hkuc

or cooked[257]. It was chewed in times of food shortage for the little nourishment it supplied[257]. The gum is chewed as a delicacy[161, 257]. No further details are given.

tcanta Beads Dye Fibre Fuel Gum Lighting Mordant Tinder WoodThin strips of the fibrous bark are used for making sleeping mats etc[82, 227]. It has also been used as a lining in shoes to absorb moisture and to keep the feet warmer[257]. When rubbed fine, the bark can be used to make children's clothing[257]. The bark is employed as a tinder and is also made into a slow match or can be shredded, bound into bundles and used as a torch to give light in the house[216, 257]. The crushed bark was twisted into a rope, tied at intervals with vucca (Yucca species), and wrapped into a coil. The free end was set on fire and kept smouldering by blowing on it at intervals. Fire could be carried in this fashion for several hours[257]. The dried seeds have been used as heads or as the 'rattle' in rattles[216, 257]. A green dye is obtained from the bark and berries[229, 257]. A yellow dye is obtained from the whole plant[257]. Ashes from the whole plant have been used as a mordant to fix the colour of dyes[257]. Wood - moderately hard, somewhat heavy, slightly fragrant. When seasoned properly it is very durable and is used mainly for fencing and fuel[82, 227, 229]. As a fuel it burns steadily and evenly[257].

dwatta Antiphlogistic Birthing aid Diuretic Dysentery Febrifuge Laxative Odontalgic Pectoral Poultice StomachicOne-seed juniper was commonly employed medicinally by a number of native North American Indian tribes, who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. The leaves are febrifuge, laxative and pectoral[216]. An infusion is used in the treatment of stomach complaints, constipation, coughs and colds[216]. An infusion was also used by pregnant women prior to childbirth in order to relax the muscles[257]. A poultice of the heated twigs can be bound over a bruise or sprain in order to reduce the swelling[257]. An infusion of the staminate cones has been used as a stomach tonic and in the treatment of dysentery[257]. The chewed bark has been applied externally to help heal spider bites[257]. It is also highly prized as a dressing on burns[257]. The fruits are strongly diuretic[257]. A gum from the plant has been used as a temporary filling in a decayed tooth[257].

nrakta South-western N. America - along the Rocky Mountains from Wyoming to Mexico. ksacta Dry rocky or sandy soils, 1000 - 2300 metres[229].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Lavering in September/October, Takes 12 months[78].

nwatta Succeeds in dry soils. Succeeds in most soils, including chalk, if they are well drained[1, 11, 200], preferring a neutral or slightly alkaline soil[11]. Trees are fairly fast growing for a Juniper, and are also long-lived in their native habitats[227]. They grow better in dry areas with hot summers, western Britain is generally to cool and wet for this species to thrive[200]. Plants are resistant to honey fungus[88]. This species is closely related to J. occidentalis[11]. The seed matures in 1 year[200]. Some fruit is produced most years, but heavy crops only occur every 2 - 3 years[229]. Dioecious. Male and female plants must be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

# 5.2.241 Crataegus monogyna

Hawthorn, Oneseed hawthorn 4 tlin 8 cyuc 3 kcak 3 tcan 5 dwat m hkuc hmimhtut cyutli hgattcuphja7n hwicli hyishrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hionli

drutta Crataegus monogyna is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Coffee TeaFruit - raw or cooked[2, 12]. Not very appetizing raw[9, K], it is normally used for making jams and preserves[9, 183]. The fruit can be dried, ground, mixed with flour and used for making bread etc[46]. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. Young shoots - raw[5, 177]. A pleasant nutty flavour[144], they are a good addition to the salad bow[183]. A tea is made from the dried leaves[21, 46, 177, 183], it is a china tea substitute. The roasted seeds are a coffee substitute[12, 21, 46, 177]. The flowers are used in syrups and sweet puddings[183].

tcanta Fuel Hedge Hedge WoodA good hedge plant, it is very tolerant of being cut and of neglect and is able to regenerate if cut back severely, it makes a good thorny stock-proof barrier[186] and resists very strong winds. It is often used in layered hedges[11, 29]. The cultivar 'Stricta' has made a very good hedge 3.5 metres tall in an exposed maritime position at Rosewarne in N. Cornwall[K]. Wood - very hard and tough, difficult to work. Used for tool handles etc. Valued in turning[7, 46, 61]. A good fuel, giving out a lot of heat[4].

dwatta Antispasmodic Astringent Cardiotonic Diuretic Hypotensive Malaria Sedative Tonic VasodilatorHawthorn is an extremely valuable medicinal herb. It is used mainly for treating disorders of the heart and circulation system, especially angina[254]. Western herbalists consider it a 'food for the heart', it increases the blood flow to the heart muscles and restores normal heart beat[254]. This effect is brought about by the presence of bioflavonoids in the fruit, these bioflavonoids are also strongly antioxidant, helping to prevent or reduce degeneration of the blood vessels[254]. The fruit is antispasmodic, cardiac, diuretic, sedative, tonic and vasodilator[4, 9, 21, 46, 165]. Both the fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222], they are also used to treat a heart muscle weakened by age, for inflammation of the heart muscle, arteriosclerosis and for nervous heart problems[21]. Prolonged use is necessary for the treatment to be efficacious[222]. It is normally used either as a tea or a tincture [222]. Hawthorn is combined with ginkgo (Ginkgo biloba) to enhance poor memory, working by improving the blood supply to the brain[254]. The bark is astringent and has been used in the treatment of malaria and other fevers[7]. The roots are said to stimulate the arteries of the heart[218].

nrakta Europe, including Britain, absent from Iceland, south and west the the Mediterranean and Afghanistan ksacta Woods, hedges, thickets etc, on most soils except wet peat and poor acid sands[9, 17].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting

potted up and placed in a frame until established [11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Foundation, Pest tolerant, Massing, Specimen, Woodland garden. A very easy plant to grow, thriving in any good garden soil[11, 200] and tolerating dense shade under trees[1, 28]. It grows well in heavy clay soils and also succeeds in dry soils if it is given a good mulch annually[197]. It dislikes exposure to strong winds[K]. Plants are hardy to about -20°c[184]. Very tolerant of pruning, plants can be cut back into old wood if they grow too large and straggly[238]. Spring is the best time to do this[238]. Suckers are fairly freely produced, with established plants forming dense thickets[200]. Most plants grown under this name are casual hybrids with M. repens[67]. This species is easily confused with M. pinnata[67], with which it also hybridizes[200]. The flowers are delicately scented[245]. A number of named forms have been developed for their ornamental value[182]. This species is notably resistant to honey fungus[88, 200]. This plant is the state flower of Oregon[95]. Special Features: North American native, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 5.2.239 Castanea mollissima

Chinese Chestnut

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Castanea mollissima is a deciduous Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[46, 61, 63, 105]. Eaten raw, there is a distinct astringency, especially if the fleshy inner skin beneath the outer shell of the seed is not removed[K]. When cooked, however, and especially when baked, the seed becomes much sweeter and has a floury texture[K]. It then makes an excellent food and can be used as a staple food in much the same way as potatoes or cereals[K]. The skin (or pellicle) of the seed is easily peeled[183]. The seed is low in fats and oils but high in carbohydrates[183]. A nutritional analysis is available[218].

tanta Fuel Tannin WoodThe bark, leaves, wood and seed husks all contain tannin. Wood - hard, strong, light. Used for fence posts etc[11]. Coppiced for fuel.

dwatta Antidote Astringent Dysentery StomachicThe burrs (seed cases?) are rich in tannin and are astringent and stomachic[147, 218]. A decoction is used in the treatment of diarrhoea, uncontrollable nose bleed, dysentery, regurgitation and profound thirst[147]. The flowers are used in the treatment of scrofula[218]. The stem bark is used to treat poisoned wounds whilst the stem sap is used to treat lacquer poisoning[218].

nrakta E. Asia - China. ksacta Woods and forests to 2500 metres[109]. Mountain slopes from near sea level to 2,800 metres[266].

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K].

nwatta Industrial Crop: Biomass Industrial Crop: Tannin Management: Standard Minor Global Crop Other Systems: Strip intercrop Staple Crop: Balanced carbPrefers a good well-drained slightly acid loam but succeeds in dry soils[1, 11, 200]. Once established, it is very drought tolerant[1, 11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. Although very winter-hardy, this species does not do well in Britain, it only really thrives in areas with hot summers[200]. Does not fruit well in Britain[11, 200]. A tree in semi-shade at Kew in 1990 was 9 metres tall[K]. Extensively cultivated for its edible seed in China, and also much grown in America, there are a number of named varieties[117, 183, 200, 266]. Plants can fruit in 5 - 7 years from seed[117] and yields from mature trees are around 25 - 60 kilos per tree[160]. Resistant, but not immune, to blight[183], it is hybridized with C. dentata to try and find blight resistant cultivars with superior seeds[200]. A shallow rooted tree[160]. Responds well to coppicing[11, 109]. An excellent soil-enriching understorey in pine forests[200]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Blooms are very showy. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

# 5.2.240 Juniperus monosperma

One-Seed Juniper

396

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhien hionli

drutta Juniperus monosperma is an evergreen Tree growing to 18 m (59ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: GumFruit - raw or cooked. Soft, juicy and pulpy[81, 85, 105], but with a thin flesh[82]. It can be dried and ground into a powder and then be baked[82, 227], or can be used as a seasoning in stews etc[161, 257]. The fruits were only used when other foods were in short supply[257]. The cones are about 5 - 8mm in diameter and ripen in their first year[200]. Inner bark - raw

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus sylvestris is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit OilEdible Uses: Oil Pectin Pectin TeaFruit - raw or cooked[9, 15]. Used for jellies, preserves and juices[183]. The flavour improves considerably if the fruit is not harvested until it has been frosted[12]. The fruit is quite variable in size (it is about 2 - 4cm in diameter[200]) and quality. Whilst usually harsh and acid, some forms are quite sweet and can be eaten out of hand[K]. The fruit is rich in pectin and can be used in helping other fruits to set when making jam etc[61, 142]. Pectin is also said to protect the body against radiation[201]. An edible oil can be obtained from the seed[4]. It would only really be viable to use these seeds as an oil source if the fruit was being used for some purpose such as making cider and then the seeds could be extracted from the remaining pulp[K]. A very pleasant tea can be made from the leaves[7]

tcanta Dye Fuel Oil Pectin PectinThe fruit is a source of pectin[61, 142]. Pectin is used as a thickener in jams etc and as a culture medium in laboratories. A red to yellow dye is obtained from the bark[257]. The wood is an excellent fuel[67].

dwatta Anthelmintic Antibacterial Astringent Hypnotic Laxative RefrigerantThe fruit is astringent and laxative[4, 9]. The crushed fruit pulp can be used as a poultice to heal inflammations or small flesh wounds[7]. The fruit is eaten to obviate constipation[240]. The bark, and especially the root bark, is anthelmintic, refrigerant and soporific[218, 240]. An infusion is used in the treatment of intermittent, remittent and bilious fevers[4, 240]. The leaves contain up to 2.4% of an antibacterial substance called 'florin'[240]. This inhibits the growth of a number of gram-positive and gram-negative bacteria in as low a concentration as 30 ppm[240].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Greece and S.W. Asia. ksacta Woods, scrub and hedges, especially in oak woods, on neutral to calcareous soils[9, 17, 200].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, including heavy ones, preferring a moisture retentive well-drained loamy soil[1, 98, 200]. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[186, 200]. Fairly tolerant of cutting, it succeeds in a mixed hedgerow[186]. A parent of the cultivated apple[11], it is often used as a rootstock[50]. The fruit is a good wildlife food source, especially for birds[200]. The plant has over 90 associated insect species[24]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.176 Sorbus lanata

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sorbus lanata is a deciduous Tree growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[272]. The fruit is usually bletted if it is going to be eaten raw[2, 51, 146, 158]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit[K]. The fruit is about 1.2 - 3cm across[200] and is borne in bunches which makes harvesting easier[K].

tcanta WoodWood - moderately hard, close and even grained, seasons well[146].

nrakta E. Asia - Himalayas. ksacta Forests to 3400 metres[51]. Characteristic of high-level grazing pastures[158].

propta Seed - best sown as soon as it is ripe in a cold frame [78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed [78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification [98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two [11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. This species grows best in S.W. England[121]. Plants are susceptible to fire-blight[188]. Closely related to S. cuspidata[121] and to S. aria[2001.

# 5.2.177 Sorbopyrus species

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sorbopyrus species is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from May to November, in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Fruit - raw or cooked[183].

nrakta A bi-generic hybrid of garden origin. ksacta Not known in the wild.

propta Seed - best sown in a cold frame as soon as it is ripe if this is possible, otherwise in late winter. The plant produces very little fertile seed, and this does not breed true[200], though some interesting plants might be produced[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Grafting is the best method

of propagating this plant. This is best carried out in early spring, though budding can be carried out in the summer.

nwatta Succeeds in a well-drained moisture-retentive soil in an open sunny position[200]. Succeeds in light shade but fruits less well in such a position. This species is a bigeneric hybrid of garden origin between a Sorbus species and Pyrus communis[183].

# 5.2.178 Crataegus punctata

Dotted Hawthorn,

4 tlin 8 cyuc 3 kcak 2 tcan 2 dwat 10 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus punctata is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked[159]. Eaten out of hand or made into jellies, preserves etc[177, 183]. A good size, about 25mm in diameter, and borne in small clusters[200]. Ripening in October, it is quite apple-like in texture and appearance, making a good dessert fruit[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta MiscellanyWood - heavy, hard, tough, closegrained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive MiscellanyA compound decoction of the shoots and bark has been used to stop menstrual flow[257]. Although no other specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221].

nrakta Eastern N. America - Quebec to Georgia, west to Minnesota and Oklahoma. ksacta Open rocky ground, thickets and pasture[43]. Rich hillsides[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all flussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in

full sun is best when plants are being grown for their fruit. they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[1], it grows very well in Britain, flowering and fruiting abundantly[11]. There are some named varieties selected for their ornamental value[200]. 'Ohio Pioneer' is a thornless form growing about 8 metres tall[200]. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root nattern is also useful and given here if available The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 5.2.179 Pinus bungeana

Lace-Bark Pine, Bunge's pine 4 tlin 7 cyuc 3 koak 0 tcan 2 dwat 10 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli dyat hionli

drutta Pinus bungeana is an evergreen Tree growing to  $10~\mathrm{m}$  (32ft) by  $6~\mathrm{m}$  (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: SeedEdible Uses: CondimentSeed - raw or cooked[105, 177]. A reasonable size, being up to 10mm x 8mm[200]. The oil-rich seed has a resinous flavour. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye HerbicideA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk. or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4] Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc.

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 5.2.237 Reynoutria japonica

Japanese knotweed.

4 tlin 8 cyuc 3 kcak 3 tcan 3 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Reynoutria japonica is a PERENNIAL growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root Seed Shoots StemEdible Uses: Edible Portion: Leaves, Shoots, Rhizomes, Roots. Young shoots in spring - cooked. They can be used as an asparagus substitute[55, 62, 116, 1599, 179, 183]. They have an acid flavour and can also be used as a rhubarb substitute in pies, fruit soups, jams etc[183]. Older stems and shoot tips - cooked[62, 159]. They taste like a mild version of rhubarb[K]. Seed - raw or cooked. It is rather small and fiddly to utilize. The seed can also be ground into a powder and used as a flavouring and thickener in soups etc, or can be mixed with cereals when making bread, cakes etc. The root is sometimes eaten[183].

tcanta Carbon Farming Solutions - Industrial Crop: fiber (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1].

dwatta Possibly may have similar properties to other knotweeds where the root can be antiphlogistic, bechic, depurative, diuretic, emmenagogue, emollient, febrifuge, stomachic and vulnerary[46, 61, 147, 178, 218]. It is also used in the treatment of women's complaints[147]. A decoction is used in the treatment of burn injuries, boils and abscesses, poisonous snakebites, acute hepatitis, appendicitis, traumatic injuries and menstrual irregularities[147]. The leaves can be crushed and applied externally as a poultice to abscesses, cuts etc, whilst the dried roots can be ground into a powder and applied externally[147]. Extracts of the plant have shown antitumour activity[218].

nrakta Origin: Asia. ksacta Cold to warm temperate. It grows in forests and humid areas. It grows in wetlands. propta Plants can be grown from seeds.

nwatta Experimental Crop Industrial Crop: Fiber Management: HayClimate: cold to warm temperate. Humidty: humid. Carbon Farming Solutions - Cultivation: experimental. Management: hay (Describes the non-destructive management systems that are used in cultivation) [1-1]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

# 5.2.238 Mahonia aquifolium

Oregon Grape, Hollyleaved barberry, Oregon Holly Grape, Oregon Holly

4 tlin 8 cyuc 3 kcak 3 tcan 3 dwat 2 m hkuc

pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Mahonia aquifolium is an evergreen Shrub growing to 2 m (6ft) by 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from January to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Barberry, goldenseal, oregon grape and other plants containing Berberine should be avoided during pregnancy and breastfeeding. Avoid if over active thyroid gland. High doses cause vomiting, lowered blood pressure, reduced heart rate, lethargy, nose bleed, skin and eye irritation and kidney infection. Liquorice as Glycyrrhiza species nullify berberine effects [301].

kcakta Edible Parts: Flowers FruitEdible Uses: Drink-Fruit - raw or cooked[2, 3, 5, 95]. The fruit is almost as large as a blackcurrant and is produced in large bunches so it is easy to harvest[K]. It has an acid flavour, but it is rather nice raw and is especially good when added to a porridge or muesli[K]. Unfortunately, there is relatively little flesh and a lot of seeds, though some plants have larger and juicier fruits[K]. The cooked fruit tastes somewhat like blackcurrants[K]. The fruit can also be dried and stored for later use[257]. Flowers - raw. They can also be used to make a lemonade-like drink[183].

tcanta Dye Hedge HedgeA yellow dye is obtained from the inner bark of the stem and roots[99, 101, 257]. It is green according to another report[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. This species can be grown as a low hedge and does not need trimming. Because of its suckering habit, it also makes a good dense ground cover plant though it can be slow to become established[197, 2001.

dwatta Alterative Antibacterial Antipsoriatic Antiseborrheic Antitumor Blood tonic Cholagogue Diuretic Dysentery Laxative Ophthalmic TonicOregon grape was often used by several native North American Indian tribes to treat loss of appetite and debility[254]. Its current herbal use is mainly in the treatment of gastritis and general digestive weakness, to stimulate the kidney and gallbladder function and to reduce catarrhal problems[254, 257]. The root and root bark is alterative, blood tonic, cholagogue, diuretic, laxative and tonic[4, 21, 165, 257]. It improves the digestion and absorption and is taken internally in the treatment of psoriasis, syphilis, haemorrhages, stomach complaints and impure blood conditions[4, 238]. Externally, it has been used as a gargle for sore throats and as a wash for blurry or bloodshot eyes[257]. The roots are harvested in late autumn or early spring and dried for later use[238]. The fruit is an excellent gentle and safe laxative[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta Western N. America. Naturalized in Britain. ksacta Mixed coniferous woods to 2000 metres. It is found in woods and hedgerows in Britain[17].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3- 6 months at  $10^{\circ}\mathrm{C}$ . Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are

dwatta Aphrodisiac Aromatic Diaphoretic Diuretic Expectorant Stimulant TonicSea holly roots were collected on a large scale in the 17th and 18th centuries in England and were candied then used as restorative, quasi-aphrodisiac lozenges[238]. The plant is still used in modern herbalism where it is valued especially for its diuretic action[254]. The root is to be aphrodisiac, aromatic, diaphoretic, diuretic, expectorant, stimulant and tonic[4, 165, 200]. The root promotes free expectoration and is very useful in the treatment of debility attendant on coughs of chronic standing in the advanced stages of pulmonary consumption[4]. It is used in the treatment of cystitis, urethritis, as a means to alleviate kidney stones (it is unlikely that it dissolves the stones, but it probably helps to retard their formation), and to treat enlargement or inflammation of the prostate gland[254]. Drunk freely, it is used to treat diseases of the liver and kidneys[4, 238]. Used externally as a poultice, the dried powdered root aids tissue regeneration[268]. The root should be harvested in the autumn from plants that are at least 2 years old[4].

nrakta European coasts, including Britain, from Scandanavia to the Mediterraneanand Baltic, and Black Sea ksacta Sea shores, preferring sand and shingle whilst avoiding acid soils[17].

propta Seed - best sown as soon as it is ripe in early autumn on the surface of a well-drained compost in a cold frame[200]. The seed can also be sown in spring. Germination can be very slow[4], although another report says that the seed usually germinates in 5 - 90 days at 20°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring or autumn. Take care since the plant resents root disturbance[200]. Root cuttings in autumn or winter[200].

nwatta Requires a deep well-drained soil and a sunny position[1]. Prefers a light sandy saline soil but tolerates most soil types including lime and poor gravels[200, 268]. Plants are best grown in a hot dry position[187, 233]. Established plants are drought tolerant[190]. Plants are hardy to about -15°c[187]. Sea holly has very long roots that penetrate deeply in the soil and are often several feet long[4]. These roots are sweetly scented[245]. The plant should be placed in its final position whilst small since it resents root disturbance[200]. Although a sea-shore plant, it is amenable to garden cultivation[4]. A good bee plant[108]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.235 Amelanchier spicata

4tlin 8 cyuc 3 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier spicata is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked. Sweet and juicy[177, 183]. The fruit is rich in iron and copper[226]. It is rather small, about 8mm in diameter[200].

nrakta N. America - Ontario to Michigan, Iowa, Pennsylvania and North Carolina. ksacta Dry rocky places[235].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the

seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200], but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Plants are hardy to about -25°c[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Produces suckers freely, forming thickets. This species is closely related to A stolonifera[11], it is possibly a hybrid of A. canadensis x A stolonifera[17]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

# 5.2.236 Ribes missouriense

Missouri Gooseberry

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes missouriense is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[257]. A rich sub-acid vinous flavour that is very agreeable, the fruit is somewhat too acid to be eaten raw for most tastes but when fully ripe makes delicious tarts[183]. The fruit can be dried for later use[257]. A gooseberry, but with a smooth skin, it is about 10mm in diameter[200], though some forms can be up to 14mm in diameter[235].

nrakta Central N. America - Illinois to Minnesota, South Dakota, Kansas and Tennessee. ksacta Dry to moist open woods, thickets and fence rows[228].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and  $5^{\circ}c$  and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

mwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°c[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Widely cultivated in temperate areas for its edible fruit, there are many named varieties[183]. For polyculture design as well as the above-ground architecture (form-tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown 11-21. The root pattern is flat with shallow roots forming a

as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta E. Asia - C. and N. China. ksacta Mud and sandstone shales, 1000 - 1250 metres[109]. Often found on limestone[1].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses:Border, Pest tolerant, Rock garden, Specimen, Street tree. Prefers a deep loamy soil[120]. Thrives in a light well-drained sandy or gravelly loam[1]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought, succeeding in hot dry sites[200]. A very ornamental tree with beautiful bark. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. This species is slow growing and hard to establish in Britain, doing best in the mild areas of the country[120, 185]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Inconspicuous flowers or blooms.

# 5.2.180 Arundinaria spp

Running Bamboo

4 tlin 10 cyuc 3 kcak 4 tcan 1 dwat 10 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Arundinaria spp is an evergreen Bamboo growing to 10 m (32ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not marritime exposure.

pcista None Known

kcakta Edible Parts: Seed ShootsEdible Uses: Young shoots - cooked[11, 22, 46, 105, 183]. Used as a potherb[236]. Seed - cooked[46, 61, 161]. It can be used as a wheat substitute[2, 105], for which it is not much inferior[213], but it is rather small and difficult to collect in quantity[159]. The plants only flower at irregular intervals of several years. See individual species for more information.

tcanta FodderAgroforestry Uses: With its extensive running root system, the plant is ideal for helping to control soil erosion, especially along the sides of rivers[352]. The extense growth of the plant provides streambank stabilization, sediment retention, and bioaccumulation of nutrients and toxins[1050].So long as it can be restrained, the plant makes an excellent, dense hedge or screen[352]. The canes are used as pipe-stems, are woven into baskets and mats plus a variety of other purposes[169, 236]. The hollow stems can be made into flutes[257]. Carbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses. Indus-

trial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Fodder: bank.

dwatta See individual species.

nrakta Asia, North America ksacta Forms dense thickets along riverbanks, in swamps and low woods[43, 235]. Found on all types of soil; at elevations from sea level to 600 metres[195].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. When large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded place in the greenhouse until large enough to plant out. Bamboos only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Rhizome cuttings. Basal cane cut-

nwatta Fodder: Bank Industrial Crop: Biomass Manage Managed Multistem Minor Global CropThere are three recognized species of the genus Arundinaria accepted: Arundinaria appalachiana Triplett, Weakley and L.G.Clark - Hill cane, Arundinaria tecta Muhl. - Switch cane. Climate: cold to warm temperate. Humidity: humid. Carbon Farming Solutions - Managed bamboo forest sequester more carbon than wild bamboo and the same as fast-growing tropical trees like eucalyptus. Cultivation: minor global crop. Management: managed multistem (Describes the non-destructive management systems that are used in cultivation) [1-1].

#### 5.2.181 Malus floribunda

Japanese Crab, Japanese flowering crab apple 4 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus floribunda is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Up to 1cm in diameter[200]. It tastes like a soft fruit. Acid but nice, about the size of a large blackcur-

nrakta E. Asia - Japan? Probably not a truly wild species but a hybrid M. sieboldii x M. baccata or M. prun ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow

away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta Landscape Uses:Border, Espalier, Pest tolerant, Standard, Specimen, Street tree. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A very ornamental plant[1], the fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. The tree is a very good pollinator for the apple orchard[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

#### 5.2.182 Crataegus opaca

Western Mayhaw

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 9 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli frusflatoriklwis hpa7tmwatli xre7t hionli

drutta Crataegus opaca is a deciduous Shrub growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[160]. Juicy and acid with a pleasant flavour[2]. It is up to 2cm in diameter[227]. The fruit is frequently used and much prized in parts of southern N. America where it is often gathered in quantity from the wild. Its acid flavour makes it a favourite for preserves and jellies[82, 183, 227]. The fruit can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard and strong, but not large enough for commercial use[227]. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Southern N. America - North Carolina to Mississippi. ksacta Deep depressions filled with water for most of the year, borders of swamps, low river banks etc[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be

best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. It thrives in acid soils[160]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semishade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy species, tolerating temperatures down to about -30°c[160]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Occasionally cultivated for its fruit in America, there are some named varieties[183].

# 5.2.183 Malus spectabilis

Chinese Flowering Apple, Asiatic apple 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus spectabilis is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. About 2 - 3 cm in diameter[200]. Bitter and harsh when eaten fresh[11], when stored in a cool dry place and allowed to blett it becomes quite acceptable[K].

nrakta E. Asia - China. ksacta Plains and mountain regions at elevations of 500 - 2000 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

mwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A very ornamental tree[1], it is much cultivated in China for its edible fruit[11]. The fruit of growth. Give an occasional liquid feed to the seedlings to make sure that they do not become nutrient deficient. When the plants are dormant, pot up the small bulbs putting 2-3 bulbs in each pot. Grow them on in a shady position in the greenhouse for another 2 3 years and then plant them out into their permanent positions when they are dormant in late summer. Division in summer as the leaves die down. This species does not produce offsets[200].

nwatta Prefers slightly acid soil conditions but succeeds in chalky soils if these contain plenty of humus[164]. Requires semi-shade, preferably provided by trees or shrubs, and a well-drained soil[164]. Succeeds in almost any light soil, preferring one that is rich in humus[1]. This species is unsatisfactory in cultivation outdoors in Britain. It comes into growth early in the year and the flowers probably need more heat than our typical spring provides if they are to open properly[90]. Because stolons are absent in Erythronium mesochoreum, most plants in a population produce flowers; nonflowering plants may sometimes appear after flowering plants have flowered[270]. Flowers are produced in 3 - 4 years from seed[164]. This species does not produce offsets[200].

# 5.2.233 Quercus muehlenbergii

Yellow Chestnut Oak, Chinkapin oak 4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hna7tmwatli hionli

drutta Quercus muehlenbergii is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked. It is up to 18mm long[227]. The seed contains very little bitter tannin, it is quite sweet and rather pleasant eating[183, 227]. Tastes nice when baked in an oven[183]. Any bitter seeds can be leached by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency Roasted seed is a coffee substitute.

tcanta Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - heavy, very hard, strong, close grained, durable. It weighs 53lb per cubic foot[227]. Not abundant enough to be used commercially, it is used for fencing, cooperage etc and makes an excellent fuel[82, 149, 229]

dwatta Antiemetic Astringent DysenteryAn infusion of the bark has been used in the treatment of vomiting[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Vermont and Ontario to Minnesota, Nebraska, Alahama and Texas. ksacta Dry calcareous slopes and ridges, or on rich bottoms[43]. Welldrained uplands[227], favouring limestone soils and avoiding acid soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Pest tolerant, Aggressive sur-

face roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Growth is fairly rapid for an oak[227], especially when the tree is young, though it slows down with age[229]. Seed production is cyclic, a year with high yields is followed by 2 - 3 years of light crops[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Q. muhlenbergii brayi (Small.)Sarg. has somewhat larger seeds than the type, sometimes 3cm long[227]. Closely related to Q. prinus[11]. Trees are often confused with Q. prinus, Q. prinoides and Q. michauxii[200]. Trees respond well to coppicing[149]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus [200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

#### 5.2.234 Eryngium maritimum

Sea Holly, Seaside eryngo

4 tlin 8 cyuc 3 kcak 2 tcan 3 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprikl-

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpr wissliphsom hpa7tmwatli fyifxre7t hjonli

drutta Eryngium maritimum is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves Root ShootsEdible Uses: Young shoots - cooked[46, 61, 66]. They are normally blanched by excluding light from the growing plant, and are then used as an asparagus substitute[2, 115, 183]. They are said to be palatable and nourishing[4]. Root - cooked[2]. Used as a vegetable or candied and used as a sweetmeat[5, 66, 115]. Palatable and nutritious[4], it is slightly sweet and smells of carrosts[13]. The boiled or roasted roots are said to resemble parsnips or chestnuts in flavour[2, 183].

tcanta Soil stabilizationThe extensive root system helps to bind sand on the sea shore[13].

mosquitoes[257].

dwatta Antidandruff Antirheumatic Antispasmodic Carminative Epilepsy Febrifuge Odontalgic Stimulant TB TonicCow parsnip was widely employed medicinally by a large number of native North American Indian tribes who used it to treat a wide variety of complaints, but especially as a poultice on bruises, sores etc[257]. It is little used in modern herbalism, though perhaps it merits further investigation. All parts of the plant are antirheumatic, antispasmodic. carminative, febrifuge, odontalgic and stimulant[21, 94, 155, 172, 257]. The leaves are tonic[257]. They have been used in the treatment of colds[257]. A soothing drink made from the leaves is used to treat sore throats[257]. A poultice of the heated leaves has been applied to minor cuts, sore muscles etc[257]. An infusion of the fresh young stems has been used in the treatment of diarrhoea[257]. It has also been used as a wash to remove warts[257]. The plant has been used in the treatment of epilepsy[213]. A tea made from the roots is used in the treatment of indigestion, colds, stomach cramps, rheumatism, sore throats, TB etc[222, 257]. Externally, the root is used as a poultice on sores, bruises, swellings, boils. rheumatic joints, VD scabs etc, whilst a bit of root has been held on an aching tooth to reduce the pain[222, 257]. The root can be crushed, mixed with water and used as an antidandruff hair wash[257]. The root contains psoralen, which is being investigated for its use in the treatment of psoriasis, leukaemia and AIDS[222]. The seed has been used to treat severe headaches[257].

nrakta N. America to W. Asia, ksacta Rich damp soils of prairies and mountains, especially along streams and in open woods in Western N. America[212].

propta Seed - sow mid to late spring or early autumn in situ. Division in autumn.

nwatta Succeeds in any ordinary garden soil, doing best in moist soils or deep woodland[1, 55, 60].

#### 5.2.231 Viburnum edule

Mooseberry, Squashberry

4 tlin 8 cvuc 3 kcak 3 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum edule is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no records of toxicity have been seen for this species, it is closely related to V. opulus, the raw fruit of which can cause nausea in some people if it is eaten in large quantities, although the cooked fruit is perfectly alright[65,

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit raw or cooked[11, 62, 101, 257]. The fully ripe fruits are mildly acid with a pleasant taste[183]. The ovoid fruit is about 8mm long and contains a single large seed[200]. The fruit can also be dried for winter use[183]. It is highly valued for jam[43]. It is best before a frost and with the skin removed[85, 172]. Another report says that the native Americans would often not harvest the fruit until it had been frosted[257]. Some caution is advised, see the notes above on toxicity. Flowers - used in fritters[172].

tcanta BasketryThe stems have been used to reinforce birch bark basket rims[257].

dwatta Antispasmodic Astringent Dysentery Odontalgic SalveThe bark is antispasmodic and astringent[172, 257]. An infusion of the crushed inner bark has been used in the treatment of dysentery and has also been used as a purgative[257]. The bark has been chewed and the juice swallowed in the treatment of whooping cough and 'cold on the lungs'[257]. A decoction of the stems has been used in the treatment of coughs[257]. An infusion of the leaves and stems has been used as a gargle in the treatment of sore throats[257]. The twig tips have been chewed and the juice swallowed in the treatment of sore throats[257]. A poultice of the chewed, unopened flower buds has been applied to lip

sores[257]. A decoction of the roots has been used to treat sickness associated with teething[257].

nrakta E. Asia. Eastern N. America. ksacta Woods, thickets and cool mountain slopes[43].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 2001. Grows well in heavy clay soils. Prefers a slightly acidic soil[172]. Best if given shade from the early morning sun in spring[200]. Plants are possibly self-incompatible[11] and may need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Closely allied to V. opulus, but this species has no sterile flowers in the inflorescence and is a superior fruiting form[11].

# 5.2.232 Erythronium albidum mesochoreum

Prairie Trout Lily

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Erythronium albidum mesochoreum is a BULB growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to April, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist

pcista Although no records of toxicity have been seen for this species, the following notes have been seen for another member of this genus and so some caution is advised. Skin contact with the bulbs has been known to cause dermatitis in sensitive people[65].

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[105, 161]. Rather small, it is about 20mm long[235]. The bulbs are eaten avidly by children[257]. Young leaves - raw or cooked. Crisp, tasty, tender and mild when eaten raw[183]. Eating the leaves will greatly reduce the vigour of the bulb, so can only be recommended in times of emer-

nrakta N. America - Iowa and Nebraska to Missouri, Oklahoma and Texas. ksacta Woods, thickets and meadows[43, 90]. Prairies and dry woods in Texas[274].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame. Water lightly in summer, it should germinate in autumn or winter[164, 200]. Stored seed requires a period of cold stratification[164]. Sow as early in spring as possible in a cold frame. Sow the seed thinly so that it will not be necessary to prick them out for their first year is a good wildlife food source, especially for birds[200]. Hy- durable. Used for furniture, construction, fence posts etc[46, bridizes freely with other members of this genus [200]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.184 Pyrus pashia

Indian Wild Pear

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 9 m hkuc

hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus pashia is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 11, 51, 105, 158, 272]. Up to 2.5cm in diameter[194]. The fruit is usually bletted[183], but even then it is not sweet[146]. Tasty when fully ripe, even when dried[194]. Our experience is that the fully ripe fruit has a reasonable flavour and, when bletted, is sweet and very pleasant[K]. A mature tree yields about 45kg of fruit per year[194]. The fruit contains about 6.8% sugars, 3.7% protein, 1% ash, 0.4% pectin. Vitamin C is very low, about 1.2mg per 100g[194].

tcanta Rootstock WoodThis plant can be used as a rootstock for the cultivated pear[194]. Wood - compact fine grained, hard, durable, liable to split and warp during seasoning. Used for small implements, walking sticks and fuel[51, 158, 266].

dwatta AstringentThe juice of the ripe fruit is used in the treatment of diarrhoea[272].

nrakta E. Asia - Afghanistan to W. China. ksacta Shrubberies in the Himalayas to 2700 metres[51].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200].

#### 5.2.185 Castanea crenata

Japanese Chestnut

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 9 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasilutnyik hpa7tli frusflatprik hpa7tmwatli hionli

drutta Castanea crenata is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[1, 46, 61]. A good potato substitute[63, 105, 142, 171]. A source of starch[177]. Very poor flavour[142]. Coarse and of little value. Very variable in size and quality, any astringency can be removed by boiling the seed in salty water[183].

tcanta Tannin WoodThe bark, leaves, wood and seed husks all contain tannin. Wood - hard, strong, light, very

nrakta E. Asia - Japan. ksacta Foothills[58].

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K].

nwatta Industrial Crop: Tannin Management: Standard Regional Crop Staple Crop: Balanced carbPrefers a good well-drained slightly acid loam but succeeds in dry soils[1, 11, 200]. Once established, it is very drought tolerant[1, 11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. The majority of species in this genus only really thrive in areas with hot summers, though this species is better adapted to British conditions than most[200]. Cultivated for its edible seed in Japan, there are many named varieties[58, 63, 183]. It is often also cultivated for its seed in America because it is fairly resistant to chestnut blight[171, 200]. Individual trees are very variable with regard to size of the seed, resistance to blight and astringency of the seed[183]. Some cultivars have the largest seeds of any member of this genus. Trees fruit freely when only 3 - 3.5 metres tall[11]. This species is occasionally planted as a timber tree in S. Europe[50]. An excellent soil-enriching understorey in pine forests[200]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.186 Juniperus communis

Juniper, Common juniper

4 tlin 10 cyuc 3 kcak 4 tcan 3 dwat 9 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Iuniperus communis is an evergreen Shrub growing to 9 m (29ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure

pcista Although the fruit of this plant is guite often used medicinally and as a flavouring in various foods and drinks. large doses of the fruit can cause renal damage. Juniper should not be used internally in any quantities by pregnant women[65, 165]. Diarrhoea with repeated use. Avoid in kidney disease. Do not use internally for more than 6 weeks

kcakta Edible Parts: Fruit Leaves SeedEdible Uses: Coffee Condiment TeaFruit - raw or cooked[2, 5, 9, 15]. It is usually harvested in the autumn when fully ripe and then dried for later use[12]. A soft, mealy, sweet, resinous flesh[82]. The fruit is often used as a flavouring in sauerkraut, stuffings, vegetable pates etc. and is an essential ingredient of gin[183]. The aromatic fruit is used as a pepper substitute according to one report[183]. An essential oil is sometimes distilled from the fruit to be used as a flavouring[183]. Average yields are around 1%[7]. The cones are about 4 - 8mm in diameter and take 2 - 3 years to mature[82, 200]. Some caution is advised when using the fruit, see the notes above tea is made by boiling the leaves and stems[161]. A tea made from the berries has a spicy gin-like flavour[183].

tcanta Fibre Fuel Hair Incense Repellent Resin Strewing TinderA decoction of the branches is used as an anti-dandruff shampoo[172]. The essential oil distilled from the fruits is used in perfumes with spicy fragrances[238]. In hot countries the tree yields the resin 'Sandarac' from incisions in the trunk[4, 74]. This is used in the production of a white varnish[74]. The stems were at one time used as a strewing herb to sweeten the smell of rooms[14, 244]. The whole plant can be burnt as an incense and fumigant[66, 102, 146]. It was used during epidemics in the belief that it would purify the air and cleanse it of infection[244]. Fresh or dried juniper branches also make a good insect repellent[102, 172]. Many forms of this species are good ground cover plants for sunny situations[208]. Forms to try include 'Depressa Aurea', 'Dumosa', 'Effusa', and 'Repanda'[197]. 'Prostrata' can also be used[188]. The bark is used as cordage[61] and as a tinder[172]. Wood - strong, hard, fragrant, very durable in contact with the soil and very close-grained, but usually too small to be of much use[82, 229, 244, 245]. It makes an

dwatta Antiseptic Aromatherapy Aromatic Carminative Diaphoretic Diuretic Rubefacient Stomachic Tonic Urinary Juniper fruits are commonly used in herbal medicine, as a household remedy, and also in some commercial preparations. They are especially useful in the treatment of digestive disorders plus kidney and bladder problems[4]. The fully ripe fruits are strongly antiseptic, aromatic, carminative, diaphoretic, strongly diuretic, rubefacient, stomachic and tonic[4, 7, 9, 21, 46, 165, 240, 254]. They are used in the treatment of cystitis, digestive problems, chronic arthritis, gout and rheumatic conditions[254]. They can be eaten raw or used in a tea[222], but some caution is advised since large doses can irritate the urinary passage[4]. Externally, it is applied as a diluted essential oil, having a slightly warming effect upon the skin and is thought to promote the removal of waste products from underlying tissues[254]. It is, therefore, helpful when applied to arthritic joints etc[254]. The fruits should not be used internally by pregnant women since this can cause an abortion[9]. The fruits also increase menstrual bleeding so should not be used by women with heavy periods[254]. When made into an ointment, they are applied to exposed wounds and prevent irritation by flies[4]. The essential oil is used in aromatherapy. Its keyword is 'Toxin elimination'[210].

nrakta Northern temperate zone, incl Britain, south to the mountains of N. Africa, Himalayas and California ksacta Chalk downs in S. England but only where there is least sunshine and most rain, heaths, moors, pine and birch woods in the north of Scotland on acid peat, often dominant on chalk, limestone and slate

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Specimen. An easily grown plant, it succeeds in hot dry soils and in poor soils. Succeeds in most soils so long as they are well drained[186]. preferring a neutral or slightly alkaline soil. Does well in chalky soils[1]. Grows well in heavy clay soils. Tolerates a pH range from 4 to 8[186]. Succeeds in light woodland but dislikes heavy shade[186]. Established plants are very tolerant of drought[186]. Although the fully dormant plant is cold-tolerant throughout Britain, the young growth in spring can be damaged by late frosts. All parts of the plant are very aromatic[245]. Juniper is a very polymorphic species that has a long history of culinary and medicinal use[244]. It is

on toxicity. The roasted seed is a coffee substitute[177]. A frequently grown in the ornamental and herb garden, there is a huge range of cultivars of widely diverse habits[11, 81]. At least some forms tolerate maritime exposure[186], there is a thriving colony in an exposed position at Land's End in Cornwall[81]. The fruits take 2 - 3 years to ripen on the plant[11]. Plants are usually very slow growing, often only a few centimetres a year[186]. Resists honey fungus[88]. Plants are sometimes attacked by a rust, this fungus has an aecidial stage on hawthorn (Crataegus spp.)[1]. Dioecious. Male and female plants must be grown if seed is required. Special Features: North American native, Fragrant foliage, Inconspicuous flowers or blooms.

## 5.2.187 Corvlus cornuta californica

California Hazel

4 tlin 8 cyuc 3 kcak 4 tcan 0 dwat 8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyif hjonli

drutta Corylus cornuta californica is a deciduous Shrub growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed raw or cooked[177]. Eaten fresh or preserved for winter use[183]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

tcanta Biomass Fencing Fibre Oil PaperA fibre is obtained from the inner bark and is used to make paper[189]. The branches are removed in the autumn, the leaves removed and the branches steamed then the fibre is removed[189]. The fibres are cooked for two hours with lve and then put through a blender[189]. It makes a brown paper[189]. The fibre is also used for cordage[189].

nrakta South-western N. America. ksacta Damp slopes and banks below 2100 metres in California[71].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent

nwatta An easily grown plant, it succeeds in most soils. but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

#### 5.2.188 Malus sieversii

4 tlin 10 cvuc 3 kcak 0 tcan 0 dwat 8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus sieversii is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is

frosts. A very ornamental plant[1], it often self sows when in a suitable position[200]. Cultivated as a dye plant[50] and on a small scale for its edible young shoots, there is at least one named form. 'White Stem' has white stems and the berries yield a golden-peach dye instead of purple. It is not yet known (1992) if it will breed true from seed[183]. This plant is an alternative host to a number of viral diseases that affect members of the Amarvllidaceae, Liliaceae (broad view, including plants recently [1992] moved into separate families) and Solanaceae[200]. Plants seem to be immune to the predations of rabbits[233]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

# **5.2.229** Taxus x media

Anglojapanese Yew

4 tlin 7 cyuc 3 kcak 4 tcan 4 dwat m hkuc

pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Taxus x media is an evergreen Shrub growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous[1, 4, 7, 10, 19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[K]. Very sweet and gelatinous, most people find it delicious though some find it sickly [K]. The fruit is a fleshy berry about 10mm in diameter and containing a single seed[200]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm, if the seed has been bitten into, however, it could cause some problems.

tcanta WoodWood - strong, hard, heavy. Used for paddles, fence posts etc.

dwatta Modern research has shown that yew trees contain the substance 'taxol' in their shoots and bark. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[222, 238]. This remedy is very toxic and, even when used externally, should only be used under the supervision of a qualified practitioner[238]. See also the notes above on toxicity.

nrakta A hybrid species of garden origin, T. baccata x T. cuspidata. ksacta Not known in the wild.

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slowgrowing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. This is a hybrid species, it will not breed true from seed. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded frame[113].

nwatta Landscape Uses:Border, Hedge, Massing, Screen, Superior hedge. Thrives in almost any soil, acid or alkaline, as long as it is well-drained[200]. Succeeds in dry soils. Plants are very shade tolerant[82]. Dormant plants are very cold-hardy in Britain, though the new growth in spring can be damaged by light frosts[K]. Leaves have a reddish tinge when the plants are grown in a sunny position[200]. Plants produce very little fibrous root and should be planted in their final positions when still small[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. The cultivar 'Sargentii' was 3 metres tall and 1 metre wide at the Hillier Arboretum in September 1993. It was growing well and carrying a good crop of tasty fruit though the harvest time seemed to be somewhat later than that of T. baccata[K]. Special Features: Not North American native, Inconspicuous flowers or blooms.

#### 5.2.230 Heracleum sphondylium montanum

Cow Parsnip

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat m hkuc

pcimhmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Heracleum sphondylium montanum is a PEREN-NIAL growing to 2.4 m (7ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Many members of this genus, including this species[65], contain furanocoumarins. These have carcinogenic, mutagenic and phototoxic properties. The fresh foliage can cause dermatitis[21]. If the juice and hairs of the outer skin are left on the face and mouth, they can cause blisters[212]. This effect is especially prevalent for people with fair complexions[256].

kcakta Edible Parts: Flowers Leaves Root StemEdible Uses: Condiment SaltRoot - cooked[2, 46, 85, 94]. Tastes like a swede[155, 183]. Used like potatoes, though it is considered to be poisonous by some writers[213]. The peeled stem can be eaten raw but is best cooked[2, 61, 183]. The unpeeled stem can be used when young, or just the inner tissue of older stems can be used, before the plants flower[85. 94]. For people not used to the flavour, they are best cooked in two changes of water when they make a tasty celery-like vegetable[213]. Another report says that, despite the strong odour of the leaves and outer skin, the peeled young stems are mild and sweet, resembling celery in flavour[256]. The stems cannot be eaten raw in large quantities because they give a burning sensation in the mouth[257]. The stems are highly nutritious, containing up to 18% protein[213]. Leaves and young shoots - raw or cooked[55, 85, 94, 118]. Cooked as greens or added to salads[183]. Young flowers[46, 61, 105]. No further details. The dried seeds are used as a flavouring for soups, stews and potato salads[85, 183]. The dried base of the plant and ashes from the burnt leaves are used as a salt substitute[183].

tcanta Dye Musical Packing Repellent StrawWhistles, flutes, straws etc can be made from the hollow stems[99]. 257]. The leaves are used as a covering for baskets of fruit etc[99]. A yellow dye is obtained from the roots[257]. An infusion of the blossoms, rubbed on the body, repels flies and dwatta Anodyne Carminative Depurative Diaphoretic Diuretic Laxative Purgative Resolvent Vitamin C Vulnerary. The leaves, stems and the roots are anodyne, carminative and vulnerary[13, 147]. A decoction is used in the treatment traumatic injuries, fractures, rheumatoid arthralgia, gas pains, acute and chronic nephritis[147]. The fruit is depurative and laxative[7, 9]. The leaves are diuretic, resolvent and sudorific[7]. They are used externally to soothe abscesses and boils[7]. The root, and the oil from the seed, are purgative[7, 9].

nrakta Europe to W. Asia. Occasionally naturalized in N. Britain[17]. ksacta Woods, mainly in mountains[50].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78]. Division of suckers in the dormant season.

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position. Prefers cool moist conditions. Tolerates atmospheric pollution and coastal situations. Hardy to about -25°c[184]. Plants self-sow in N. Britain but they rarely fruit well in S. Britain[3, 182]. There are some named varieties developed for their ornamental value[182]. The flowers have a sweet smell, free from the fishy undertones found in some other members of the genus[245]. This subspecies has larger fruits and seeds than the type[200]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.228 Phytolacca americana

Pokeweed, American pokeweed, Garnet, Pigeon Berry, Poke 4 tlin 8 cyuc 3 koak 2 tcan 3 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phytolacca americana is a PERENNIAL growing to 2 m (6ft) by 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves are poisonous[21, 62, 76, 95]. They are said to be safe to eat when young, the toxins developing as the plants grow older. Another report says that the seeds and root are poisonous. The plant sap can cause dermatitis in sensitive people[222]. The plant contains substances that cause cell division and can damage chromosomes. These substances can be absorbed through any abrasions in the skin, potentially causing serious blood aberratins, and so it is strongly recommended that the people wear gloves when handling the plant[222, 274]. Avoid during pregnancy. Even children consume even 1 berry emergency poison treatment should be instituted. Up to 10 berries are considered harmless for adults [301].

kcakta Edible Parts: Fruit LeavesEdible Uses: ColouringLeaves - they must be cooked and even then it is best to change the water once[1, 2, 4, 33, 95]. They are used like spinach[183]. Only the young leaves should be used since they become toxic with age[102]. Caution is advised, see the notes above on toxicity. Young shoots - cooked[20, 33, 62, 102]. An asparagus substitute[183], they are delicious[159]. The shoots are sometimes blanched before using, or forced in cellars to provide an early crop[183]. The tender clear inner portion of the stem can be rolled in commeal and fried[183]. Although cultivated on a small scale in N.

America for its shoots, caution is advised, see notes above. A nutritional analysis is available [218]. Fruit - cooked and used in pies [159, 213]. Poisonous raw, causing vomiting and diarrhoea. Even the cooked fruits should be viewed with caution. The fruit is a berry about 12mm in diameter [200]. A red dye is obtained from the fruit and used as a food colouring [183].

tcanta Ink Insecticide SoapA red ink and a dye are obtained from the fruit[46, 50, 57, 100, 102, 159, 169]. A beautiful colour, though it is not very permanent[4]. It makes a good body paint, washing off easily when no longer required, though the slightly toxic nature of the berries should be remembered[K]. The rootstock is rich in saponins and can be used as a soap substitute[169]. Cut the root into small pieces and simmer it in boiling water to obtain the soap. The plant is currently (1980) being evaluated for its snail-killing properties[213].

dwatta Alterative Anodyne Antiinflammatory Antirheumatic Antiviral Cancer Cathartic Dysentery Expectorant Homeopathy Hypnotic Narcotic PurgativePokeweed has a long history of medicinal use, being employed traditionally in the treatment of diseases related to a compromised immune system. The plant has an interesting chemistry and it is currently (1995) being investigated as a potential anti-AIDS drug[238]. It contains potent anti-inflammatory agents, antiviral proteins and substances that affect cell division[238]. These compounds are toxic to many diseasecausing organisms, including the water snails that cause schistosomiasis[238]. All parts of the plant are toxic, an excess causing diarrhoea and vomiting[238]. This remedy should be used with caution and preferably under the supervision of a qualified practitioner. It should not be prescribed for pregnant women[238]. The root is alterative, anodyne. anti-inflammatory, cathartic, expectorant, hypnotic, narcotic and purgative[4, 21, 46, 61, 165, 192, 238]. The dried root is used as an anodyne and anti-inflammatory[213]. The root is taken internally in the treatment of auto-immune diseases (especially rheumatoid arthritis), tonsillitis, mumps, glandular fever and other complaints involving swollen glands, chronic catarrh, bronchitis etc[238]. The fresh root is used as a poultice on bruises, rheumatic pains etc, whilst a wash made from the roots is applied to swellings and sprains[222]. The root is best harvested in the autumn and can be dried for later use[238]. The fruit has a similar but milder action to the roots[238]. The juice is used in the treatment of cancer, haemorrhoids and tremors[213]. A poultice made from the fruit is applied to sore breasts[222]. A tea made from the fruit is used in the treatment of rheumatism, dysentery etc[222]. The plant has an unusually high potassium content and the ashes, which contain over 45% caustic potash, have been used as a salve for ulcers and cancerous growths[232]. The leaves are cathartic, emetic and expectorant[222]. A homeopathic remedy is made from the fresh root[232]. Its main action is on the throat, breast, muscular tissues and the joints[232].

nrakta Northern and Central N. America. Occasionally naturalized in Britain[17]. ksacta Damp rich soils in clearings, woodland margins and roadsides[43]. Disturbed areas, pastures, clearings, thickets, woodland borders and roadsides from sea level to 1400 metres[270].

propta Seed - sow autumn or spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it might be worthwhile trying an outdoor sowing in a seed bed in early spring. Grow the plants on in the seedbed for their first year and plant them out the following spring. Division in March or October. Use a sharp spade or knife to divide the rootstock, making sure that each section has at least one growth bud. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta An easily grown plant, succeeding in most soils[1], though preferring a moisture retentive soil in full sun or partial shade[111, 200]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Succeeds in an open woodland garden[200], growing well under trees[20]. Whilst the dormant plant is hardy in much of Britain, the young growth in spring can be damaged by late

pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Large and well-flavoured[74]. The fruit is usually between 3 - 5cm in diameter, though it can be up to 7cm[266].

nrakta C. Asia - western Tibet to Kazakhstan and Russia.. ksacta Mountain forests and slopes, streamsides in mountain valleys[74]. Mountain summits, slopes and valleys, often the dominant tree of forests, at elevations of 1200 - 1300 metres in Tibet[266]

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. This species is vulnerable to extinction because of its limited range and exploitation[266]. It is believed to be the principal ancestor of commercially grown apples[266]. A parent of the cultivated apple[11], the large well-flavoured fruit is possibly of economic interest[74]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 5.2.189 Amelanchier asiatica

Korean Juneberry

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier asiatica is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit, raw or cooked[3, 105, 177]. Of good quality[183], the fruit is sweet and juicy, contains a few small seeds at the centre and has a hint of apple in the flavour[K]. The fruit is rich in iron and copper[226]. The fruit is up to 15mm in diameter[266].

nrakta E. Asia - China, Japan, Korea. ksacta Hilly and mountainous regions[58]. On slopes by streams, mixed forests at elevations of 1000 - 2000 metres[266].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil, including chalk, so long as it is not too dry or water-logged[11, 200]. Plants succeed in quite shady positions but do not flower or fruit well there[K]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A very ornamental plant[1], it is closely allied to A. canadensis and A. laevis, and is also very similar to A. arborea[11]. The sub-species A. asiatica sinica C. Schneid. is found in China. It has smaller fruits than the type species[200]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

# 5.2.190 Corylus heterophylla

Siberian Filbert

4 tlin 8 cyuc 3 kcak 4 tcan 1 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fvif hionli

drutta Corylus heterophylla is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Óil SeedEdible Uses: OilSeed - raw or cooked[46, 61, 105, 177]. The seed, which has a hard shell, is of relatively good flavour[183]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

dwatta Appetizer DigestiveThe seed is digestive and appetizer[218].

nrakta E. Asia - China, C. Japan. ksacta Wood margins and mountain slopes, forming dense thickets from E. Mongolia to N. China[74].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta Management: Coppice Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: Protein-oilAn easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. This species is cultivated in Asia for its edible seed[61] but it is of little value as a nut bearer in Britain[1]. Closely related to C. avellana[1]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

# 5.2.191 Crataegus pedicellata gloriosa

Scarlet Haw

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 7 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Crataegus pedicellata gloriosa is a deciduous Shrub growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. Up to 2cm long and pear shaped[11]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - New York. ksacta Not known

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well

on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Plants are hardy to at least -18°c[202]. This sub-species has larger fruits than the type[11]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.192 Malus coronaria

Garland Crab, Sweet crab apple 4 tlin 8 cyuc 3 koak 0 tcan 1 dwat 7 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus coronaria is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: PectinFruit - raw or cooked[159, 161]. Fairly large, it is up to 5cm in diameter[200]. Harsh and acid[11], it is mainly used for jellies[183] but can be eaten raw when it is fully ripe[101]. The fruits can be buried in the ground overwinter and will have lost much of their acidity by the spring[183]. The fruit can also be dried and stored for later use[257]. Rich in pectin, so it can be added to pectin-low fruits when making jams or jellies[226]. Pectin is also said to protect the body against radiation[201].

tcanta Pectin Rootstock WoodThe plant can be used as a rootstock for cultivated apples, conferring a greater hardiness[226]. Wood - heavy, close-grained, not strong[46, 82, 229]. It weighs 43lb per cubic foot[235]. Used for making levers, the handles of tools, small domestic items and fuel[46, 82, 2291].

dwatta Abortifacient Astringent Birthing aid Emmenagoue Lithontripic OphthalmicAn infusion of the bark has been used to ease a difficult birth and also in the treatment of gallstones, piles and as a wash for sore mouths[257]. A cold infusion of the bark has been used as a wash for black eyes, sore eyes and snow blindness[257]. A decoction of the root has been used to treat suppressed menses and so can cause an abortion, especially early in the pregnancy[257].

nrakta Eastern N. America - New York to South Carolina, west to Kansas. ksacta Bottoms, wooded slopes, thickets and clearings[43] in most soil types and moisture levels[159].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from

nrakta Eastern N. America - Maine to Georgia, west to Michigan and Oklahoma. ksacta Thickets and open rocky woods[43, 235].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year Kl. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

# 5.2.226 Prunus alleghaniensis

Allegheny Plum, Davis' plum 4 tlin 8 cyuc 3 kcak 2 tcan 1 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus alleghaniensis is a deciduous Tree growing to 3.5 m (11ft 6in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[11, 82, 105, 183]. The thick juicy flesh is pleas-antly acid[183, 229]. The fruit can also be made into jams, preserves etc[82, 183]. The fruit has a tough skin, it can be up to 2cm in diameter and contains one large seed[82, 229]. Seed - raw or cooked. Do not eat the seed if it is too bitter-see the notes above on toxicity.

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - hard, heavy, close grained[82]. Trees are too small for the wood to be commercially valuable[229].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Eastern N. America - Connecticut to Pennsylvania, south to Tennessee. ksacta Thickets and woodland edges[43, in low moist soils and on dry ridges, especially limestone bluffs[82]. It forms large thickets in open sites, or grows as individual trees in woodland shade[229].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. A fast-growing but short-lived tree in the wild[229]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. This species is closely related to P. americana[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

# 5.2.227 Sambucus racemosa kamtsch ica

Red Elder

4 tlin 8 cyuc 3 kcak 2 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sambucus racemosa kamtschatica is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of this species has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76]. The seed is said to be poisonous[21].

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit - raw or cooked[13]. The tastiest fruit in this genus[7]. Rich in vitamin C, the seed can be removed and the fruit used in jellies, preserves etc[183]. The fruit is about 5mm in diameter and is borne in large clusters, making it easy to harvest[200]. Some caution is advised, see notes above on toxicity. Flowers - raw or cooked.

tcanta Repellent Straw WoodThe leaves are used to repel insects[6]. Wood - commonly used in the manufacture of domestic items. It can be hollowed out to make flutes, pipes, straws etc[7, 99].

kcakta Edible Parts: FruitEdible Uses: Fruit - cooked[3, 4, 177]. Very harsh and acid raw but fragrant when cooked[1, 11]. Used for jams, jellies etc and as a flavouring with cooked apples[183, K]. The fruit can be apple or pear-shaped and up to 6.5cm long x 6.5cm wide[200].

tcanta Hedge HedgePlants can be grown as a medium sized hedge[11, 29, 200]. Some cultivars, such as 'Jet Trail' are suitable for ground cover[182].

dwatta Analgesic Antiemetic Antiinflammatory Antispasmodic Astringent Cholera DigestiveThe fruit is analgesic, anti-inflammatory, antispasmodic, astringent and digestive[147, 218, 238]. A decoction is used internally in the treatment of nausea, joint pains, cholera and associated cramps[147, 218, 238].

nrakta E. Asia - China. An occasional garden escape in Britain[17]. ksacta Long cultivated, its natural habitat is now obscure.

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame(200). Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta Landscape Uses:Border, Espalier, Hedge, Massing, Woodland garden. Easily cultivated in any reasonably good soil[1, 11]. Prefers a deep moist well-drained loam[11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[200]. Tolerates atmospheric pollution[200]. This species is hardy to about -25°c[200]. Plants fruit freely in Britain, but the fruit does not always ripen. They do best when grown against a southfacing wall[11]. A very ornamental plant[1], there are many named varieties developed for their ornamental value[182, 183]. Closely allied to C. japonica[11]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 5.2.224 Helianthus giganteus

Giant Sunflower

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 3.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Helianthus giganteus is a PERENNIAL growing to 3.6 m (11ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic

(mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Root SeedEdible Uses: Tubers cooked[95]. A similar taste to Jerusalem artichokes but less productive. The var. 'subtuberosus' is used[1, 177]. Seed - raw or cooked. It can be dried and ground into a powder, then mixed with cornmeal and used for making bread[2, 14, 46, 61, 183]. The seed is very small and fiddly to use[K].

nrakta N. America - Maine and Ontario to Saskatchewan, Florida, Louisiana and Colorado. ksacta Damp or rich thickets, swampy woods and clearings[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. Likes moist soils, doing well by a stream[200]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants have a running root system and can be invasive[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.225 Crataegus intricata

Copenhagen hawthorn

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus intricata is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw, cooked or dried for later use[2, 105, 161]. Hard dry flesh[43]. Fruit we have eaten from this tree is mealy and fairly soft, with a pleasant sweet flavour[K]. It ripens in early September in southern Britain[K]. The fruit is up to 14mm in diameter and is borne in small clusters[229]. The skin is slightly hairy[235]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A slow-growing and shortlived tree in the wild[229]. The fruit is a good wildlife food source, especially for birds[200]. The flowers are sweetly scented[245]. This species is closely related to M. ionensis[1]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.193 Crataegus pruinosa

Frosted Hawthorn, Waxyfruit hawthorn 4 tlin 8 cyuc 3 koak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicil hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus pruinosa is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 177]. The flesh is thick[82]. A sweet yellow flesh[200]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use[257]. The fruit is about 1cm in diameter[200]. The fruit is up to 16mm in diameter with a thin flesh[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Newfoundland to North Carolina, west to Wisconsin and Oklahoma. ksacta Thickets and rocky ground[43] in open woods[235]. Slopes of low hills, often in limestone soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

# 5.2.194 Crataegus chrysocarpa

Fireberry Hawthorn, Red haw, Piper's hawthorn, 4 tlin 8 cyuc 3 koak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus chrysocarpa is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[161, 177]. Used mainly as a famine food[257]. A very pleasant flavour when ripe, with the added bonus of ripening in late summer before most other members of the genus[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. It is about 1cm in diameter and borne in small clusters[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. A tea can be made from the twigs[257]. (This probably means the young shoots with leaves[K].)

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic Hypotensive LaxativeA decoction of the dried berries has been used as a mild laxative[257]. A compound decoction of the root has been used in the treatment of diarrhoea[257]. Although no other specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. It is normally used either as a tea or a tincture[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Newfoundland to Pennsylvania, west to the Rocky Mountains. ksacta Thickets and rocky ground along streams[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to

pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. A ten year old tree was seen at Kew Gardens in 2002. It was about 2.5 metres tall and was hearing a very good crop of fruit[K] The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 5.2.195 Aralia elata

Japanese Angelica Tree, Angelica Tree 4 tlin 9 cyuc 3 kcak 2 tcan 2 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Aralia elata is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves ShootsEdible Uses: Young shoots - cooked[177, 200]. They can also be blanched and used in salads. The young shoots of Aralia elata are a popular wild food in Japan where the tree is known as Taranoki and the shoots as Taranome. In Korea the shoots are called dureup.

tcanta Landscape Uses: Specimen. Special Features: Not North American native, Blooms are very showy. attracts wildlife. Nectary - Shelter [1-2].

dwatta Anodyne Cancer CarminativeThe roots and stems are anodyne and carminative[147]. All parts of the plant are used for the treatment of rheumatoid arthralgia, coughs, diabetes, jaundice, stomach ulcers and stomach cancers[147, 218].

nrakta E. Asia - China, Japan, Korea. ksacta Thin woodland and thickets on rich well moistened slopes[74, 109], 900 - 2000 metres in N. Hupeh[109].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at  $20^\circ$ c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a good deep loam and a position in semishade but it also succeeds in a sunny position[11, 200]. Requires a sheltered position. Plants are hardier when grown on poorer soils[11, 200]. Prefers an acid soil[184]. Dormant plants are hardy to at least -15°c[184, 200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A very ornamental species, there are a number of named varieties. It is usually a single stemmed shrub, spreading by means of suckers[182]. This species is closely allied to A. chinensis. In Japan Aralia elata is a pioneering plant that often grows where forests have been cleared. In open sunny areas with adequate soil moisture it grows rapidly. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

## 5.2.196 Crataegus flabellata

Fanleaf hawthorn

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 6 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus flabellata is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A sweet but very soft and mealy flesh, it makes an acceptable dessert fruit[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is up to 15mm long and 8mm wide, it is borne in small clusters[82, 229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to South Carolina, west to Louisiana. ksacta Thickets and open woods[204]. Dry open places, borders of woods and the margins of high banks of streams[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed

to October, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: Young shoots in spring - cooked. They can be used as an asparagus substitute[55, 62, 116, 1599, 179, 183]. They have an acid flavour and can also be used as a rhubarb substitute in pies, fruit soups, jams etc[183]. Older stems and shoot tips - cooked[62, 159]. They taste like a mild version of rhubarb[K]. Seed - raw or cooked. It is rather small and fiddly to utilize. The seed can also be ground into a powder and used as a flavouring and thickener in soups etc, or can be mixed with cereals when making bread, cakes etc. The root is sometimes eaten[183].

tcanta Biomass DyeA yellow dye is obtained from the root[46, 61]. The plant is potentially a good source of biomass. Plants can be grown to form a ground cover that will exclude all other growth[208]. It is best to use the subspecies compactum since this is less invasive[208].

dwatta Antiphlogistic Antitumor Depurative Diuretic Emollient Febrifuge Stomachic Vulnerary Women's complaintsThe root is antiphlogistic, bechic, depurative, diuretic, emmenagogue, emollient, febrifuge, stomachic and vulnerary[46, 61, 147, 178, 218]. It is also used in the treatment of women's complaints[147]. A decoction is used in the treatment of burn injuries, boils and abscesses, poisonous snakebites, acute hepatitis, appendicitis, traumatic injuries and menstrual irregularities[147]. The leaves can be crushed and applied externally as a poultice to abscesses, cuts etc, whilst the dried roots can be ground into a powder and applied externally[147]. Extracts of the plant have shown antitumour activity[218].

nrakta E. Asia - Japan. Commonly naturalized in S. England. ksacta Wet grassy places in lowland all over Japan[58], propta Seed - sow spring in a cold frame. Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Container, Specimen, Woodland garden. A very easily grown plant, it succeeds in ordinary garden soil in sun or shade[1, 111], though it prefers a moist soil in partial shade[187]. Japanese knotweed is an extremely invasive plant capable of sending up new shoots at a considerable distance from the main clump and also of growing up through tarmac[200]. The sub-species cuspidatum is the form that is most likely to cause problems. It is considered to be a pest in many areas, where it is forming large clumps in the wild and out-competing native species. If grown in the garden it should be planted within a strong barrier to contain its roots. The sub-species compacta is only about 70cm tall and is far less invasive, but should still not be grown in small gardens[200]. A report on the Natural History Programme stated that Japanese knotweed is actually becoming a very valuable habitat for spiders, frogs, grass snakes and

many other creatures. Its hollow stems allow a wide variety of insects and other small creatures to overwinter and find hiding places, thus a greater abundance of food is provided for insectivores such as frogs, who are themselves eaten by grass snakes. In areas of north Wales where Japanese knotweed has run rife, it is now the primary habitat for grass snakes[215]. Plants seem to be immune to the predations of rabbits[233]. Often cultivated as a dye and a medicinal plant[46, 61]. Very closely related to P. conspicuum[58]. Dioecious, male and female plants must be grown if seed is required[58]. Special Features:Attractive foliage, Invasive, Wetlands plant.

## 5.2.222 Eleutherococcus sieboldianus

Ukogi, Five Leafed Aralia 4 tlin 8 cyuc 3 kcak 2 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eleutherococcus sieboldianus is a deciduous Shrub growing to 3 m (9ft) by 2.5 m (8ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - cooked[46, 61, 177]. A delicious somewhat fragrant flavour[105, 183]. The dried leaves are a tea substitute[183].

tcanta Hedge HedgeThe plant is used as a hedge[200]. nrakta E. Asia - China, Japan. ksacta Escaped from cultivation in Japan, where it grows wild in calcareous soils[275].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Landscape Uses:Border, Hedge, Massing, Screen, Specimen. Prefers a light warm open loamy humusrich soil and a position sheltered from north and east winds[11, 200]. Prefers a well-drained soil and full sun[200]. Thrives in sun or shade according to another report. Tolerates urban pollution and poor soils[200]. Plants are hardy to at least -15° ci fithey are sheltered from cold winds[200]. Cultivated as a medicinal and culinary plant in Japan[58], there are some named varieties selected for their ornamental value[200]. Special Features:Attractive foliage, Not North American native.

# 5.2.223 Chaenomeles speciosa

Japanese Quince, Flowering quince 4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Chaenomeles speciosa is a deciduous Shrub growing to 3 m (9ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution

one report[177] whilst others have found it to be sweet and juicy[183, K]. The fruit can be added to pancakes or dried for later use[183]. Fruits are oval or pear shaped unlike other members of this genus that have round fruits[183]. They are 15mm long[200]. The fruit is rich in iron and copper[226].

nrakta N. America - Labrador to Minnesota and south to Pennsylvania. ksacta Peaty or boggy thickets, sphagnum bogs, bushy and mountain slopes to the sub-alpine zone[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if reguired.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil, including chalk, so long as it is not too dry or water-logged[11, 200]. Grows well in heavy clay soils. Plants are hardy to about -30°c[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that hirds adore the fruit and will often completely strip a tree before it is fully ripe[K]. This species hybridises with A. sanguinea, A. humilis, A. stolonifera, A. fernaldii and A. canadensis. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

#### 5.2.219 Vaccinium fuscatum

Black Highbush Blueberry

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 3.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlut hpa7tli frusflat hpa7tmwatli dyatxre7t hjonli

drutta Vaccinium fuscatum is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105, 200]. Large, sweet, juicy and very flavourful[183]. The fruit is about 8mm in diameter[200].

nrakta Eastern N. America - New Hampshire, Ontario and Indiana south to Florida and Arkansas. ksacta Swamps and pine barrens, wet woods and the edges of lakes[43, 184].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that

spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist or wet lime free soil[11, 184, 200], preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Plants are hardy to about -25°c[184]. This species is often cultivated for its edible fruit[3]. Plants are self-sterile, at least two different varieties must be grown if seed is required[11]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Closely related to V. corymbosum[11, 182]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.220 Vaccinium stamineum

Deerherry

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium stamineum is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Unpalatable[200]. The quality varies from shrub to shrub[183]. When cooked and served cold they are considered to be delicious with a flavour suggesting gooseberry and cranberry sauce with the slightly bitter aftertaste of grapefruit marmalade[183]. The fruit is about 10mm in diameter[200].

nrakta Eastern N. America - Maine to Indiana and Missouri, south to Georgia and Louisiana. ksacta Dry woods thickets and clearings[43].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Another report says that it prefers a position in partial shade[184]. Requires shelter from strong winds[200]. Plants are hardy to about -25°c[184]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. A polymorphic species, the plants are very variable in leaf shape. It is closely related to V. neglectum[11]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.221 Polygonum japonicum

Japanese Knotweed, Mexican Bamboo, Japanese Knotweed 4 tlin 10 cyuc 3 kcak 0 tcan 3 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta Polygonum japonicum is a PERENNIAL growing to 3 m (9ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July

but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit. they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A tree at Kew in September 1993 was fruiting heavily[K].

#### 5.2.197 Xanthoceras sorbifolium

Yellowhorn

4 tlin 7 cyuc 3 kcak 0 tcan 0 dwat 6 m hkuc

htut cyuʻlli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Xanthoceras sorbifolium is a deciduous Shrub growing to 6 m (19ft) by 2.5 m (8ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves SeedEdible Uses: Flowers - cooked[2, 105, 183]. They are usually boiled[179]. Leaves - cooked[2, 105, 183]. They are usually boiled[179]. Seed - cooked[2, 105, 177]. The seed is about the size of a pea, it is quite sweet[183], with a taste like a sweet chestnut[178]. The seed is husked and then ground into a powder and boiled[179].

nrakta E. Asia - N. China. ksacta Thickets in drier areas, usually on shaded slopes.

propta Seed. 3 months cool stratification improves germiation rates[113] so the seed is probably best sown in a cold frame in the autumn[K]. Another report says that the seed can be sown in a warm greenhouse in February or March[78], probably after stratification[K]. When large enough to handle, prick the seedlings out into individual pots. Grow the on in a lightly shaded position in a greenhouse for their first winter then plant them out into their permanent positions in late spring or early summer. Consider giving them some protection from winter cold for their first winter or two outdoors. Root cuttings, 3cm long planted horizontally in pots in a frame in December or January. Good percentage[78]. Division of suckers in the dormant season[200]. They can be planted out straight into their permanent positions.

nwatta Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: Protein-oilPrefers a good loamy soil[1], but succeeds in most well-drained fertile soils in a sunny position[184, 200]. Prefers a warm dry situation[184]. Requires protection from cold winds[202]. Dornant plants are hardy to about -20°c[184]. They grow best in areas with warm summers and dry springs without late frosts[184], the young growth can be damaged by late spring frosts[1, 11]. They require summer heat in order to fully

ripen their wood and to stimulate the production of flower buds[11, 200]. They are subject to attacks by 'coral spot' fungus, particularly if the wood is not fully ripened and is then damaged by winter cold[11]. Flowers are produced on the previous year's wood[202]. Plants are usually slow to become established[202]. Special Features:Not North American native, Fragrant flowers, Blooms are very showy. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 5.2.198 Amelanchier intermedia

une berry.

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier intermedia is a deciduous Shrub growing to 6 m (19ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[11]. We have yet to see the fruit on this species, but if it is like the closely related A. lamarckii, then it will be sweet and succulent with a flavour of apples[K]. The fruit can also be dried for later use and is up to 10mm in diameter. The fruit is rich in iron and copper[226].

nrakta Eastern N. America - Vermont to North Carolina ksacta Swamps and moist soils[235].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Prefers an acid or neutral soil. Plants are hardy to about -25°c[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main drawback to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Considerable confusion has existed between this species and A. arborea, A. canadensis and A. laevis, see [11] for the latest (1991) classification. Some botanists consider this species to be part of A. canadensis or A. lamarckii[11, 200]. A group of plants growing at Kew were about 5 years old in 1995. They were flowering well in early April, were about 2 metres tall and had lots of side branches[K]. Their native range was given as western N. America, which conflicts with other reports[K]. Older plants are being grown at Hilliers Arboretum in Hampshire, in early April 1999 they were 4 metres tall, suckering guite freely in a tight clump and flowering very freely[K]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

#### 5.2.199 Crataegus rotundifolia

4tlin 8 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus rotundifolia is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A fair size fruit, to 15mm in diameter, with a reasonable sweet mealy taste, though when not fully ripe there is a distinct bitterness[K]. It makes an acceptable dessert fruit[K]. The fruit can be used in making pies, preserves, etc. and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

nrakta Eastern N. America. ksacta Not known

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year [K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A tree bearing this name at Kew in September 1993 was fruit-

ing abundantly[K]. There is some confusion over the correct name of this species. C. rotundifolia Moench. is said to be a synonym for C. chrysocarpa phoenicea, C. rotundifolia Borckh. is a synonym of C. chrysocarpa. There is also a C. rotundifolia Lam, which is a synonym of Amelanchier rotundifolia[200].

# 5.2.200 Crataegus coccinoides

Kansas Hawthorn

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Crataegus coccinoides is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 177]. Firm and sub-acid[82]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is borne in small clusters and is up to 17mm in diameter[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

nrakta Central N. America - Illinois and Missouri to Kansas, Oklahoma and Arkansas. ksacta Dry thickets and calcareous hills [43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted

tcanta Dye Oil RootstockA potential rootstock for apricots[113]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Analgesic Antiasthmatic Antiseptic Antitussive Digestive Emollient Laxative TonicThe seed is analgesic, an tiasthmatic, antiseptic, antitussive and emollient[176]. It is used in the treatment of coughs, asthma, acute or chronic bronchitis and constipation[176]. The seed contains amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-beind[238].

nrakta E. Asia - China, Korea, Mongolia and eastern Siberia. ksacta Dry sunny slopes amongst shrubs[74]. Forests, thickets, hill grasslands, river valleys and dry sunny slopes at elevations of 400 - 2500 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Industrial Crop: Oil Management: Standard Regional Crop Staple Crop: OilThrives in a well-drained moisture-retentive loamy soil, growing well on lime-stone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. This species is reputed to be hardy to about -50°c and as such is of potential use for conferring greater cold tolerance in breeding programmes with the closely related apricot, P. armeniaca. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.217 Lindera benzoin

Spice Bush, Northern spicebush, Bush Northern Spice 4 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 3 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli nyanhjen hjonli

drutta Lindera benzoin is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaThe young leaves, twigs and fruit contain an aromatic essential oil and make a very fragrant tea[55, 62, 95, 102, 149, 183]. The twigs are best gathered when in flower as the nectar adds considerably to the flavour[183]. The dried and powdered fruit is used as a substitute for the spice 'allspice'[2, 46, 55, 62, 95, 183]. The fruit is about the size of an olive[245]. The leaves can also be used as a spice substitute[55]. The new bark is pleasant to chew[183].

tcanta Disinfectant RepellentThe leaves contain small quantities of camphor and can be used as an insect repellent and disinfectant[169]. An oil with a lavender-like fragrance is obtained from the leaves[245]. The fruit, upon distillation, yield a spice-scented oil resembling camphor[245]. An oil smelling of wintergreen is obtained from the twigs and bark[245].

dwatta Aromatic Astringent Diaphoretic Disinfectant Dysentery Febrifuge Stimulant TonicSpice bush has a wide range of uses as a household remedy, especially in the treatment of colds, dysentery and intestinal parasites[222, 238]. It warrants scientific investigation[222]. The bark is aromatic, astringent, diaphoretic, febrifuge, stimulant and tonic[61, 149, 227, 257]. It is pleasant to chew[227]. It is used in the treatment of coughs and colds[257]. The bark can be harvested at any time of the year and is used fresh or dried[238]. The fruits are carminative[222]. The oil from the truits has been used in the treatment of bruises and rheumatism[222]. A tea made from the twigs was a household remedy for colds, fevers, worms and colic[222]. A steam bath of the twigs is used to cause perspiration in order to ease aches and pains in the body[257]. The young shoots are harvested during the spring and can be used fresh or dried[238]. The bark is diaphoretic and vermifuge. It was once widely used as a treatment for typhoid fevers and other forms of fevers[213, 222].

nrakta Eastern N. America - Maine and Ontario to Kentucky, Missouri and Kansas. ksacta Wet woods and by streams[184] on sandy or peaty soils[149]. Stream banks, low woods, margins of wetlands; uplands, especially with exposed limestone, from sea level to 1200 metres[270].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse. The seed has a short viability and should not be allowed to dry out[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in early summer. Cuttings of half-ripe wood, July in a frame[200]. Cuttings of mature side-shoots, 10 - 12cm with a heel, September/October in a cold frame. They may root by spring. Fair to good percentage[78]. Layering.

nwatta Landscape Uses:Border, Pest tolerant, Massing. Woodland garden. Requires a lime-free rather moist soil[200] with a pH in the range 4.5 - 6[238]. Prefers partial shade or dappled sunlight in a fertile moisture-retentive soil enriched with leafmould[200]. Succeeds in full sun or semi-shade[184]. Plants are hardy to about -25°c[184]. The leaves, bark and berries are very aromatic[182, 213]. Plants can be pruned right back to the base if required, though any drastic pruning is best spread over several seasons[200]. Plants in this genus are notably resistant to honey fungus[200]. The fruit has a high fat content and is much eaten by migratory birds to supply their high energy demands when migrating[274]. Dioecious, male and female plants must be grown if seed is required[188, 238]. Special Features: Attracts birds, North American native, Fragrant foliage. Wetlands plant. Attracts butterflies. Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

#### 5.2.218 Amelanchier bartramiana

Oblongfruit serviceberry

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier bartramiana is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[101, 105, 161]. The fruit contains a few small seeds at the centre, it is sweet but rather dry according to

(loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: Oil Seed - raw or cooked in soups, bread, biscuits, sweets etc[63, 101, 183]. The nuts have a thick shell with a small sweet kernel[183], they make an excellent dessert[K]. Although smaller than the seeds of cultivated species, the seed is of the same general quality[270]. Nuts at the 'milk' stage (before they are fully ripe) are softer and sweeter[183]. The seed is rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed,

tcanta Hedge Hedge OilThe plant makes a good screening hedge[159].

dwatta Astringent PoulticeA tea made from the bark is astringent[222]. It was used in the treatment of hives and fevers[222, 257]. A poultice made from the bark is used to close cuts and wounds, treat tumours, old sores etc[222, 257].

nrakta Eastern N. America - Maine to Georgia, west to Saskatchewan and Oklahoma. ksacta Thickets and rich woods[43, 159]. Moist to dry open woods and thickets, hillsides, roadsides, fencerows, and waste place from sea level to 750 metres[270].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta An easily grown plant, it succeeds in most soils including chalk, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does well in a loamy soil[11, 200]. Plants are fairly wind tolerant[1, 11]. This species is cultivated in America for its edible seed, there are some named varieties[61, 183]. This species is of little value in Britain, however, rarely bearing seeds[11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

## 5.2.215 Amelanchier sanguinea

Roundleaf Serviceberry, Gaspé serviceberry 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Amelanchier sanguinea is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy

(clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[101, 105]. A sweet flavour[177]. The fruit is produced in small clusters and is up to 11mm in diameter[229]. The fruit is rich in iron and copper[226].

nrakta Eastern N. America - Maine to New Jersey, west to Minnesota and Iowa. ksacta Open woods, rocky slopes and river banks on neutral to slightly calcareous soils[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if re-

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200, but thrives in any soil that is not water-logged[11]. Grows well in heavy clay soils. Tolerates dry soils[200]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Plants produce suckers and form thickets[200]. Hybridizes with A. stolonifera, A. laevis and A. bartramiana. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[11].

#### 5.2.216 Prunus sibirica

Siberian Apricot

4 tlin 8 cyuc 3 kcak 4 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prunus sibirica is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in March, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Oil SeedEdible Uses: Condiment OilFruit - raw or cooked[2, 105]. A good size, it is about 25mm x 25mm and contains one large seed[200]. Sour and scarcely edible[11, 266]. The fruit is occasionally eaten. Seed - raw or cooked. A bitter taste[11], they are normally used as an almond flavouring[74, 105]. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible oil is obtained from the seed[183] - it is used as an almond flavouring[74]. The oil resembles olive oil[183].

trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

# 5.2.201 Crataegus altaica

Altai Mountain Thorn

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crataegus altaica is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Fruit - raw or cooked. About 8mm in diameter, the fruit is yellow with a fairly dry mealy texture and a pleasantly sweet flesh[K]. The fruit can also be used in making pies, preserves, etc, and can also be dried for later use. The fruit ripens in August, making it one of the earliest ripening hawthorns[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221].

nrakta W. Asia - Altai Mountains, ksacta Not known

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5-8 years before they start bearing fruit, though grafted trees

will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. This species is closely related to C. wattiana[11]. Hawthorns in general hybridize freely with other members of the genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 5.2.202 Crataegus laevigata

Midland Hawthorn, Smooth hawthorn, English Hawthorn 4 tlin 8 cyuc 3 kcak 5 tcan 5 dwat 6 m hkuc pcimhmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus laevigata is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit LeavesEdible Uses: Coffee TeaFruit - raw or cooked[2, 9, 12, 183]. A dry and mealy texture, they are not very appetizing[K]. The fruit can be used for jams and preserves[9]. The fruit pulp can be dried, ground into a meal and mixed with flour in making bread etc[46, 183]. The fruit is about 1 cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]. Young leaves and young shoots -raw[5, 177]. A tasty nibble, they are nice in a salad[K]. Young leaves are a tea substitute[21, 46, 177, 183]. The roasted seed is a coffee substitute[12, 21, 183].

tcanta Charcoal Fuel Hedge Hedge Rootstock WoodA good hedge plant, it is very tolerant of neglect and is able to regenerate if cut back severely, it makes a good thorny stock-proof barrier[186] and resists very strong winds. It can be used in layered hedges[11, 29]. The plant is often used as a rootstock for several species of garden fruit such as the medlar (Mespilus germanica) and the pear (Pyrus communis sativa)[4]. Wood - very hard and tough but difficult to work[7, 46, 61]. It has a fine grain and takes a beautiful polish but is seldom large enough to be of great value[4]. It is used for tool handles and making small wooden articles etc[4, 7, 46, 61]. The wood is valued in turning and makes an excellent fuel, giving out a lot of heat, more so even than oak wood[4]. Charcoal made from the wood is said to be able to melt pig iron without the aid of a blast[4].

dwatta Antiarrhythmic Antispasmodic Astringent Cardiotonic Diuretic Hypotensive Malaria Sedative Tonic VasodilatorHawthorn is an extremely valuable medicinal herb. It is used mainly for treating disorders of the heart and circulation system, especially angina[254]. Western herbalists consider it a 'food for the heart', it increases the blood flow to the heart muscles and restores normal heart heat[254]. This effect is brought about by the presence of bioflavonoids in the fruit, these bioflavonoids are also strongly antioxidant, helping to prevent or reduce degeneration of the blood vessels[254]. The fruit is antispasmodic, cardiac, diuretic, sedative, tonic and vasodilator[4, 9, 21, 46, 165]. Both the fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222], they are also used to treat a heart muscle weakened by age, for inflammation of the heart muscle, arteriosclerosis and for nervous heart problems[21]. Prolonged use is necessary for the treatment to be efficacious[222]. It is normally used either as a tea or a tincture[222]. Hawthorn is combined with ginkgo (Ginkgo biloba) to enhance poor memory, working by improving the blood supply to the brain[254]. The bark is astringent and has been used in the treatment of malaria and other fevers[7]. The roots are said to stimulate the arteries of the heart[218].

nrakta Europe, including Britain, from Sweden to Spain, eastwards to Poland. ksacta Woods, hedges, thickets etc on clays and heavy loams, especially in E. Britain[17, 186]. Where found in hedges it is often as a relict of ancient woodland[186].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Border, Espalier, Pollard, Specimen. Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200].. A true woodland species, it grows well in quite dense shade[17, 186]. A very hardy plant, tolerating temperatures down to at least -18°c[202]. Hybridizes freely with other members of this genus[200]. Closely allied to C. monogyna, it often hybridizes with that species in the wild when growing in its proximity[186]. There are many named forms selected for their ornamental value[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. An important food plant for the larvae of many lepidoptera species[30]. Special Features:Not North American native, Blooms are very

# 5.2.203 Crataegus anomala

Arnold hawthorn

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 5 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli

flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Crataegus anomala is a deciduous Shrub growning to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177, 235]. Juicy[43]. A very nice flavour, it

makes a very good dessert fruit [K]. The fruit can also be used in making pies, preserves, etc, and can be dried for later use. The fruit is up to 20mm in diameter with a thick flesh[235]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to New York. ksacta Rocky banks and open woods on low limestone ridges[43, 82]

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. This species is growing in a number of botanical gardens in Britain, where it is fruiting very well[K]. Some botanists do not recognise it as a distinct species and place it as part of C. pedicellata[82]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

# 5.2.204 Crataegus columbiana

Columbian Hawthorn

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 5 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus columbiana is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow

even when relatively large[11]. Special Features:Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 5.2.213 Prunus spinosa

Sloe - Blackthorn

4 tlin 8 cyuc 3 kcak 4 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Prunus spinosa is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from March to April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death. Avoid excessive intake and use recommended doses.

kcakta Edible Parts: Flowers Fruit SeedEdible Uses: TeaFruit - raw or cooked[2, 5, 7, 11, 12, 13, 34]. Exceedingly astringent, it is normally cooked but once the fruit has been frosted it loses some of its astringency and some people find they can enjoy it raw[183, K]. The fruit is more usually used in jellies, syrups, conserves etc and as a flavouring for sloe gin and other liqueurs[183]. Some fruits that we ate in December were fairly pleasant raw[K]. In France the unripe fruit is pickled like an olive[183]. The fruit is about 15mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. The leaves are used as a tea substitute[7, 183]. The dried fruits can be added to herbal teas[183]. The flowers are edible and can be crystallised or sugared[183].

tcanta Cosmetic Dye Hedge Hedge Ink Pioneer Tannin WoodThe bark is a good source of tannin[7]. It is used to make an ink[66]. The juice of unripe fruits is used as a laundry mark[66], it is almost indelible[115]. The pulped ripe fruit is used cosmetically in making astringent face-masks[7]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The bark, boiled in an alkali, produces a vellow dve[66]. The sloe is very resistant to maritime exposure and also suckers freely. It can be used as a hedge in exposed maritime positions. The hedge is stock-proof if it is well maintained[1, 29]. though it is rather bare in the winter and, unless the hedge is rather wide, it is not a very good shelter at this time[K]. Because of its suckering habit, the plant is a natural pioneer species, invading cultivated fields and creating conditions conducive to the regeneration of woodland. Wood - very hard. Used for turnery, the teeth of rakes etc[1, 13, 46, 66].

Suitable branches are used for making walking sticks and are highly valued for this purpose because of their twisted and interesting shapes[7].

dwatta Antidiarrhoeal Antiflatulent Antispasmodic Aperient Astringent Depurative Diaphoretic Diuretic Febrifuge Laxative StomachicThe flowers, bark, leaves and fruits are aperient, astringent, depurative, diaphoretic, diuretic, febrifuge, laxative and stomachic[7, 9, 21]. An infusion of the flowers is used in the treatment of diarrhoea (especially for children), bladder and kidney disorders, stomach weakness et[9]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Prunus spinosa Sloe - Blackthorn for inflammation of mouth and pharvnx (see [302] for critics of commission E)

nrakta Europe, including Britain, from Scandanavia suth and east to the Mediterranean, Siberia and Iran. ks-acta Hedgerows and woods, usually in sunny positions, on all soils except acid peats[9, 17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Agroforestry Services: Living fence Agroforestry Services: Windbreak Industrial Crop: Oil Management: Standard Regional CropLandscape Uses:Specimen. Requires a well-drained moisture retentive soil[11]. Succeeds in all soils except very acid peats[186]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Thrives on chalk according to another report[182]. Plants are very resistant to maritime exposure[186]. An important food plant for the caterpillars of several species of butterfly[30], especially the larvae of the brown and black hairstreak butterflies[186]. A good bee plant. Plants are shallow-rooted and of a suckering habit, they can form dense impenetrable thickets which are ideal for nesting birds, especially nightingales[186]. Flowers are often damaged by late frosts[186]. Plants regenerate quickly after cutting or after fast moving forest fires, producing suckers from below ground level[186]. This species is notably resistant to honey fungus[88, 200]. Special Features: All or parts of this plant are poisonous, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface. The root pattern is suckering with new plants from runners away from the plant [2-1].

# 5.2.214 Corylus americana

American Hazel

4 tlin 8 cyuc 3 kcak 2 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikl-

wisslip hpa7tmwatli fyif hjonli

drutta Corylus americana is a deciduous Tree growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium

nrakta N. America - British Columbia to Newfoundland, south to Georgia, Iowa, Colorado and California. ksacta Moist to wet soils along streams, in woods and open areas from valleys to around 3,000 metres[212].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Closely related to S. racemosa and considered part of that species by some botanists[43]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.211 Decaisnea fargesii

Blue Sausage Fruit

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Decaisnea fargesii is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from April to October, in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[1, 105]. A sweet taste, but rather insipid[109]. A very nice delicate flavour according to our palates[K]. The fruit looks like a bright blue sausage or broad bean pod[K] and is up to 10cm long[200]. You peel off the skin in much the same way as you would peel a broad bean pod, this reveals a line of seed running the entire length of the fruit surrounded by a relatively thin layer of flesh[K].

nrakta E. Asia - W. China ksacta Moist woods and thickets to 1600 metres[109]. Mixed forests, scrub on mountain slopes, wet area in ravines at elevations of 900 - 3600 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200], it then usually germinates freely in early spring[K]. Sow stored seed in February in a greenhouse. This usually germinates well, within 1 - 3 months at 18°c[175]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on under protection for their first winter. Plant out in late spring after the last expected frosts. Cuttings.

nwatta An easily grown plant[182] succeeding in most soils[202], but it prefers a rich moist loamy soil and a sunny position sheltered from cold winds[175, 200]. Succeeds in partial shade[200]. Prefers partial shade, succeeding in full sun if the soil is reliably moist[202]. Dislikes drought[K]. A very cold-hardy plant when fully dormant, but the flowers and young growth in spring can be damaged by late frosts[11, 200]. Plants usually fruit well and regularly in Cornwall[11, 581 and a specimen has been seen on a number of occasions at Kew Botanical gardens laden down with fruit[K]. The flowers are produced at the tips of the new upright growths in the spring[11, 202]. Plants take some years from seed to produce fruit[202]. A very ornamental plant[1]. It is fairly fast growing but it looks gaunt and open in the winter[182]. Plants do not usually require pruning[202]. In some new floras, this species is seen as no more than a synonym for D. insignis[266]. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold

winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

#### 5.2.212 Corylus cornuta

Beaked Hazel, California hazelnut, Turkish Filbert, Turkish

4 tlin 7 cyuc 3 kcak 3 tcan 1 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyif hjonli

drutta Corylus cornuta is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[2, 62, 101]. Very popular in America, the seed is sweet and well-flavoured with a thin shell[2, 85]. The seed can be dried and ground into a powder which is added to cereals and used in making bread, pies etc[85, 183]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

tcanta Basketry Dye Oil StringYoung sucker shoots are used to make a rope[99]. The shoots are soaked in urine first, to make them more pliable[257]. A blue dye is obtained from the root or inner bark[99, 101]. The branches are used in basketry[160].

dwatta Cardiac Odontalgic StomachicAn infusion of the branches and leaves has been used in the treatment of heart complaints and intestinal disorders[257]. A decoction of the bark has been given to children to alleviate teething pain[257].

nrakta Eastern and Central N. America. ksacta Dry or moist woodland on hills or mountain slopes[62]. Rich thickets. clearings and woodland edges[43].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta Landscape Uses:Firewood, Specimen, Street tree. An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Tolerates a pH in the range 5.8 to 7.5. Plants are fairly wind tolerant[1, 11]. Plants are hardy to about - 30°c[160]. They thrive in a short growing season[160]. This species is occasionally cultivated for its edible seed in N. America[61] but is of no value in Britain as a seed bearer[11]. Plants can bear fruit in 5 - 6 years from seed[160]. Members of this genus bear transplanting well and can be easily moved

in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked[161, 166]. A very pleasant flavour, it is slightly mealy but juicy and can be eaten in quantity as a dessert fruit[K]. It is also used in making pies, preserves etc and can be dried for later use[161, 177]. The fruit is up to 11mm in diameter and is borne in small clusters[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Western N. America - British Columbia to California, east to Idaho and Oregon. ksacta Meadows and near streams in California[71].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year [K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is closely related to C. douglasii[71].

## 5.2.205 Sambucus pubens

American Red Elder

4 tlin 8 cyuc 3 kcak 1 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sambucus pubens is a deciduous Shrub growing to 4 m (13ft lin). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is

pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76]. NC State University have noted Cyanogenic glycoside and alkaloids can cause low toxity if eaten.

kcakta Edible Parts: Flowers FruitEdible Uses: TeaFruit - raw or cooked[105, 164, 257]. A bitter flavour[183]. The fruit is quite nutritious, having a relatively high fat and protein as well as carbohydrate content[212]. The fruit can be dried prior to use, it will then lose some of its rank taste[183]. The fruit is about 5mm in diameter and is borne in large clusters making it easy to harvest[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked. The root is made into a tea-like beverage[105, 161, 183].

tcanta MusicalThe stem is easily hollowed and can be used to make a whistle [212].

dwatta Diuretic PurgativeThe bark and the leaves are used as a diuretic and purgative[212]. The blossoms have been used in the treatment of measles[257].

nrakta N. America - British Columbia to Newfoundland, south to Georgia, Iowa, Colorado and California. ksacta Moist to wet soils along streams, in woods and open areas from valleys to around 3.000 metres[2121.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Closely related to S. racemosa and considered part of that species by some botanists[43]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.206 Crataegus x grignonensis

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 4 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus x grignonensis is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta A hybrid species of garden origin, C. crus-galli x C. pubescens, ksacta Not known in the wild.

propta Seed - this is a hybrid species and it will not breed true from seed. If this is no problem, then the seed is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones [245].

#### 5.2.207 Castanea x neglecta

Chinknut

4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 4 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Castanea x neglecta is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[183]. Eaten raw, there is a distinct astringency, especially if the fleshy inner skin beneath the outer shell of the seed is not removed[K]. When cooked, however, and especially when baked, the seed becomes much sweeter and has a floury texture[K]. It then makes an excellent food and can be used as a staple food in much the same way as potatoes or

cereals[K]. The seed is quite small, though it is larger than C. pumila[11]. Another report says that only one large seed is formed in each seed case[82].

tcanta Tannin WoodThe bark, leaves, wood and seed husks all contain tannin. Wood - coarse-grained, hard, strong, light, durable, easy to split.

nrakta Eastern N. America - N. Carolina. ksacta A natural hybrid, C. dentata x C. pumila, found on well-drained soils[82].

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors [78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed. the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K]. This species is a natural hybrid and might not breed true from seed[K]. Division of suckers in winter[200]. They can be planted straight out into their permanent positions.

nwatta Prefers a good well-drained slightly acid loam but succeeds in dry soils[1, 11, 200]. Once established, it is very drought tolerant[1, 11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. This species is an excellent soil-enriching understorey in pine forests[200], growing and fruiting well so long as the canopy of pines is fairly light. Although it is very winter-hardy, this species only really thrives in areas with hot summers[200]. This species is a natural hybrid. C. dentata x C. pumila[11, 200]. It is very similar to C. pumila[270], but has larger fruits than C. pumila[11] and often produces two fertile seeds in each fruit[270].. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus [200]. Fruits are produced in 2 - 3 years from seed[117]. This species is occasionally cultivated for its edible seed in N. America, there are some named varieties[183]. The plants produce seeds abundantly in the wild[183]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.208 Staphylea trifolia

4 tlin 8 cyuc 3 kcak 2 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hna7tmwatli xre7t hionli

drutta Staphylea trifolia is a deciduous Shrub growing to 4 m (13ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[161, 177]. They are eaten like pistachios[2]. The seed can be used in place of walnuts (Juglans spp) in making chocolate-chip cookies[183]. A sweet edible oil is obtained from the seed[2]. It is used for cooking purposes[183].

tcanta Oil Soil stabilizationPlants have dense underground root systems and are of some value in erosion control[229].

dwatta SkinAn infusion of the powdered bark has been used as a wash for sore faces[257].

nrakta Eastern N. America - Quebec to Georgia, west to Kansas and Nebraska. ksacta Rich moist thickets along streams and the borders of woods[43, 229].

propta Seed - this can be very slow to germinate, sometimes taking 18 months or more. It is best sown as soon as it is ripe in a cold frame[200], and some of it at least should then germinate in the spring. Stored seed should be sown as early in the year as possible and given cold stratification - it might not germinate until spring of the following year. Prick out the seedlings into individual pots when they are being moved or they will transplant very badly. Division of large enough to handle and grow them on in light shade in the greenhouse for their first winter. Plant them out early the following summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Fair to good percentage[78]. Layering in July/August. Takes 15 months. Good percentage[78].

nwatta Tolerant of a wide range of soils so long as they are not too dry[11, 182, 200], it prefers a rich loamy soil in full sun or semi-shade[200]. A fast-growing but short-lived tree in the wild[229]. The plants flower best in years that follow hot summers[200]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.209 Quercus gambelii

Shin Oak, Gambel oak, Rocky Mountain White Oak 4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 4.5 m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ouercus gambelii is a deciduous Shrub growing to 4.5 m (14ft 9in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clav) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[257]. A staple food for several native North American Indian tribes[257]. A sweet taste[61, 62, 63, 85, 161]. The seed is about 2cm long and wide[82, 200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. If the seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[85]. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Buttons Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff[4]. The seed cups are used as buttons[5]. Wood - hard, heavy, close-grained. The trees are generally too small to be of use commercially, though the wood is used locally for lumber and also makes a good fuel[229].

dwatta Analgesic Astringent Cathartic DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The acorns have been eaten to give greater sexual potency[257]. The root bark is analgesic and cathartic[257]. A decoction has been used to treat postpartum pain and facilitate delivery of the placenta[257].

nrakta Western N. America - Rocky Mountains from Utah and Wyoming to Mexico. ksacta Dry foothills and lower mountain slopes, 1350 - 2800 metres[62].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without

suckers in the dormant season[11].

nwatta Landscape Uses:Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. A slow growing shrub that often produces suckers and grows as a thicket[182, 229], it occasionally makes a small tree[229]. Seed production is cyclical, a year when good crops are produced is followed by several years of light production[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year [200, 229]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. Special Features: North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

## 5.2.210 Sambucus racemosa

American Red Elder

4 tlin 8 cyuc 3 kcak 1 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sambucus racemosa is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76]. NC State University have noted Cyanogenic glycoside and alkaloids can cause low toxity if eaten.

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit raw or cooked[105, 161, 257]. A bitter flavour[183]. The fruit is guite nutritious, having a relatively high fat and protein as well as carbohydrate content[212]. The fruit can be dried prior to use, it will then lose some of its rank taste[183]. The fruit is about 5mm in diameter and is borne in large clusters making it easy to harvest[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked. The root is made into a tea-like beverage[105, 161, 183].

tcanta Repellent Straw WoodThe stem is easily hollowed and can be used to make a whistle[212].

dwatta Anodyne Carminative Depurative Diaphoretic Diuretic Laxative Purgative Resolvent Vitamin C Vulnerary-The bark and the leaves are used as a diuretic and purgative[212]. The blossoms have been used in the treatment of measles[257].

species, a large white-flowered form grows wild in wet places whilst a smaller form is found on drier slopes[90]. The hardiness zone has been given as 4, this is somewhat questionable, the plant is liable to be much less hardy[K].

## 5.2.337 Mentha arvensis

Corn Mint, Wild mint

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha arvensis is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A reasonably strong minty flavour with a slight bitterness, they are used as a flavouring in salads or cooked foods[5, 172, 183]. A herb tea is made from the fresh or dried leaves[21, 183]. An essential oil from the plant is used as a flavouring in sweets and beverages[183]. The leaves contain about 0.2% essential oil[218].

tcanta Essential Repellent StrewingThe plant is used as an insect repellent[18, 20, 99]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. The leaves also repel various insects[257]. An essential oil is obtained from the plant[238]. The yield from the leaves is about 0.8%[240]. The sub-species M. arvensis piperascens produces the best oil, which can be used as a substitute for, or adulterant of, peppermint oil[238]. Yields of up to 1.6% have been obtained from this sub-species[240].

dwatta Anaesthetic Antiphlogistic Antiseptic Antispasmodic Aromatic Cancer Carminative Diaphoretic Emmenagoque Febrifuge Galactofuge Salve Stimulant Stomachic-Corn mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The whole plant is anaesthetic, antiphlogistic, antispasmodic, antiseptic, aromatic, carminative, diaphoretic, emmenagogue, galactofuge, refrigerant, stimulant and stomachic[147, 172, 218]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are a classical remedy for stomach cancer[218]. Another report says that this species is not very valuable medicinally[4]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, N. Asia and the Himalayas. ksacta Arable land, heaths, damp edges of woods[5, 17].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[KI. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than

3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. This species tolerates much drier conditions than other members of the genus[238]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to at least -15°c[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. Polymorphic[200]. The whole plant has a very strong, almost oppressive, smell of mint[245]. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

#### 5.2.338 Campanula garganica

Adriatic Bellflower

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.2 m hkuc htut cyutli tcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Campanula garganica is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked. The leaves are quite small but have a pleasant mild flavour, and make a very acceptable addition to salads[K]. Flowers - raw or cooked. Slightly sweet[K].

nrakta S. Europe - Italy. ksacta Not known

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c. Very easy[221]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring. Very easy[221]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta An easily grown plant[221], it succeeds in most fertile well-drained soils[233], though it prefers a moist but well-drained sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Flowers most freely when growing in full sun with a good supply of chalk or lime in the soil[221]. Plants grow well in a wall so long as there is some soil for them to root into[219]. Plants are hardy to at least -15°c[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Plants are often short-lived, though they are easily propagated by seed or basal cuttings[219, 221]. They also usually self-sow freely[221]. This species is closely related to C. elatines[200]. There are some

ophthalmic, poultice and sedative[46, 61, 99, 257]. A decoction of the leaves is used in the treatment of digestive disorders and sore throats[216, 257]. An infusion of the fresh or dried leaves is used to treat pneumonia, bad colds with coughing and bronchitis[257]. It is used both internally and externally in the treatment of rheumatism[257]. The crushed plant is used as a liniment on cuts, sores etc whilst a decoction of the leaves is used as an antiseptic wash for cuts, wounds and sores[257]. A poultice of the steeped leaves is applied to sore eyes[257]. The plant is burnt in the house in order to disinfect it[257].

nrakta Western N. America - British Columbia to California and Mexico, east to Nebraska. ksacta Dry plains and hills on calcareous soils[60]. Found on slightly acid and on alkaline soils[164].

propta Seed - surface sow from late winter to early summer in a greenhouse in a very free-draining soil, but making sure that the compost does not dry out. The sub-species A tridentata vaseyana germinates better if given a cool stratification for 30 - 50 days. Other sub-species germinate in 1 - 2 weeks in a warm greenhouse[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter, planting them out in late spring or early summer. Cuttings of halfripe wood, July/August in a frame. Very slow to root[11] Division in spring or autumn. Layering[164].

nwatta Requires a sunny position and a well-drained soil that is not too rich[1, 11]. Requires a lime-free soil[60]. There are a number of sub-species growing in different habitats from deep fertile soils to poor shallow ones[164]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Established plants are very drought tolerant[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. The plant is very aromatic, especially after rain[11, 182]. The pollen of this species is one of the main causes of hayfever in N. America[212]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.249 Allium macropetalum

Largeflower Wild Onion

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium macropetalum is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[161, 257]. They can be dried and stored for winter use[257]. The North American Indians would singe the bulb to reduce the strong flavour and then eat it immediately or dry it for later use[257]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta South-western N. America - Colorado, Utah, Arizona, Texas and New Mexico. ksacta Desert plains and hills at elevations of 300 to 2500 metres[270].

propta Seed - sow spring in a cold frame. Prick out the sedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained soil[1]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.250 Achillea millefolium

Yarrow, Boreal yarrow, California yarrow, Giant yarrow, Coast yarrow, Western yarrow, Pacific yarrow 4 tlin 8 cyuc 3 kcak 4 tcan 4 dwat m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Achillea millefolium is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Extended use of this plant, either medicinally or in the diet, can cause allergic skin rashes or lead to photosensitivity in some people[21, 238]. Theoretically yarrow can enhance the sedative effects of other herbs (e.g. valerian, kava, German chamomile, hops) and sedative drugs. Possible sedative and diuretic effects from ingesting large amounts [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked[4, 5, 46, 52]. A rather bitter flavour, they make an acceptable addition to mixed salads and are best used when young[9, 183, K]. The leaves are also used as a hop-substitute for flavouring and as a preservative for beer etc[2, 9, 53, 183]. Although in general yarrow is a very nutritious and beneficial plant to add to the diet, some caution should be exercised[K]. See the notes above on possible toxicity. An aromatic tea is made from the flowers and leaves[183]. An essential oil from the flowering heads is used as a flavouring for soft drinks[183].

tcanta Companion Compost Cosmetic Dye Essential Hair Liquid feed RepellentThe growing plant repels beetles, ants and flies[14, 99, 172]. The plant has been burnt in order to ward off mosquitoes[257]. A liquid plant feed can be made from the leaves [54]. You fill a container with the leaves and then add some water. Leave it to soak for a week or two and then dilute the rather smelly dark liquid, perhaps 10 - 1 with water though this figure is not crucial[K]. This plant is an essential ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The fragrant seeds have been used to impart a pleasant smell indoors[257]. An essential oil obtained from the leaves is used medicinally[17, 46, 61]. The leaves contain from 0.6 to 0.85% essential oil[240]. The leaves have been used as a cosmetic cleanser for greasy skin[268]. Yellow and green dyes are obtained from the flowers[168]. A good ground cover plant, spreading quickly by its roots[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Nectary, invertebrate shelter.

dwatta Antidiarrhoeal Antiinflammatory Antiseptic Antispasmodic Appetizer Aromatic Astringent Carminative Cholagoque Diaphoretic Digestive Emmenagoque Odontalgic Stimulant Tonic Vasodilator Vulnerary Yarrow has a high reputation and is widely employed in herbal medicine, administered both internally and externally. It is used in the treatment of a very wide range of disorders but is particularly valuable for treating wounds, stopping the flow of blood, treating colds, fevers, kidney diseases, menstrual pain etc[218, 238, 254, 257]. The whole plant is used, both fresh and dried, and is best harvested when in flower[222]. Some caution should be exercised in the use of this herb since large or frequent doses taken over a long period may be potentially harmful[222], causing allergic rashes and making the skin more sensitive to sunlight[238]. The herb combines well with Sambucus nigra flowers (Elder) and Mentha x piperita vulgaris (Peppermint) for treating colds and influenza[268]. The herb is antiseptic, antispasmodic, mildly aromatic, astringent, carminative, cholagogue, diaphoretic, digestive, emmenagogue, odontalgic, stimulant, bitter tonic, vasodilator and vulnerary[4, 9, 14, 21, 54, 145, 165, 172, 238, 240, 254]. It also contains the anti-inflammatory agent azulene, though the content of this varies even between plants in the same habitat[238]. The herb is harvested in the summer when in flower and can be dried for later use[4]. The fresh leaf can be applied direct to an aching tooth in order to relieve the pain[268].

nrakta Europe, including Britain, north to 71°, and east to western Asia, ksacta Meadows, pastures, lawns etc. on all but the poorest soils[17]

propta Seed - sow spring or early autumn in a cold frame[133]. The seed usually germinates in 1 - 3 months[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be planted direct into their permanent positions. Divisions succeed at any time of the year. Basal cuttings of new shoots in spring. Very easy, collect the shoots when they are about 10cm tall, potting them up individually in pots and keeping them in a warm but lightly shaded position. They should root within 3 weeks and will be ready to plant out in the summer

nwatta Landscape Uses: Container, Ground cover, Massing. Seashore. Woodland garden. Succeeds in most soils and situations but prefers a well-drained soil in a sunny position[1, 14]. Shade tolerant[13]. Plants live longer when grown in a poor soil[200] and also do well on lime[208]. Established plants are very drought tolerant[200], they can show distress in very severe droughts but usually recover[190]. It remains green after grass has turned brown in a drought[187]. Plants succeed in maritime gardens[233]. The plant has a very spreading root system and is usually quite invasive[233, K]. A very hardy plant, tolerating temperatures down to about -25°c[187]. Yarrow is an excellent plant for growing in lawns, meadows, orchards etc., it is tolerant of repeated close cutting and of being walked on[20, 54]. It works to improve the soil fertility[20, 54]. A very good companion plant, it improves the health of plants growing nearby and enhances their essential oil content thus making them more resistant to insect predations[14, 18, 20, 53]. There are some named forms, selected for their ornamental value[183, 238]. 'Pink' (syn. 'Rosea') has very aromatic foliage and deep pink flowers[183]. Hybridizes freely with other members of this genus[200]. A good bee plant, it is an important nectar source for many insects[24]. Special Features: Attractive foliage, Edible, Fragrant foliage, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

#### 5.2.251 Arctium minus

4 tlin 8 cyuc 3 kcak 4 tcan 5 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli fyifxre7t hjonli

drutta Arctium minus is a BIENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

pcista Although no reports of toxicity have been seen for this plant, some caution is advised due to the following report for the closely related A. lappa[K]. Care should be taken if harvesting the seed in any quantity since tiny hairs from the seeds can be inhaled and these are toxic[205].

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: CoffeeRoot - raw or cooked[62, 85]. The best roots are obtained from young plants[85]. Usually peeled and sliced[183]. The roasted root is a coffee substitute[183]. Young leaves and leaf stems - raw or cooked[85]. Used as a potherb[183]. Mucilaginous. It is best to remove the rind from the stem[85]. Young flowering stem - peeled and eaten raw or cooked like asparagus[177, 183]. Seed sprouts[55]. No further details.

tcanta PaperA fibre is obtained from the inner bark and is used to make paper. It is about 0.9mm long[189]. The stems are harvested in late summer, the leaves are removed and the stems steamed in order to strip off the fibre. The fibres are then cooked for two hours in soda ash before being put in a ball mill for 2 hours[189]. The resulting paper is a light tan/ brown colour[189].

dwatta Alterative Antibacterial Antifungal Aperient Blood purifier Carminative Cholagogue Diaphoretic Diuretic Eczema HypoglycaemicBurdock is one of the foremost detoxifying herbs in both Chinese and Western herbal medicine[254]. Arctium lappa is the main species used, though this species has similar properties[254]. The dried root of one year old plants is the official herb, but the leaves and fruits can also be used[4]. It is used to treat conditions caused by an 'overload' of toxins, such as throat and other infections, boils, rashes and other skin problems[254]. The root is thought to be particularly good at helping to eliminate heavy metals from the body[254]. The plant is antibacterial, antifungal and carminative[9, 21, 147, 165, 176]. It has soothing, mucilaginous properties and is said to be one of the most certain cures for many types of skin diseases, burns, bruises etc[4, 244]. It is used in the treatment of herpes, eczema, acne, impetigo, ringworm, boils, bites etc[244]. The plant can be taken internally as an infusion, or used externally as a wash[244]. Use with caution[165]. Oneyear old roots are alterative, aperient, blood purifier, cholagogue, depurative, diaphoretic, diuretic and stomachic[218. 222]. The seed is alterative, antibacterial, antifungal, antiphlogistic, depurative, diaphoretic, diuretic and hypoglycaemic[176, 218]. It is used in the treatment of colds with sore throat and cough, measles, pharyngitis, acute tonsillitis and abscesses[176]. The crushed seed is poulticed onto bruises[222]. The seed is harvested in the summer and dried for later use[254]. The seed contains arctiin, this excites the central nervous system producing convulsions an increase in respiration and later paralysis. It also lowers the blood pressure by dilating the blood vessels[176]. The leaves are poulticed onto burns, ulcers and sores[222].

nrakta Most of Europe, including Britain, south and east to N. Africa and the Caucasus. ksacta Waste ground, edges of woods, roadsides etc[5, 13].

propta Seed - best sown in situ in autumn

of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 5.2.334 Hydrophyllum virginianum

Virginia Waterleaf, Eastern waterleaf 4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hionli

drutta Hydrophyllum virginianum is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 61]. A bland flavour[159]. The mild-tasting and tender young leaves make a pleasant addition to the salad bowl[183, K], whilst older leaves make a good spinach[183]. Only use when young, they become bitter with age[159].

dwatta Astringent DysenteryA tea made from the roots is astringent, it is used in the treatment of diarrhoea, dysentery etc[222]. A decoction, or the chewed root, has been used as a wash for cracked lips and sore mouths[257].

nrakta Eastern N. America - Ouebec and New England to Virginia, west to Tennessee and Kansas. ksacta Rich woods and damp clearings[43].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed usually germinates in early spring. Sow stored seed as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to not up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a moist humus-rich soil in semishade[200]. Slugs are particularly fond of this plant and will soon destroy it if given a chance[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 5.2.335 Chenopodium capitatum

Strawberry Blite, Blite goosefoot 4 tlin 8 cvuc 3 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cvutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chenopodium capitatum is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods. such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Fruit Leaves SeedEdible Uses: ColouringLeaves - raw or cooked[27, 106]. Used like spinach[2], they are a good source of vitamins C and A[257]. The young leaves are best[85, 172, 183]. Poor quality[74]. The raw leaves have been used in salad mixtures[257], but should only be eaten in small quantities, see the notes above on toxicity. Fruit - raw or cooked[2, 27, 172]. An insipid but sweet flavour[85], they can be added to salads[183]. The fruit is about 12mm in diameter[200]. A red food colouring can be obtained from the fruit[74, 99, 172, 183]. Seed - cooked. It can be ground into a meal and mixed with cereal flours in making bread etc[161, 172]. The seed is small and fiddly, it should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins.

tcanta DyeGold/green dyes can be obtained from the whole plant[168]. A red dye is obtained from the fruit, it is used in cosmetics and as a paint[46, 257].

dwatta Antiphlogistic PectoralThe plant has been used as a lotion for treating black eyes and head bruises[257]. The juice of the seeds and an infusion of the plant has been used to treat lung congestion[257].

nrakta Europe. A rare casual in Britain[17]. ksacta Rubbish tips etc in Britain[17].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. A very ornamental plant[74], strawberry blite has at times been cultivated for its edible leaves[61].

## 5.2.336 Triteleia hyacinthina

Hyacinth Brodiaea, White brodiaea 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.7 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Triteleia hyacinthina is a BULB growing to 0.7 m (2ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[105, 161, 212, 257]. Rich in starch, the bulb can be used like potatoes[257]. An emergency food, it is only used when all else fails[177].

nrakta South-western N. America - British Columbia and south to California. ksacta Grassy, often rocky open flats to mid-montane meadows[60], also found in wet places, meadows and slopes to 1800 metres[90].

propta Seed - best sown as soon as it is ripe in a cold frame. Alternatively, the seed can be sown in spring in a cold frame. Germination usually takes place within 1 - 3 months at 15°c. Sow the seed thinly so that there is no need to prick them out and grow the seedlings on in the pot for their first year. Give an occasional liquid feed to ensure that they do not become mineral deficient. Seedlings are prone to damping off so be careful not to overwater them and keep them well ventilated. When they become dormant, pot up the small bulbs placing about 3 in each pot. Grow them on in the greenhouse for another year or two until the bulbs are about 20mm in diameter and then plant them out into their permanent positions when they are dormant in the autumn. Division of flowering size bulbs in autumn. Dig up the clumps of bulbs, replanting the larger ones direct into their permanent positions. It is best to pot up the smaller ones and grow them on in a greenhouse for a year before planting them out when they are dormant in early autumn.

nwatta Requires a rich well-drained sandy loam[1]. Likes plenty of moisture whilst in growth followed by a warm dry period in late summer and autumn[200]. Succeeds outdoors in a very sheltered warm position, otherwise it is best grown in a bulb frame[90]. There are two basic forms of this soil, preferring one that is rich in humus[1]. Plants are hardy to about -15°c[90]. The sub-species E. revolutum johnstonii is growing well, flowering freely and spreading nicely in the dappled shade of a woodland garden at Kew[K]. It does not, however, produce new bulbs freely by division, relying instead upon self-sown seedlings[258]. There are a number of named garden forms, 'Pink Beauty' has been specially mentioned as easy to grow in Britain[200]. Flowers are produced in 3 - 4 years from seed[164]. Bulbs should be planted about 7cm deep[1].

# 5.2.332 Oxalis violacea

Violet Wood Sorrel

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Oxalis violacea is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: DrinkLeaves - raw or cooked[2, 105, 159, 161]. The acid salty leaves are eaten raw in salads and sandwiches or cooked as a potherb[183]. Use in moderation, see notes at top of sheet. Flowers - raw[105, 161]. An attractive and tasty garnish for salads[183]. Root - raw or cooked[105, 161, 183, 257]. A lemon-flavoured drink is made from the leaves[159].

dwatta Anthelmintic Antiemetic Blood purifier Cancer SalveThe plant is anthelmintic, antiemetic, blood purifier, cancer and salve[257]. A cold infusion is used to stop a person vomiting[257]. An infusion can be used as a blood purifier, it is said to be a treatment in the early stages of cancer[257]. An infusion of the plant is drunk and also used as a wash in treating children with hookworm[257]. An infusion of the leaves, mixed with oil, can be used as a salve on sores[257].

nrakta Eastern N. America - New York to Wisconsin. south to Florida, ksacta Woods, shaded slopes, gravelly banks and prairies[43]. Dry sandy or clay soils[159].

propta Seed - best sown as soon as it is ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early

nwatta Easily grown in a moisture-retentive humus-rich soil in shade or dappled sunlight[200]. Succeeds in dry soils[159]. Grows well in a wild or woodland garden[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

# 5.2.333 Mitchella repens

Partridge Berry 4 tlin 9 cyuc 3 kcak 4 tcan 3 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Mitchella repens is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers welldrained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw[2, 105, 161]. Pleasant and slightly aromatic[183]. Dry and tasteless, with lots of seeds according to another report[4]. The fruit hangs on well on the bush[1]. The fruit is about 8mm in diameter[200]. A tea is made from the leaves[207].

tcanta Can be used as a ground cover plant in a shady position[3, 188]. Plants form a spreading carpet, rooting along the stems, and are best spaced about 30cm apart each

dwatta Astringent Diuretic Hypnotic Oxytoxic Sedative Tonic Women's complaintsPartridge berry was commonly used by several native North American Indian tribes as a parturient to hasten childbirth. It was also occasionally used to treat a variety of other complaints including insomnia, rheumatic pain and fluid retention[254]. It is still used in modern herbalism as an aid to childbirth and is also considered to have a tonic effect upon the uterus and the ovaries[254]. The herb is astringent, diuretic, hypnotic and tonic[4, 21, 102, 165, 192, 213]. Frequent doses of a tea made from the fresh or dried leaves were used by N. American Indian women in the weeks preceding childbirth in order to promote easy delivery[213, 222, 238]. This tea should not be used during the first six months of labour, however. since it can induce a miscarriage[238]. The tea is also used to treat delayed, painful or irregular menses[222, 238]. The tea was also used externally as a wash for hives, swellings, sore nipples, rheumatism etc[222]. The leaves are harvested in the summer and dried for later use[238]. A tea made from the berries has a very definite sedating effect on the nervous system[192].

nrakta N. America - Newfoundland to Florida, west to Texas and Minnesota. ksacta Dry or moist knolls in woods[43], on sandy sub-strates[200].

propta Seed - it germinates better if given 3 months cold stratification and so it is best sown as soon as it is ripe in the autumn[113]. Sow stored seed as early in the year as possible. Make sure that all the fruit pulp is removed from the seed because it contains germination inhibitors[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of naturally layered stems in the spring[200], Cuttings.

nwatta Landscape Uses:Container, Ground cover, Rock garden, Specimen, Woodland garden. Requires a moist but well-drained lime-free soil and some shade[11]. Prefers a peaty soil[1, 200], succeeding in neutral to acid soils[200]. Plants are hardy to at least -20°c[200]. A trailing plant, the stems forming new roots at the nodes[192]. The dried leaves have a scent of newly mown hay[245]. The flowers have a pleasant sweet fragrance[245]. Succeeds in the shade of trees[1, 11], growing well in a woodland and in the rock garden[1, 200]. Plants can be difficult to establish[188], though they can become invasive once they are well established[238]. Special Features: Attracts birds. Attractive foliage, North American native, Naturalizing, Fragrant flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is fibrous dividing into a large number

nwatta Succeeds on most soils, preferably moist[200]. Prefers a sunny position. Prefers partial shade according to another report[200]. A polymorphic species[17]. A good butterfly plant[24]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

## 5.2.252 Vitis cinerea floridana

Current Grane

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis cinerea floridana is a deciduous Climber. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves SapEdible Uses: Fruit - raw or dried for winter use[183]. It can also be used in pies, iellies etc. The fruit is about 4 - 6mm in diameter[200] and is borne in bunches. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked. The sap is made into a tasty bever-

tcanta Dye RootstockA yellow dye is obtained from the fresh or dried leaves[168]. Used as a rootstock.

nrakta South-eastern N. America - S.E. Virginia to Florida. ksacta Not known

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Lavering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Used in breeding programmes to develop resistant varieties for Florida and other hot areas[183]. There are some named varieties[183]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.253 Rosa nutkana

Nootka Rose, Bristly Nootka rose 4 tlin 8 cyuc 3 kcak 4 tcan 2 dwat 2.7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rosa nutkana is a deciduous Shrub growing to 2.7 m (8ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral

and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: TeaFruit - raw or cooked[2, 101, 118, 161, 257]. The taste is best after a frost[172]. Juicy, pleasantly acid and a good source of vitamin C[183]. The fruit can be dried, powdered and added to tea as a flavouring or used in its own right as a fruity-flavoured tea[21, 101, 183]. The fruit is about 20mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Petals - raw. The petals are pleasantly aromatic, but you need to remove the bitter white base[172]. Young shoots - raw or cooked. Peeled and eaten in spring when they are still tender[101, 172, 177, 183, 257]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The peeled stems are used to make a beverage[257]. The leaves are used to make a tea[257].

tcanta Hedge HedgeThe plant makes a good informal

dwatta Analgesic Astringent Birthing aid Cancer Foot care Ophthalmic Stings Vitamin C Women's complaintsAn infusion of the roots and sprouts has been used as an eyewash for sore eyes[257]. A decoction of the roots has been used by women after giving birth and also in the treatment of sore throats[257]. A decoction of the bark has been taken to ease the labour pains of childbirth[257]. A poultice of the chewed leaves has been used to alleviate the pain of bee stings[257]. A decoction of the branches, combined with chokecherry (Prunus virginiana) and red willow (Salix bonplandiana), has been used in the treatment of various women's complaints, diarrhoea and vomiting[257]. The leaves have been placed in shoes as a protection from athletes foot[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta North-western N. America. ksacta Woods and open places at moderate elevations[60].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall. otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Prefers a slightly acid soil[14]. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18]

20]. Grows badly with boxwood[18]. A very ornamental plant[1], it fruits well in Britain[11]. This plant is often wrongly grown under the name R. californica[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.254 Chenopodium giganteum

Tree Spinach

4 tlin 8 cvuc 3 kcak 0 tcan 0 dwat 2.4 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chenopodium giganteum is a ANNUAL growing to 2.4 m (7ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is polinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves - cooked[46, 61, 105, 177]. Of excellent quality, they are a spinach substitute[74]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Seed - cooked. Ground into a powder and used with wheat or other cereals in making bread etc. The seed is small and fiddly, about 1.5mm in diameter[266], it should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins.

tcanta Dye WoodGold/green dyes can be obtained from the whole plant[168]. The stout stems have been used for making walking sticks[266].

nrakta E. Asia - N. India. Naturalized in S. France[50]. ksacta Weed infested places[74].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

mwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. This species is closely related to C. album[50], and was probably derived from it through cultivation[266]. The tree spinach is sometimes cultivated for its edible leaves[74], there are some named varieties[183]. 'Magentaspreen' is a vigorous plant growing 1.5 metres tall. It has large leaves, the new growth is a brilliant magenta colour. Tastiest when young, the leaves are eaten raw or cooked like spinach[183].

# 5.2.255 Vitis mustangensis

Mustang Grape

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat m hkuc

A warm climate is required in order to ripen the seed[74].

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Vitis mustangensis is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline)

soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw, cooked or dried for winter use[105, 161, 177]. Tough skinned, they are used mainly for pies and jellies[183]. A disagreeable flavour[11, 200]. The fruit is about 16mm in diameter[200] and is borne in bunches. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern N. America - Oklahoma and Arkansas to Texas. ksacta Rich damp woodland soils[200], often on limestone[11].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth. December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.256 Cryptotaenia canadensis

Honewort, Canadian honewort

4 tlin 8 cvuc 3 kcak 0 tcan 0 dwat 1 m hkuc

4 tin 8 cyuc 3 kcak 0 tcan 0 dwat 1 m nkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Cryptotaenia canadensis is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Root StemEdible Uses: Young leaves, stems and flowers - raw or cooked[105, 177]. Used as a potherb or added to salads[183]. A flavour that is somewhat like celery[238], if you use your imagination[K]. Root - cooked[177, 183]. The seeds are used as a flavouring for cakes, breads and biscuits[183].

nrakta Eastern N. America - Western New Brunswick to Manitoba and south to Alabama. Arkansas and Texas. ksacta Rich woods and thickets[43]. Woodland ravines and riverbanks[238].

propta Seed - sow April in a greenhouse. Germination is usually rapid, prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. The ideal temperature for sowing is about 25°c, though seed does germinate at higher and lower temperatures[206]. Seed can also be sown in early autumn[206]. Division in spring or autumn.

nwatta Succeeds in a rich moist soil, preferring to grow in dappled shade[200, 238]. Closely related to C. japonica, a species that is cultivated as a vegetable in Japan[43, K]. This species is being cultivated in America to supply the Japanese market with a chervil-like herb[218]. Slugs are extremely fond of this plant, especially when the new growth emerges in spring[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper

nwatta Landscape Uses: Massing, Seashore, A very easily grown plant, horseradish prefers a good deep moist welldrained soil and a sunny position[16, 27, 33, 200]. Plants require a good soil if they are to produce good roots[4], though once established they are very tolerant of neglect and will continue to produce a crop for many years[264, K]. Plants do not thrive if they are in the shade of trees[264]. Excess nitrogen causes heavy top growth and forking of the roots[200]. Prefers a wet clay soil according to one report[14], whilst another says that it will not grow in wet clay[16]. Tolerates a pH in the range 5.8 to 8.3. Horseradish has long been cultivated for its root which is used as a food flavouring and medicinally, there are some named varieties[4, 17, 61, 183]. If the roots are given some protection they will produce fresh young leaves for the salad bowl all through the winter. Digging up some roots and putting them into a greenhouse for the winter is the easiest method. If the young shoots are blanched they will produce white, tender, sweet leaves[183]. A very invasive plant[33], it is considered to be a pernicious weed in some areas[200]. Even quite small sections of root will regrow if they are left in the soil[4]. The plant has yet to prove invasive on our Cornwall trial grounds, though it has survived and even prospered in a very overgrown site[K]. The forms of this plant grown in gardens are almost sterile and seldom produce good seed[264]. This is a good companion plant for potatoes since it is said to deter potato eelworm[14, 18, 201] and the Colorado beetle[238]. One plant at each corner of the potato patch is guite sufficient[201]. When grown under apple trees it is said to prevent brown rot, powdery mildew and other fungal diseases[201]. Special Features: Fragrant foliage, Not North American native, Invasive. Naturalizing, Fragrant flowers. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 5.2.330 Muscari comosum

Tassel Hyacinth, Tassel grape hyacinth 4 tlin 8 cyuc 3 kcak 2 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Muscari comosum is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[22, 61, 183]. It is about 35mm in diameter[200]. A slightly bitter taste[7] that is appreciated by certain ethnic groups, especially Greeks and Italians[183]. Used in spring[46, 177]. The cooked bulbs, preserved in oil, are used as a relish[183].

tcanta Landscape Uses: Border, Container, Massing, Rock garden, Specimen, forest garden.

dwatta Appetizer Diuretic PoulticeThe bulb is appetizer and diuretic[7, 183]. The bulb is rich in mucilage and can be crushed then applied as a poultice to reddened skin[7].

nrakta Europe. A frequent casual, rarely naturalized in Britain[17]. ksacta Hedgerows, edges of fields, woods and in short grass on dry soils[7, 50].

propta Seed - best sown as soon as ripe in a greenhouse[200]. The seed can also be sown in early spring in a greenhouse. A good proportion of the seed usually germinates within 2 - 3 months. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first year of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in late summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. If you have sufficient seed then it is worthwhile trying sowing it in situ outdoors in early spring. This is rather a hit and miss method, but a lot less work than indoor sowing. Division of offsets in July/August after the leaves die down[1]. It can be done every other year if a quick increase is required[1]. Larger bulbs can be replanted direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out when they are dormant in late summer.

nwatta Prefers a rich open well-drained soil[1]. Succeeds in any soil and situation[1, 42]. Does very well in short grass[1], increasing freely and it can become invasive[200]. The flowers have a pleasing perfume[245]. There is at least one named form, selected for its ornamental value[200].

# 5.2.331 Erythronium revolutum

Pink Fawn Lily, Mahogany fawnlily 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Erythronium revolutum is a BULB growing to  $0.3\,\mathrm{m}$  (1ft) by  $0.2\,\mathrm{m}$  (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, the following notes have been seen for another member of this genus and so some caution is advised. Skin contact with the bulbs has been known to cause dermatitis in sensitive people[65].

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[256]. It can also be dried and stored for later use[257]. The bulbs are usually harvested in the spring as the first leaves appear above ground, they can be stored for some months in a cool place[256]. The raw bulb has a slightly bitter milky taste, the texture is cool and moist inside and so the North American Indians liked eating them on hot days[256]. The cooked bulb has a more starchy texture. The Indians always drank water after eating the bulbs because they believed that otherwise they would get sick[256]. The ovoid bulb is 35 - 50mm long[270].

nrakta South-western N. America - Vancouver Island, south to N. California. ksacta Redwood forest and mixed evergreen forest, edges of bogs and along wooded streams, from the coast to 1000 metres[90].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame. Water lightly in summer, it should germinate in autumn or winter[164, 200]. Stored seed reguires a period of cold stratification[164]. Sow as early in spring as possible in a cold frame. Sow the seed thinly so that it will not be necessary to prick them out for their first year of growth. Give an occasional liquid feed to the seedlings to make sure that they do not become nutrient deficient. When the plants are dormant, pot up the small bulbs putting 2 -3 bulbs in each pot. Grow them on in a shady position in the greenhouse for another 2 3 years and then plant them out into their permanent positions when they are dormant in late summer. Division of the bulbs in the summer as the leaves die down[1]. Larger bulbs can be replanted immediately into their permanent positions, but it is best to pot up smaller bulbs and grow them on in a shady position in a greenhouse for a year before planting them out when dormant in late summer.

nwatta Prefers slightly acid soil conditions but succeeds in chalky soils if these contain plenty of humus[164]. Requires semi-shade, preferably provided by trees or shrubs, and a well-drained soil[42, 164]. Succeeds in almost any light

## 5.2.328 Erythronium grandiflorum

Avalanche Lily, Yellow avalanche-lily 4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.2 m hkuc hmim cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Erythronium grandiflorum is a BULB growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers dry or moist soil.

pcista Skin contact with the bulbs has been known to cause dermatitis in sensitive people[65].

kcakta Edible Parts: Leaves Root SeedpodEdible Uses: Bulb - raw or cooked[2, 46, 85, 105, 161, 257]. The slender bulbs, which are up to 5cm long[270], are usually harvested in the spring as the first leaves appear above ground, they can be stored for some months in a cool place[256]. The raw bulb has a slightly bitter milky taste, the texture is cool and moist inside and so the North American Indians liked eating them on hot days[256]. The cooked bulb has a more starchy texture and a sweet flavour[256, 257]. Stored bulbs develop a sweeter flavour when cooked than fresh bulbs[257]. The Indians always drank water after eating the bulbs because they believed that otherwise they would get sick[256]. Large quantities can have an emetic effect[85]. The bulbs can also be dried for later use[207]. Leaves - raw or cooked[85, 106]. Eating the leaves will greatly reduce the vigour of the bulb, so can only be recommended in times of emergency[K]. Young seedpods - raw or cooked[106, 212]. The cooked pods taste like French beans[212].

dwatta SkinThe pulverized root was applied to boils and as a wet dressing on skin sores[213, 257].

nrakta Western N. America - British Columbia to California, east to Alberta, Wyoming and Colorado. ksacta Sagebrush, open woodland and grassy mountain slopes, sometimes to the tree line[42, 90]. Rich moist soil along the banks of streams, shaded woods and sub-alpine meadows, often in large patches[212].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame. Water lightly in summer, it should germinate in autumn or winter[164, 200]. Stored seed reguires a period of cold stratification[164]. Sow as early in spring as possible in a cold frame. Sow the seed thinly so that it will not be necessary to prick them out for their first year of growth. Give an occasional liquid feed to the seedlings to make sure that they do not become nutrient deficient. When the plants are dormant, pot up the small bulbs putting 2 -3 bulbs in each pot. Grow them on in a shady position in the greenhouse for another 2 3 years and then plant them out into their permanent positions when they are dormant in late summer. Division of the bulbs in the summer as the leaves die down[1]. Larger bulbs can be replanted immediately into their permanent positions, but it is best to pot up smaller bulbs and grow them on in a shady position in a greenhouse for a year before planting them out when dormant in late summer.

nwatta Prefers slightly acid soil conditions but succeeds in chalky soils if these contain plenty of humus[164]. Requires semi-shade, preferably provided by trees or shrubs, and a well-drained soil[42, 164]. Succeeds in almost any light soil, preferring one that is rich in humus[1]. Not an easy species to grow in Britain, it prefers a well-drained soil that is wet in spring but rather dry in the summer[90]. Plants are best given perfect drainage[200]. Offsets are freely produced if the plant is growing well[1]. Flowers are produced in 3 - 4 years from seed[164]. Bulbs should be planted about 7cm deep[1].

# 5.2.329 Armoracia rusticana

Horseradish, Red Cole 4 tlin 9 cyuc 3 kcak 2 tcan 3 dwat 0.7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslin hpa7tmwatli fyifxre7t hionli drutta Armoracia rusticana is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Large quantities of this plant can be poisonous due to its content of volatile oils[76]. Traditional texts suggested possible thyroid function depression. Contraindicated with chronic nephritis, hepatitis, gastro-oesophageal reflux or hyperacidity conditions, and inflammatory bowel conditions. Avoid during pregnancy and lactation (moderate amounts with food ok)[301].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentYoung root - raw or cooked. The grated root is used to make the condiment 'Horseradish sauce'[2, 9, 13, 14, 27, 33, 34, 52], this has a hot mustard-like flavour[100]. The sauce is best used uncooked or gently warmed, heating it will destroy the volatile oils that are responsible for its pungency[238]. It is said that in Germany the roots are sliced and cooked like parsnips[183] - rather them than me![K]. The root is a rich source of sulphur[201]. Fresh roots contain the glycoside sinigrin - this is decomposed in the presence of water by the enzyme myrosin, producing mustard oil which gives the root its hot flavour[268]. The fleshy roots can be up to 60cm long and 5cm thick[268]. The plant is fully hardy and can be left in the ground all winter to be harvested as required[4]. Alternatively, the roots can be harvested in early winter and stored for later use, they will retain their juicy state for some time if stored in dry sand[4]. Young leaves raw or cooked[2, 9, 14, 177]. A very strong flavour, though nice when added in small quantities to the salad bowl[183, K]. A pleasant mild flavour according to another report[238]. Seeds - sprouted and eaten in salads[183].

tcanta Fungicide RepellentHorseradish tea is effective against brown rot of apples and other fungicidal diseases[18, 201]. The growing plant deters potato eelworm[14].

dwatta Antibacterial Antirheumatic Antiseptic Aperient Digestive Diuretic Expectorant Rubefacient Stimulant UrinaryHorseradish is a very pungent stimulant herb that controls bacterial infections and can be used both internally and externally[238]. The plant is a powerful stimulant, whether used internally as a spur for the digestive system or externally as a rubefacient[4]. It should not be used internally by people with stomach ulcers or thyroid problems[238]. The roots are antiseptic, aperient, digestive, diuretic, expectorant, rubefacient and stimulant[4, 13, 14, 165, 171, 222]. They should be used in their fresh state[4]. An infusion is used in the treatment of colds, fevers and flu and is of value in the treatment of respiratory and urinary tract infections[254]. A sandwich of the freshly grated root is a traditional remedy for hay fever[254]. A tea made from the root is weakly diuretic, antiseptic and expectorant[222]. The plant is antibiotic against gram-negative and gram-positive bacteria and also pathogenic fungi[222, 240]. It is experimentally antitumor[222]. Externally, a poultice made from the roots is used to treat pleurisy, arthritis and infected wounds[238]. It will also relieve the pain of chilblains[244]. Some caution should be employed, however, because it can cause blistering[254]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Armoracia rusticana for internal and external use in catarrhs of the respiratory tract, internally as supportive therapy for urinary tract infections, externally for the hyperaemic treatment of minor muscles aches (see [302] for critics of commission E).

nrakta Europe. Naturalized in Britain[17]. ksacta Arable land, waste ground and by streams[9], favouring slightly damp positions[165].

propta Seed - this is seldom produced on plants in cultivation[200]. If seed is obtained then it is best sown in situ during the spring[238]. Division is very easy and can be carried out at almost any time of the year, though it is probably best in spring[33]. It is best to use sections of root about 20cm long, which can be planted out into their permanent positions in February or March, though even very small bits of root will grow away[4, 264]. Division should be carried out at least once every three years or the crop will deteriorate[4].

with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.257 Lilium canadense editorum

Meadow Lily

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium canadense editorum is a BULB growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[2, 105, 177]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum). The taste is rather like raw green corn on the ear[207]. The bulb can be dried, ground into a powder and used in making bread etc[257]. A famine food, only used when better foods are not available[257]. The bulb is up to 5cm in diameter[235].

nrakta Eastern N. America. ksacta Meadows, low thickets and wet woods[43].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant. putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Dislikes lime[42]. This sub-species is said to be lime tolerant[163, 200]. Does well in open woodland[1, 143]. Succeeds in partial shade but rapidly degenerates in deep shade[143]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°c[214]. Stoloniferous[200], the bulbs should be planted 15 - 25cm deep[143]. Only replant in autumn, never in spring[143]. A very ornamental plant[1], unlike the main species, this form is easily grown in Britain[143]. Polymorphic[143]. It hybridizes in nature with L. superbum but it does not hybridize readily in the garden[143]. Closely allied to L. michiganense[143]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### 5.2.258 Amelanchier humilis

Low serviceberry

4 tlin 8 cyuc 3 koak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier humilis is a deciduous Shrub growing to 1.8 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow

in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit raw or cooked[105, 159, 177]. Sweet[43]. A very pleasant flavour, the fruit is juicy with a hint of apple in the taste and contains a few small seeds at the centre[K]. The fruit is rich in iron and copper[226].

nrakta Eastern N. America - Vermont to Alberta and south to New York and Iowa.. ksacta Rocky or sandy shores and banks, often calcareous[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if re-

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Plants are often found growing on calcareous soils in the wild[43]. Hardy to about -25°c[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. This species produces suckers freely, forming thickets[184]. Closely related to A. stolonifera[11, 200]. Hybridizes with A. stolonifera, A. arborea and A. bartramiana. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

#### 5.2.259 Symphytum asperum

Prickly Comfrey

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Symphytum asperum is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista No reports of toxicity have been seen for this species, but the following reports have been seen for S. officinale. This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

kcakta Edible Parts: LeavesEdible Uses: Gum TeaThe following reports are for S. officinale, they are said to also apply to this species[200]. Young leaves - cooked or raw[2, 4, 5, 9, 46, 61]. The leaf is hairy and the texture is mucilaginous. It may be full of minerals but it is not pleasant eating for most tastes. It can be chopped up finely and added to salads, in

this way the hairiness is not so obvious[183]. Young shoots can be used as an asparagus substitute[46]. The blanched stalks are used[183]. Older leaves can be dried and used as a tea[26]. The peeled roots are cut up and added to soups[183]. A tea is made from the dried leaves and roots[183]. The roasted roots are used with dandelion and chicory roots for making coffee[183].

tcanta Biomass Compost GumThe following reports are for S. officinale, they are said to also apply to this species[200]. The plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap[26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun[100].

dwatta Anodyne Astringent Demulcent Emollient Expectorant Haemostatic Refrigerant VulneraryThe leaves are anodyne, mildly astringent, demulcent, emollient, expectorant, haemostatic, refrigerant and vulnerary. They are used as an external poultice in the treatment of cuts, bruises and sprains. Internally, they are used as a tea in the treatment of chest complaints. The plant contains a substance called 'allantoin', a cell proliferant that speeds up the healing process[4, 21, 26, 165]. The leaves are harvested in the summer and can be used fresh or dried.

nrakta Europe to W. Asia. Occasionally naturalized in Britain. ksacta Waste places in Britain[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material[200]. Plants can be invasive, often spreading freely by means of self-sown seed. They are also very difficult to remove, the root system is very deep and even small fragments of root left in the soil can produce new plants.

# 5.2.260 Silphium integrifolium

Prairie Rosinweed

4 tlin 8 cyuc 3 kcak 2 tcan 1 dwat 1.8 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Silphium integrifolium is a PERENNIAL growing to 1.8 m (6ft) by 0.9 m (3ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

koakta Edible Parts: OilEdible Uses: OilCarbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Under development at the Land Institute to domesticate this species for use as an oilseed crop. Trials vielded 1.1t/ha of seed [1-1].

tcanta OilGarden Ornamental. Compared to other Silphium species, it is shorter, less likely to topple over, and faster from seed to flower. More manageable than most perennial sunflowers as it spreads slowly, and it is not known to be allelopathic. Adapts well to prairies, wildflower/native

plant gardens, naturalized areas, meadows or moist, open woodland areas. Attracts birds and butterflies

dwatta Native American peoples used the roots to treat pain from injuries [4].

nrakta Native to eastern North America, including Ontario in Canada and the eastern and central United States as far west as New Mexico. ksacta Mesic to dry black soil prairies, gravel prairies, clay prairies, hill prairies, openings in rocky upland forests, limestone glades, and areas along railroads, particularly where prairie remnants occur. This plant can survive significant degradation, and recovers readily from occasional wildfires. It competes well against most prairie grasses and forbs in mesic to dry areas.

propta Seed. Plants may be slow to establish in the gardene, particularly when grown from seed. Plants often self-seed in optimum growing conditions. Plants develop taproots. Once established, division is not recommended.

nwatta Management: Standard Staple Crop: Proteinil Under DevelopmentClimate: boreal to warm temperate.
Humidity: semi-arid to humid. It needs full sun, poor to
loamy soils, and mesic to dry conditions. Average, medium
moisture, well-drained soils. Tolerates some light shade.
Also tolerates some drought once established. Will grow in
a variety of soils including sandy, loamy or clay ones. Cultivation: under development. Management: standard (Describes the non-destructive management systems that are
used in cultivation) [1-1].

#### 5.2.261 Yucca filamentosa

Spoonleaf Yucca, Adam's needle, Desert Candle, Needle Palm, St. Peter's Palm, Spanish Bayonet, Comm 4 tlin 10 cyuc 3 kcak 4 tcan 1 dwat 1.2 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Yucca filamentosa is an evergreen Shrub growing to 1.2 m (4ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is polinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit StemEdible Uses: Fruit - raw or cooked[2, 46, 61]. Large and fleshy[161, 183]. The fruit is often dried for winter use[1]. Flowers - raw or dried, crushed and used as a flavouring[159, 164, 177]. A tasty addition to the salad bowl[183]. We have found the flowers to be fairly bitter[K]. Flowering stem - cooked and used like asparagus[164].

tcanta Brush Fibre Paper SoapA fibre obtained from the leaves is used for making ropes, cloth, baskets and mats[21, 46, 61, 82, 169]. The fibre can also be used for making paper[189] The leaves are harvested in summer, they are scraped to remove the outer skin and are then soaked in water for 24 hours prior to cooking. The fibres are cooked for 2 hours with Iye and then beaten in a ball mill for 4 hours. They make a cream paper[189]. The leaves are used as paint brushes[92]. The roots are rich in saponins and can be used as a soap substitute for washing the hair, body and clothing[46, 61, 82, 257].

dwatta Poultice SalveMedicinal Parts: Leaves and roots of non-flowering plants[301]. A poultice made from the roots is used in the treatment of sores, skin diseases and sprains[222, 257]. Liver and gallbladder disorders[301].

nrakta South-eastern N. America - Southern New Jersey to Florida. Naturalized in S. Europe. ksacta Sand dunes, waste ground and pine forests along the coastal plain[11, 43].

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Aperient Aphrodisiac Carminative Demulcent Deobstruent Diuretic Lenitive OphthalmicThe kernels are aperient, carminative, demulcent, deobstruent, diuretic, lenitive and ophthalmic[147, 176, 178, 218, 279]. Their use lowers the blood pressure[176]. A decoction is used in the treatment of sluggish colon, constipation, oedema and inadequate elimination of urine[147]. The pits of this subspecies are aphrodisiac for both sexes[218]. The root is used in the treatment of constipation, children's fever, pinworms and teeth ailments[218]. All members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, Korea, Manchuria. ksacta Open country and roadsides[151]. Sunny mountain slopes at elevations of 100 - 200 metres[266].

propta Seed - requires  $2\cdot 3$  months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. A very ornamental plant[1], but it is subject to die-back[11]. Plants in this genus are notably susceptible to honey fungus[200]. This sub-species has larger plum-like fruits up to 50mm in diameter[200]. Closely related to P. glandulosa[11, 58]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

# 5.2.326 Chenopodium foliosum

Leafy goosefoot

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Chenopodium foliosum is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People

with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Fruit Leaves SeedEdible Uses: Leaves - cooked and used like spinach[61, 74, 177]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Seed - ground into a powder and cooked. It can be added to cereal flours and used in making bread. Very small and fiddly, the seed is about 1mm in diameter[266]. Soak the seed for 12 hours and then thoroughly rinse it in order to wash off any saponins before grinding it[K]. Fruit - raw. Fairly insipid, though quite attractive to look at[K]. The fruit is about 12mm in diameter[200].

tcanta DyeGold/green dyes can be obtained from the whole plant [168].

nrakta S. Europe to N. Africa and Asia. ksacta Waste places and waysides[100]. Slopes, forest margins and valleys in northern Tibet[266].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. Formerly cultivated for its edible leaves[61]. This species is closely related to C. capitatum[200].

# 5.2.327 Blephilia ciliata

Downy wood mint

4 tlin 7 cyuc 3 kcak 2 tcan 1 dwat 0.7 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Blephilia ciliata is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known

kcakta Edible Parts: LeavesEdible Uses: Leaves. Minty leaves eaten raw and used in teas. The leaves can be used to prepare sauces and drinks [1-4].

tcanta Soil stabilizationA strong scented plant that may act as an aromatic pest confuser reducing their ability to find other nearby crops [1-3]. The flowers attract long-tongued and short-tongued bees, bee flies, Syrphid flies, butterflies, and skippers (illinoiswildflowers.info). A plant for Forest Gardens, Pollinator Gardens, Prairie or Meadow. Used as Butterfly Nectar Plants or as part of a Groundcover or Mass Planting. Showy Blooms can be used in Cottage Gardens, Deer Resistant Plantings, Rock Gardens, Water-wise Landscapes, Low Maintenance Plantings, Perennial Borders, Restoration Projects and Wildlife Gardens (newmoonnursery.com).

dwatta Traditionally used by the Cherokee to make a poultice to treat headaches.  $\,$ 

nrakta Eastern North American and through parts of the Central United States. Plants occur from Canada south to Georgia and west to Oklahoma. ksacta Indigenous to dry open woods, prairies, savannas, limestone bluffs, glades, barrens, clearings, fields, steep slopes, disturbed sites and roadsides. Plants often occur in thin soils over limestone.

propta Propagate by division.

nwatta A Short-Lived fast-growing herbaceous perennial with an upright form. It prefers full sun to semi-shade and a loamy, silty soil with a pH 6 to 8. Downy wood mint has some drought tolerance but dislikes waterlogged soils or flooding. It is sensitive to salt, soil compaction. Flowers are fragrant. Soil can contain loam, clay, gravel and limestone. A high pH is tolerated but will restrict growth. It has a greater tolerance to drought than other mint species. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Root type is fibrous and shallow. Flowering time: June to August (Northern Hemisphere).

nrakta S. America to N. America. ksacta Grows in scrub near the coast from Chile to western N. America[71].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[27, 200]. Tolerates semi-shade though fruit production will be reduced. Grows best near the coast[27]. Plants like a mulch of pine or spruce leaves[18]. Cultivated for its edible fruit in the Andes[61]. This species, along with F. virginiana, is probably a parent of the cultivated strawberries[46]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen, The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. Heat zone 9-1. Can be mown in early spring.

## 5.2.324 Mahonia repens

Creeping Oregon Grape, Creeping barberry, Grape Oregon 4 tlin 8 cyuc 3 koak 4 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia repens is an evergreen Shrub growing to 0.3 m (1ft) by 2 m (6ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit - raw or cooked[85, 183]. An acid flavour but it is rather nice raw, especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. Used for making jams. jellies etc. They can also be made into a refreshing lemonade-like beverage[183]. When sugar is added, the fruit juice is similar to grape juice[212]. The fruit is about 9mm in diameter[200].

tcanta Dye Oil Soil stabilizationA yellow dye is obtained from the inner bark of the stem and roots[155, 257]. It is green[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. Plants form suckers freely, making a good dense ground cover[11, 200], though they can be slow to become established[197] and will need weeding for their first few years after planting out[K]. The sub-species M. repens rotundifolia has been especially recommended[197]. A useful plant for preventing soil erosion on slopes[155].

dwatta Alterative Anaphrodisiac Antibacterial Antiseptic Antitumor Cholagogue Depurative Diuretic Dysentery Expectorant Febrifuge Laxative Salve TonicThe root and root bark is alterative, anaphrodisiac, antiseptic, cholagogue, depurative, diuretic, expectorant, febrifuge, laxative and tonic[4, 238]. It improves the digestion and absorption and is taken internally in the treatment of coughs, fevers, psoriasis, syphilis, haemorrhages, stomach complaints, kidney problems and impure blood conditions[4, 238, 257]. Externally, it is used as an antiseptic and healing wash or poultice on wounds and rheumatic joints[257]. The roots are harvested in late autumn or early spring and dried for later use[238]. A poultice of the fresh berries has been applied to boils[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of vari-

ous enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta Western N. America. ksacta Hills and slopes, often in partial shade[85], usually on dry slopes[155].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Erosion control, Ground cover, Massing. An easily grown plant, it thrives in any good garden soil[11], preferring one on the dryish side. Grows well in heavy clay soils. Succeeds in the light shade of trees[K]. This species is hardy to about -15°c if growing in a sheltered position[184]. Established plants sucker freely and form quite dense thickets[200]. The flowers are scented[245]. Resistant to honey fungus[88]. Special Features: North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 3 (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 5.2.325 Prunus japonica nakai

Japanese Plum

4 tlin 8 cyuc 3 kcak 1 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli fla hpa7tmwatli xre7t hjonli

drutta Prunus japonica nakai is an evergreen Shrub growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. A sweet agreeable flavour, they make a good pie[183]. A very good size, about 50mm in diameter with one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept at a temperature of 20°c. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established [78]. Division of suckers in late spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Agroforestry Services: Living fence Industrial Crop: Fiber Management: Standard Regional CropLandscape Uses:Border, Container, Erosion control, Foundation, Ground cover, Massing, Rock garden, Seashore, Specimen. A very easily grown plant, it thrives in most soils but prefers a sandy loam and full exposure to the south[11]. Dislikes peaty or chalky soils[111]. Can succeed in light shade[K]. Plants are hardier when grown on poor sandy soils[200]. Established plants are very drought resistant[190]. Plants are hardy to at least -15°c when grown in a well-drained soil. This species is one of the toughest members of the genus and once established is capable of surviving, and even thriving, despite considerable neglect. Plants growing in dense weed competition on our Cornwall trial grounds have managed to spread and even flower[K]. A very ornamental and free flowering species[1], there are some named varieties[182]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in about four years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]. Special Features: Attracts birds, Attractive foliage. North American native. Attracts butterflies. Attractive flowers or blooms.

## 5.2.262 Rubus spectabilis

Salmonberry

4 tlin 8 cyuc 3 kcak 3 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hionli

drutta Rubus spectabilis is a deciduous Shrub growing to 1.8 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Fruit StemEdible Uses: TeaFruit - raw, cooked or dried for later use[1, 2, 17, 85, 101, 183]. Juicy with a very good flavour[182, 183]. The fruit can be made into jams and jellies[257]. This species is not of much value in Britain, it does not fruit freely in the cooler summers of this country and the fruits do not always develop their full flavour[11]. The fruit can range in colour from yellow, through orange to red, it is about the size of a cultivated raspberry but is rather inferior in flavour and often has a distinctive bitterness, especially in cooler summers[K]. Another report says that it fruits freely in Britain[182]. Young shoots peeled and eaten raw or cooked like asparagus[11, 101, 118, 183, 257]. They are harvested in the spring as they grow

above the soil and whilst they are still tender[161]. Flowers - raw[172]. The leaves are used as a tea substitute[183].

tcanta Disinfectant Dye PipesAgroforestry Uses: The deep root system of salmonberry can help prevent soil erosion on steep slopes[1050] Salmonberry is a pioneer or early seral species noted for its ability to spread aggressively on disturbed sites. A certain amount of soil disturbance is essential for good seedling establishment. Seedlings generally appear in abundance after fire, timber harvest, or other types of disturbance. Rhizomes enable the plant to spread vigorously and form dense patches. In many areas dense stands may form within 2 to 3 years after disturbance[1050]. The stands will often diminish as tree species become established and form a canopy, though it can persist almost indefinitely, especially under hardwood canopies such as Alder. Other Uses: The plant is used in breeding programmes with the raspberry (Rubus idaeus) in North America[317]. A purple to dull blue dve is obtained from the fruit[168]. The hollowed stems are used as pipes[99]. (The report does not specify what type of pipes).

dwatta Analgesic Astringent Disinfectant Odontalgic Poultice StomachicThe leaves and the root are astringent[172]. A poultice of the chewed leaves has been used as a dressing on burns[257]. The root bark is analgesic, astringent, disinfectant and stomachic[257]. A decoction is used in the treatment of stomach complaints[257]. A decoction has been used to lessen the pains of labour[257]. The powdered bark has been used as a dusting powder on burns and sores[257]. A poultice of the bark has been applied to wounds and aching teeth to ease the pain[257]. A poultice of the chewed bark has been used as a dressing to relive pain and clean burns and wounds[257].

nrakta Western N. America - Alaska to California. Occasionally naturalized in Britain[17]. ksacta Moist spots in and about woods below 300 metres in California[71].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Grows well in the shade of trees[200] though it is less likely to fruit well in such a position[K]. Hardy to about -25°c[184]. A very ornamental plant. but it is invasive[1]. It does not fruit well in Britain[11], but has become naturalized in Surrey and Cumbria in cool acid woodland soils[182]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 5.2.263 Berberis cooperi

4 tlin 8 cyuc 3 kcak 1 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis cooperi is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is

pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. An acid taste, but it is pleasant raw in small quantities K1

tcanta DyeA yellow dye is obtained from the root.

dwatta Ántibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Bhutan ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel. October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

#### 5.2.264 Ribes hirtellum

Currant-Gooseberry, Hairystem gooseberry 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 1 m hkuc

thut cyutli tcup hwicil hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes hirtellum is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

koakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in jams, jellies, pies, preserves etc[3, 11, 85, 101, 183]. A smooth-skinned gooseberry[235] with a pleasant taste[183, K]. The fruit can also be dried for later use[183, 257]. The fruit is about 8 - 10mm in diameter[200].

nrakta Northern N. America - Newfoundland to Manitoba, West Virginia and South Dakota. ksacta Rocky or swampy woods and clearings[43].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Prefers a very sunny position[11]. Hardy to about -20°c[200].

Closely allied to R. uva-crispa and R. oxyacanthoides[11], it is often cultivated for its edible fruit[132] and is the parent of many disease-resistant American gooseberry cultivars[200]. It is sometimes crossed with European hybrids[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

#### 5.2.265 Berberis canadensis

Allegheny Barberry, American barberry 4 tlin 8 cyuc 3 kcak 1 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Berberis canadensis is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Fruit -raw or cooked. Agreeably acid[2, 22, 46, 95, 161], they are an acceptable raw fruit in small quantities but are more commonly used in preserves[177, K]. The fruits are about 9mm long[200]. Leaves - raw. A trailside nibble[102]. Flowers[102]. No more details.

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. A tea made from the roots is used in the treatment of fevers and diarrhoea[222].

nrakta Eastern N. America - Virginia to Georgia, Alberta and Indiana. ksacta Banks of streams and dry woods[11, 43]. In woods or glades, on rocky slopes and near rivers at elevations of 100 - 700 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood. July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil but is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. The plant is an alternate host of 'black stem rust' of cereals and so it is often grubbed out when growing wild in cereal-producing areas. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1,2]

alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and flowers - raw or cooked[2, 5, 52, 53, 105]. Abot cress-like flavour, they are mainly used as a garnish or flavouring in salads etc[132] but are also sometimes used as a potherb[183]. The plant germinates most freely in the autumn and so leaves are usually available all winter[244].

tcanta The tiny flowers are attractive to a few early butterflies, including (in the United States) spring azure (Celastrina ladon) and falcate orange-tip (Anthocharis midea).

nrakta Throughout most of the northern Hemisphere, including Britain. ksacta Open and cultivated ground, rocks, scree, walls etc[17].

propta Seed - sow spring or autumn in situ. This species needs very little encouragement and is quite capable of sowing itself, often too freely.

nwatta Prefers a moist humus rich soil in shade or semishade[200] but it succeeds in most soils and positions[1]. A common garden weed, it can be in flower all year round if the weather is mild. It will usually self-sow very freely in cultivated soil and is found especially in pot-grown plants[K].

## 5.2.322 Monarda didvma

Bergamot, Scarlet beebalm, Horsemint, Oswego Tea, Bee

4 tlin 10 cyuc 3 kcak 3 tcan 2 dwat 0.9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Monarda didyma is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from April to October, in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: Flowers Leaves ShootsEdible Uses: Condiment TeaLeaves and young shoot tips - raw or cooked. They are used as a flavouring in salads, fruit salads, drinks etc[46, 61, 105, 183]. Flowers - raw. They are added as an attractive garnish to salads[183, 238, 244]. An excellent aromatic tea is made from the fresh or dried leaves and flower heads[21, 46, 105, 183]. The leaves give an Earl Grey flavour to China tea[238].

tcanta Companion Essential Pot-pourriLandscape Uses: Border, Container, Massing, Rock garden, Specimen. Attracts birds, North American native, Edible, Fragrant foliage, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. Yields an essential oil, used in perfumery, as a hair tonic etc[46, 61]. The dried leaves and flowers are used to scent and add colour to pot-pourri[238]. Brings hummingbirds.

dwatta Anthelmintic Carminative Diuretic Expectorant Febrifuge Rubefacient Stimulant UrinaryBergamot is often used as a domestic medicine, being particularly useful in the treatment of digestive disorders. The leaves and flowering stems are anthelmintic, carminative, diuretic, expectorant, febrifuge, rubefacient and stimulant[4, 222]. An infusion is used in the treatment of flatulent colic and sickness, it is also used as a diuretic to treat urinary disorders[4, 238]. The leaves can be harvested before the plant flowers, or they can be harvested with the flowering stems. They can be used fresh or dried[238]. An essential oil from the herb is mainly used externally as a rubefacient in the treatment of rheumatism etc[4].

nrakta Eastern N. America - New York to Michigan, south to Georgia and Tennessee. ksacta Moist soils[235] in rich woods, thickets and bottom lands[43].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at  $20^{\circ}$ C. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots

in spring. Harvest the shoots with plenty of underground stem when they are about 8 -  $10 \mathrm{cm}$  above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Grows well in heavy clay soils. Reguires a moist soil and a sunny position[4, 200]. Prefers some shade[4] but succeeds in a sunny position so long as the soil does not dry out. Provide light shade in hotter zones. Plants are hardy to at least -25°c[187]. The flowers are rich in nectar and are very attractive to bees[4, 55, 244]. A good companion plant, it grows well with tomatoes[14, 20], Bergamot is a very ornamental and aromatic plant, it is often grown in the herb garden, there are some named varieties[183, 233]. The leaves, stems and roots carry a delicious aromatic orange-like perfume when crushed[245]. Plants are subject to mildew in dry summers[200]. Special Features: The plant is heat tolerant in zones 10 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.323 Fragaria chiloensis

Beach Strawberry, Pacific beach strawberry, Sandwich beach strawberry

4 tlin 10 cyuc 3 kcak 3 tcan 1 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Fragaria chiloensis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[2, 27, 101, 183, 257]. Large, sweet and succulent with a delicate flavour[183]. A delicious treat[K]. The berries can be used to make jams, preserves etc[257]. A tea can be made from the leaves[257].

tcanta Plants spread by means of runners and can be grown as a ground cover[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. seedy fruit loved by birds. Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, theses are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level ground covers provide little fuel.

dwatta Antiseptic Astringent Emmenagogue Galactogogue OdontalgicThe plant is antiseptic, astringent, emmenagogue, galactogogue and odontalgic[172]. It has been used to regulate the menstrual cycle[172]. A poultice of the chewed leaves has been used to treat burns[257]. easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta An easily grown plant[203], it prefers a sunny position in a light well-drained soil[1]. Succeeds in heavy soils and in light shade[203]. The bulbs should be planted fairly deeply[1]. Closely related to A. senescens, differing mainly in having keeled leaves[203]. It has the same uses as that species[K]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.319 Allium splendens

Miyama-Rakkyo

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium splendens is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw, cooked or pickled[46, 61, 105, 177]. Rather small[183]. The bulbs are about 3 - 7cm long and 5 - 7mm in diameter[200]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta E. Asia - China, Japan, Korea, Mongolia and Russia. ksacta Alpine meadows in C. and N. Japan[58]. Also found in light woodland[203]. Forests, scrub, meadows and moist slopes at elevations of 100 - 1000 metres in northern China[266].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta Prefers a sunny position in a light well-drained soil[1]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. This species is closely related to A. lineare[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.320 Brassica oleracea gongylodes

Kohl Rabi

4tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutia Brassica oleracea gongylodes is a BIENNIAL growing to 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves StemEdible Uses: Leaves cooked[142]. Used as a vegetable, though the quality is not as good as cabbage. The young leaves can also be added to salads, though some people find them difficult to digest. A nutritional analysis is available[218]. Stem - raw or cooked. The plant produces a swollen stem just above ground level, and this is often used as a root vegetable[K]. It has a mild cabbage flavour, when finely grated it makes a good addition to mixed salads and, when cooked, is an excellent vegetable[K]. It is best eaten whilst fairly small and tender, between golf ball and tennis ball size. It becomes coarse with age[33, 116, 142]. A nutritional analysis is available[218].

dwatta Digestive TonicThe leaf is digestive and conic[218].

nrakta A cultivated form of B. oleracea, not known in the wild. ksacta Not known in the wild.

propta Seed - sow April to August in situ. Earlier sowings can be made under cloches.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Succeeds in any reasonable soil, though it is best not grown in an acid soil[16, 33]. Tolerates a pH in the range 4.5 to 7.5. Prefers some shade and plenty of moisture in the growing season[20, 37]. Established plants are drought tolerant but the best stems are formed when the plant does not go short of moisture[20, 37]. Succeeds in maritime gardens[200]. Very winter hardy, kohl rabi withstands severe frosts and so can be left in the ground all winter in most areas and be harvested as required. The young growing plant, however, is sensitive to low temperatures and a week at 10°c will cause the plants to bolt[200]. It grows best at a temperature between 18 and 25°c[200]. Kohl rabi is often cultivated for its edible swollen stem which can be available almost all year round from successional sowings. There are several named varieties and stem colour can range from white to green and purple[200]. Green forms are faster to mature and so more suitable for early sowings, the purple forms are hardier and later to mature, they are used mainly for winter crops[200]. Very fast growing, the stems of some cultivars can be harvested 6 - 8 weeks after sowing[33]. The plant is more tolerant of drought and high temperatures than turnips, which it resembles in flavour, and so it is often grown as a substitute for that species[200]. Grows well with onions, beet and aromatic herbs which seem to reduce insect predations[18, 20, 201]. Plants also grow well with cucumbers, the roots of each species occupying different levels in the soil[201]. Grows badly with strawberries, runner beans and tomatoes[18, 20, 201].

# 5.2.321 Cardamine hirsuta

Hairy Bittercress

4 tlin 8 cyuc 3 kcak 1 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine hirsuta is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly

## 5.2.266 Symphytum uplandicum

Comfrey

4 tlin 8 cyuc 3 kcak 4 tcan 5 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Symphytum uplandicum is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is poliniated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This plant contains small quantities of a toxic al-kaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

kcakta Edible Parts: LeavesEdible Uses: Gum TeaYoung leaves - cooked or raw[2, 4, 5, 9, 46, 61]. The leaf is hairy and the texture is mucilaginous. It may be full of minerals but it is not pleasant eating for most tastes. It can be chopped up finely and added to salads, in this way the hairiness is not so obvious[183]. Young shoots can be used as an asparagus substitute[46]. The blanched stalks are used[183]. Older leaves can be dried and used as a tea[26]. The peeled roots are cut up and added to soups[183]. A tea is made from the dried leaves and roots[183]. The roasted roots are used with dandelion and chicory roots for making coffee[183].

tcanta Biomass Compost GumThe plant grows very quickly, producing a lot of bulk. It is tolerant of being cut several times a year and can be used to provide 'instant compost' for crops such as potatoes. Simply layer the wilted leaves at the bottom of the potato trench or apply them as a mulch in no-dig gardens. A liquid feed can be obtained by soaking the leaves in a small amount of water for a week, excellent for potassium demanding crops such as tomatoes. The leaves are also a very valuable addition to the compost heap[26, 200]. A gum obtained from the roots was at one time used in the treatment of wool before it was spun[100]. Plants can be grown as a ground cover when planted about 1.2 metres apart each way[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anodyne Astringent Demulcent Eczema Emollient Expectorant Haemostatic Refrigerant VulneraryComfrey is a commonly used herbal medicine with a long and proven history in the treatment of various complaints. The root and the leaves are used, the root being more active, and they can be taken internally or used externally as a poultice[4, 222]. Comfrey is especially useful in the external treatment of cuts, bruises, sprains, sores, eczema, varicose veins, broken bones etc, internally it is used in the treatment of a wide range of pulmonary complaints, internal bleeding etc[4, 238, K]. The plant contains a substance called 'allantoin', a cell proliferant that speeds up the healing process[4, 21, 26, 165, 222, 238]. This substance is now synthesized in the pharmaceutical industry and used in healing creams[238]. The root and leaves are anodyne, astringent (mild), demulcent, emollient, expectorant, haemostatic, refrigerant, vulnerary[4, 21, 26, 165, 222]. Some caution is advised, however, especially in the internal use of the herb. External applications and internally taken teas or tinctures of the leaves are considered to be completely safe, but internal applications of tablets or capsules are felt to have too many drawbacks for safe usage[238]. See also the notes above on toxicity. The leaves are harvested in early summer before the plant flowers, the roots are harvested in the autumn. Both are dried for later use[238]. A homeopathic remedy is made from the fresh root, harvested before the plant flowers[232]. This has a very limited range of application, but is of great benefit in the treatment of broken bones and eve injuries[232].

nrakta A hybrid of garden origin, S. asperum x S. officinale[200]. ksacta Not known in a truly wild situation.

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This is a hybrid species that does not usually produce seed. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates most soils and situations but prefers a moist soil and some shade[1, 4]. Grows well in heavy clay soils. Best grown in an open sunny site in a deep rich soil if it is being grown for compost material[2001. Hardy to about -20°c[187]. A naturally occurring hybrid species (S. asperum x S. officinale), it does not set viable seed and so is not aggressive. The root system is very deep, fragments of root left in the soil can produce new plants. A number of named forms have been selected for their higher production of leaves[183]. Subject to attacks by the rust fungus, this can be alleviated by giving the plants a high potash feed, wood ashes are often used[26]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

#### 5.2.267 Taxus canadensis

Canadian Ye

4 tlin 8 cyuc 3 kcak 1 tcan 4 dwat 1.5 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli dyat hjonli

drutta Taxus canadensis is an evergreen Tree growing to  $1.5\ m$  (5ft) by  $1.5\ m$  (5ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, and the seeds ripen from September to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous[1, 4, 7, 10, 19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[43, 46, 1.05]. Very sweet and gelatinous, most people find it delicious though some find it sickly[K]. The fruit is a fleshy berry about 8mm in diameter and containing a single seed[200]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm, if the seed has been bitten into, however, it could cause some problems.

tcanta DyeA green dye can be obtained from the leaves[257].

dwatta Abortifacient Analgesic Antirheumatic Cancer Diaphoretic Diuretic Emmenagogue FebrifugeThe Canadian yew is a very poisonous plant, though it was employed medicinally by several native North American Indian tribes who used minute amounts of the leaves both internally and externally in order to treat a variety of complaints including rheumatism, fevers, influenza, expelling afterbirth and dispelling clots[213, 222, 257]. Modern research has shown that it contains the substance 'taxol' in its shoots and bark. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[222, 238]. This remedy is very toxic and, even when used externally, should only be used under the supervision of a qualified practitioner[238]. See also the notes above on toxicity. The plant is abortifacient, analgesic, antirheumatic, antitumor, diaphoretic, diuretic, emmenagogue, febrifuge and pectoral[257].

nrakta Eastern N. America - Newfoundland to Western Virginia, Manitoba, Kentucky and Iowa. ksacta An understory shrub in rich forests (deciduous, mixed, or coniferous), bogs, swamps, gorges, ravine slopes, and rocky banks from sea level to 1500 metres[270].

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe terminal shoots, 5 - 8cm long. July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded frame[113]

nwatta Thrives in almost any soil, acid or alkaline, as long as it is well-drained[200]. Plants are very shade tolerant82]. This species is the most cold-hardy member of the genus[11] - dormant plants will tolerate very heavy frosts though the young growth in spring can be damaged by a few degrees of frost. The plants produce very little fibrous root and should be planted in their final positions when still small[81]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Other reports say that this species usually has monoecious flowers (separate male and female flowers, but both borne on the same plant)[82, 270].

## 5.2.268 Lilium canadense

Meadow Lily, Canada lily 4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tlmwatli xre7t hionli

drutta Lilium canadense is a BULB growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[2, 105, 177]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum). The taste is rather like raw green corn on the ear[207]. The bulb can be dried, ground into a powder and used in making bread etc[257]. A famine food, only used when better foods are not available[257]. The bulb is up to 5cm in diameter[235].

dwatta Dysentery Poultice StomachicA poultice made from the bulbs is applied to snakebites[222]. A tea made from the bulbs is stomachic and is also used in the treatment of irregular menses and dysentery[222, 257]. nrakta Eastern N. America - Quebec to Nova Scotia, south to Georgia. ksacta Wet meadows, moist rich woods especially edges, streamsides and river alluvia, bogs, marshes, swamps, along wet roadsides and railroads from sea level to 1000 metres[270].

propta Seed - delayed hypogeal germination[130], Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]. nwatta Prefers an open free-draining humus-rich loamy

soil with its roots in the shade and its head in the sun[200]. Dislikes lime[42]. The sub-species L. canadense editorum is said to be lime tolerant[163, 200]. Does well in open woodland[1, 143]. Succeeds in partial shade but rapidly degenerates when grown in deep shade[143]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°c[214]. Stoloniferous[200], the bulbs should be planted 15 - 25cm deep[143]. Only replant in autumn. never in spring[143]. A very ornamental[1] and easily grown plant[143]. The species is not easy to grow in Europe[90]. Polymorphic, there are a number of sub-species[143]. It hybridizes in nature with L. superbum but it does not hybridize readily in the garden[143]. Closely allied to L. michiganense[143]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 5.2.269 Tragopogon dubius

ellow Salsify

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tragopogon dubius is a ANNUAL/PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[105, 183]. Fleshy[177]. Young stems, when 5 -10cm high, and the bases of the lower leaves - raw or cooked. Used as a potherb[183].

nrakta Europe to W. Asia - Austria and N. France eastwards. ksacta Fields in Turkey, 400 - 1840 metres[93].

land and coniferous forests, usually on leafy soils overlying a rather stony sub-soil, from sea level to 1500 metres[60].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta A woodland plant, preferring light soils[1]. It is best grown in a well-drained sandy woodland soil[42, 90, 134]. Plants are best grown in a bulb frame and kept rather dry in summer[90]. Water should be withheld in summer or hot spells[164]. A very ornamental and polymorphic plant[1]. The sub-species F. affinis tristulis is a triploid form that is exceptionally large flowered, robust and easily cultivated[90]. Plants flower within 3 - 5 years from seed[164].

## 5.2.316 Lycopus uniflorus

Bugleweed, Northern bugleweed 4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lycopus uniflorus is a PERENNIAL growing to  $0.3\,\mathrm{m}$  (1ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[55, 61, 62, 105, 161]. The roots were a staple food for some native North American Indian tribes[257]. The crisp white tubers can be eaten raw in salads or cooked in soups etc[183]. When boiled for a short time they are said to make an agreeable vegetable, somewhat like Chinese artichokes (Stachys affinis)[183].

dwatta Antitussive SedativeThe whole plant is antitussive and sedative[61].

nrakta N. America - Newfoundland to British Columbia, North Carolina, Nebraska and Oregon ksacta Low, wet or boggy ground in the north of its range, wet woodland in the south[43].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of the country. This species might be no more than a synonym for L. virginicus, a species known to be hardy in Britain. The following notes are based on the general needs of the genus. Tolerates most soil types so long as they are wet. Succeeds in damp meadows or in wet places by ponds or streams[200]. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 5.2.317 Wyethia amplexicaulis

Mulesears Wyethia, Mule-ears

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.8 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Wyethia amplexicaulis is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Root SeedEdible Uses: Root -cooked[46, 61, 105, 161, 257]. The native North American Indians dug pits in the ground which they lined with large stones. They then burnt a fire on top of the stones until the stones were hot. The roots were placed on these hot stones, sealed in with fern leaves and earth and then fermented for one or two days[94]. Seed[161, 177, 207, 257]. No more details are given. Young shoots[177]. No more details are given.

dwatta PoulticeThe roots furnish a remedy applied externally as a poultice to bruised and swollen limbs[207, 257]. nrakta Central and Western N. America. ksacta Open,

not too dry hillsides and dry meadows in the foothills[60].

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse or cold frame in early spring. Use a very freely-draining compost, prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions when they are large enough. Careful division of the crown as the plants come into growth in spring[200].

nwatta Requires a free-draining, gritty but moistureretentive soil in a sunny position[200]. Plants are intolerant of drought[200]. Plants are considered to be a pest of grazing ground in N. America and large-scale eradication programmes are carried out[212].

## 5.2.318 Allium suaveolens

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium suaveolens is an evergreen Bulb growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible 761.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta S. and C. Europe. ksacta Damp meadows and moors[203].

propta Seed - sow spring in a cold frame. Prick out the sedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very

for, or adulterant of, peppermint oil[238]. Yields of up to 1.6% have been obtained[240].

dwatta Anaesthetic Antiphlogistic Antiseptic Antispasmodic Aromatic Cancer Carminative Diaphoretic Emmenagogue Febrifuge Galactofuge Salve Stimulant Stomachic-Japanese mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its essential oil[279] which has antiseptic properties and a beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The whole plant is anaesthetic, antiphlogistic, antispasmodic, antiseptic, aromatic, carminative, diaphoretic, emmenagogue, galactofuge, refrigerant, stimulant, stomachic and vasodilator 147, 172, 218, 279]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222,279]. The leaves are a classical remedy for stomach cancer[218]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta E. Asia - China, Japan and Korea. ksacta Wet grasslands near rivers and lakes at elevations of 200 - 1100 metres in China[266].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K] Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more guickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. This species tolerates much drier conditions than other members of the genus[238]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to at least -15°c[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The whole plant has a very strong scent of peppermint[245]. Hybridizes freely with other members of this genus. Polymorphic[200]. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.314 Polygonum bistortoides

American Bistort

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Polygonum bistortoides is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of

common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root SeedEdible Uses: Leaves - raw or cooked. A pleasant acid flavour, they are used as a potherb[183]. Root - raw or cooked[106]. Starchy and rather pleasant[85], the root can be baked or added to soups, stews etc[105, 161, 183, 257]. It was often dried before being used[207]. The raw root is slightly astringent, it becomes sweeter when boiled but is best when baked[212]. Seed - raw or cooked. It is rather small and fiddly to utilize.

dwatta Astringent PoulticeThe root is astringent. A poultice has been used in treating sores and boils[257].

nrakta Western N. America - Canada to California. ks-acta Moist or wet meadows and swamps, seldom below 2500 metres[43, 85].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Plants are growing well at Kew in a moist position by water in the rock garden[K]. Plants seem to be immune to the predations of rabbits[233]. This species is closely related to P. viviparum[1] and P. bistorta[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.315 Fritillaria affinis

Chocolate Lily, Checker lily
4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis
hpa7tmwatli xre7t hjonli

drutta Fritillaria affinis is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Root SeedpodEdible Uses: Bulbraw, cooked or dried for winter use[2, 161]. Rich in starch, the bulb is best used in the autumn[172]. The plant has a small bulb surrounded by rice-like bulblets[256]. Both bulb and bulblets are used, when cooked they are tender and delicate, resembling real rice except for having a slightly bitter taste[256]. The roots were a staple food for some native North American Indian tribes[257]. Immature seedpods-raw or cooked. A bitter flavour[172].

nrakta Western N. America - British Columbia to California, east to Idaho. ksacta Prairies and grass bluffs to wood-

propta Seed - sow spring in situ. Make sure to water the seed in if the weather is dry.

nwatta Succeeds in ordinary garden soils, including heavy clays[200].

# 5.2.270 Lilium brownii

Hong Kong Lily

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lilium brownii is a BULB growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers RootEdible Uses: CondimentBulb - cooked[61, 105, 163]. A pleasant slightly sweet taste[183], they are used as a vegetable in much the same way as potatoes (Solanum tuberosum). A starch can be extracted from the bulbs and added to other foods[183]. The grated bulb can be added as a thickener to soups etc[183]. The bulb is usually rather small[260] - it is 25 - 40mm in diameter[266]. The dried flower petals are used as a flavouring in soups[183].

dwatta Antitussive Carminative Diuretic Expectorant Febrifuge Pectoral Poultice Sedative TonicThe bulb is antitussive, diuretic, carminative, expectorant, febrifuge, pectoral, sedative and tonic[147, 176, 218]. A decoction is used in the treatment of coughs and haematemesis due to deficiency condition, anxiety, apprehension, oedema and difficult urination[147]. Bulbils from the leaf axils are used in the treatment of intestinal disorders[218]. The dried and powdered flowers are used as a poultice for bruises, cuts etc[2181].

nrakta E. Asia - Southern China from Hong Kong, to Burma ksacta Loose fertile soil along woodland edges or in grass and thickets[147]. Rock crevices, amongst coarse grass and scrub below 1,500 metres[260].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]. Bulblets are formed on the stem just below the soil surface. These should be dug up in the autumn and replanted immediately, preferably in a cold frame for growing on until large enough to plant out into the garden[143,

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Requires a light soil[42, 47]. Is this species limetolerant?[200]. Plants prefer a position that s moist in the summer but dry in the winter[260]. Stem rooting, the bulbs should be planted 20 - 25cm deep[42, 47, 143]. Said to be very difficult in cultivation[47], this species tolerates temperatures down to about -3°c[260]. It grows well at Kew but is not hardy everywhere[143]. Self-sterile, the type species does not set seed[47]. It is believed that this species is either of hybrid origin or it is a garden form of the true wild species L. brownii colchesteri. Wils.[143]. It is the sub-species colchesteri that is used medicinally[176, 218]. The flowers have a soft sweet fragrance. This fragrance is more pronounced in the variety 'Viridulum' [245]. The plant does not come into growth until late spring[260]. It should be protected against slugs at this time since if the shoot tip is eaten out the bulb

will not grow in that year and will lose vigour[200]. The edible bulbs are occasionally sold in ethnic markets in San Francisco[183] and are a common food item in China[179], where the plant is cultivated for edible and medicinal use[266]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

#### 5.2.271 Monarda fistulosa

Wild Bergamot, Mintleaf bergamot, Wild Bee-Balm, Lupine 4 tlin 10 cyuc 3 kcak 2 tcan 2 dwat 1.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Monarda fistulosa is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. The entire plant above ground level can be used as a potherb[183], though it is rather aromatic. It is also used as a flavouring in salads and cooked foods[46, 105, 183, 213]. The flowers make an attractive edible garnish in salads[183]. The fresh or dried leaves are brewed into a refreshing aromatic tea[183, 257].

tcanta RepellentThe leaves have been used as an insect repellent[257].

dwatta Carminative Diaphoretic Diuretic Pectoral StimulantWild bergamot was often employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints, but especially those connected with the digestive system[257]. It is still sometimes used in modern herbalism. The leaves and flowering stems are carminative, diaphoretic, diuretic and stimulant[4, 222]. An infusion is used internally in the treatment of colds, catarrh, headaches, gastric disorders, aching kidneys, to reduce low fevers and soothe sore throats[213, 238, 257]. Externally, it is applied as a poultice to skin eruptions, cuts etc and as a wash for sore eyes[238, 257]. The leaves can be harvested before the plant flowers, or they can be harvested with the flowering stems. They can be used fresh or dried[238]. The plant contains the essential oil 'bergamot oil' which can be inhaled to treat bronchial complaints[213]. The leaves also contain 'thymol', an essential oil that can be used to expel gas from the digestive tract[213].

nrakta North-eastern N. America - Quebec to Minnesota, south to Texas. ksacta Dry thickets, clearings and woodland

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°c. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Massing. Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Grows well in heavy clay soils. Requires a moist soil and a sunny position[1, 200], though it also succeeds in light shade[187]. This species thrives when grown in a dry soil[233, 238, K]. It prefers alkaline soil conditions[238]. Plants are hardy to

at least -25°c[187]. A very ornamental plant, there are several named varieties[1, 233]. A good bee plant[200]. Subject to mildew in dry summers[200]. Special Features: Attracts birds, North American native, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.272 Leymus racemosus

Volga Wild Rye, Mammoth wildrye 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicii hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Leymus racemosus is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Oil Seed StemEdible Uses: OilSeed - used as a cereal substitute in some parts of Russia, especially in times of drought[183]. The seed is rather small and difficult to extract[K]. Young underground shoots - raw. Sweet and tender[183].

tcanta Oil Soil stabilizationPlants have an extensive spreading root system and are used to stabilize inland sand dunes, though they do not tolerate salty conditions[61].

nrakta Europe, in Russia, to central Asia and Tibet. ks-acta Dry sandy soils[50].

propta Seed - sow mid spring in situ and only just cover the seed[162]. Germination should take place within 2 weeks. If the supply of seed is limited, it can also be sown in mid spring in a cold frame. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in summer[K] Division in spring or summer[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils, preferring a sandy soil and a sunny position[1, 200]. Established plants are drought resistant[183]. Plants can be very invasive, spreading freely by means of the rhizomes. Currently (1990) being evaluated as a perennial grain crop in N. America[183]. There are some named varieties, selected for their ornamental value[200].

# 5.2.273 Sporobolus cryptandrus

Sand Dropseed

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sporobolus cryptandrus is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It

cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[257]. It can be parched, ground into a flour and eaten dry or made into a mush[61, 101, 105, 183]. The ground seed can also be added to biscuits, breads and other cereal concoctions[183, 257]. The tiny seed is easily freed from its husks[183].

tcanta Brush Soil reclamationA bunch of the grass, about 30cm long, can be tied together with string and used as a brush for cleaning[257].

nrakta Eastern N. America - Massachusetts to Montana, Pennsylvania and Mexico. ksacta Sandy soils by the coast[43]. Grasslands and disturbed sites[274].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination should take place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer if they have grown sufficiently. Otherwise, grow them on in a greenhouse for their first winter and plant them out in late spring of the following year. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any well drained soil in a sunny position[200].

#### 5.2.274 Inula helenium

Elecampane, Elecampane inula

4 tlin 8 cyuc 3 kcak 2 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Inula helenium is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Allergic reactions. Potential to interfere with the treatment of diabetes mellitus and high blood pressure. Avoid if history of allergy [301].

kcakta Edible Parts: Leaves RootEdible Uses: Leaves cooked. Rather bitter and aromatic[115], they were used as a potherb by the ancient Romans[183] but are rarely used at present. Root - candied and eaten as a sweetmeat[4, 7, 27, 105, 183]. It contains up to 44% inulin[46, 240]. Inulin is a starch that cannot be digested by humans. It usually passes straight through the digestive system, though it can ferment and cause wind problems for some people[K]. Inulin can be converted into a sugar that is suitable for diabetics to eat[238]. The Council of Europe list Inula helenium as a natural food flavouring.

tcanta Dye EssentialA blue dye is obtained from the bruised and macerated root mixed with ashes and whortleberries (Vaccinium myrtillus)[4, 46, 61]. The root yields up to 2% of a camphor-scented essential oil, this is used as a flavouring and medicinally[46, 61, 238].

dwatta Alterative Anthelmintic Antiseptic Antitussive Astringent Bitter Cholagogue Demulcent Diaphoretic Diuretic Expectorant Stimulant Stomachic TonicElecampane has a long history of use as a medicinal herb. A gently warming and tonic herb, it is especially effective in treating coughs, consumption, bronchitis and many other complaints of the chest as well as disorders of the digestive system[4, 9, 254]. A very safe herb to use, it is suitable for the old and the young and especially useful when the patient is debilitated[254]. It cleanses toxins from the body, stimulating the immune and digestive systems and treating bacterial and fungal infections[238]. The root is alterative, anthelmintic, antiseptic, astringent, bitter, cholagogue, demulcent, diaphoretic, diuretic, mildly expectorant, gently stimulant, stomachic, tonic[4, 7, 9, 21, 46. 165, 200, 218.

plant out into their permanent positions when the plants are at least 15cm tall[K]. If there is plenty of seed it can be sown in an outdoor seed bed in April. Plant out into their permanent positions the following spring. Division in spring or autumn[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings in July/August.

nwatta A very easily grown plant, it succeeds in any welldrained soil in a sunny sheltered position[200]. It prefers a light rich moist soil[37, 52],a warm position[27, 37] and partial shade[4]. Once established, this is a drought tolerant species[190, 200], it is a useful plant to try in difficult dry places[187], usually succeeding in the dustiest of soils once it is established[190]. Lemon balm is often grown in the herb garden, and sometimes also commercially [46], there are some named varieties[183]. Plants can often self-sow so freely as to become a menace[187]. If the plants are cut back hard after flowering, they will produce a fresh flush of leaves[238]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A good bee plant[4, 8, 24]. A good companion plant, especially for brassicas[14]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 5.2.312 Malva sylvestris

Mallow, High mallow, French Hollyhock, Common Mallow, Tree Mallow, Tall Mallow

4 tlin 8 cyuc 3 kcak 3 tcan 3 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Malva sylvestris is a BIENNIAL/PERENNIAL growing to 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

pcista When grown on nitrogen rich soils (and particularly when these are cultivated inorganically), the plant tends to concentrate high levels of nitrates in its leaves[76]. The leaves are perfectly wholesome at all other times. Avoid with gallstones.

kcakta Edible Parts: Flowers Leaves SeedEdible Uses: TeaLeaves - raw or cooked[2, 4, 7, 9, 94, 183]. Mucilaginous with a mild pleasant flavour, they are nice in soups where they act as a thickener[5]. The young leaves also make a very acceptable substitute for lettuce in a salad[K]. Immature seed - raw[183]. Used as a nibble[183], the seeds have a nice nutty flavour[12] but are too fiddly for most people to want to gather in quantity[K]. Flowers - raw. Added to salads or used as a garnish[183]. A pleasant mild flavour, with a similar texture to the leaves, they make a pleasant and pretty addition to the salad bowl[K]. The leaves are a tea substitute[46, 183].

tcanta Dye Fibre LitmusCream, yellow and green dyes can be obtained from the plant and the seed heads[168]. A

tincture of the flowers forms a very delicate test for alkalis[4, 115]. The leaves are used to relieve insect bites and stings[53]. A fibre obtained from the stems is useful for cordage, textiles and paper making[115].

dwatta Antiphlogistic Astringent Demulcent Diuretic Emollient Expectorant Laxative SalveAll parts of the plant are antiphlogistic, astringent, demulcent, diuretic, emollient, expectorant, laxative, salve[4, 7, 9, 21, 46, 222, 238]. The leaves and flowers can be eaten as part of the diet, or a tea can be made from the leaves, flowers or roots[222]. The leaves and flowers are the main part used, their demulcent properties making them valuable as a poultice for bruise, inflammations, insect bites etc, or they can be taken internally in the treatment of respiratory system diseases and problems with the digestive tract[4, 238, 254]. When combined with eucalyptus it makes a god remedy for coughs and other chest ailments[254]. Mallow has similar properties, but is considered to be inferior to the marsh mallow (Althaea officinalis) and are seldom used internally[4]. The plant is an excellent laxative for young children[7]. The leaves can be used fresh whenever they are available or can be harvested in the spring and dried for later use[254]. The flowers are harvested in the summer and can be dried for later use[254]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Malva sylvestris for cough, bronchitis, inflammation of the mouth and pharynx (see [302] for critics of commission E).

nrakta Most of Europe, including Britain. ksacta Waste ground, field verges and roadsides, avoiding acid soils[7, 9, 17].

propta Seed - sow early spring in situ. Germination should take place within 2 weeks.

nwatta Landscape Uses:Border, Massing. A very easily grown plant, succeeding in ordinary garden soil[1] and in poor soils[238]. It prefers a reasonably well-drained and moderately fertile soil in a sunny position[200], where it will produce a better crop of salad leaves[K]. Plants are hardy to about -20°c[187]. There are some named forms, selected for their ornamental value[187]. 'Mauritiana' is larger than the type with much more ornamental flowers[187]. The flavour of the leaves and flowers is considered by many to be superior to the type species[183]. Plants seem to be immune to the predations of rabbits[233]. Prone to infestation by rust fungus[200]. Special Features: Not North American native, Naturalizing, Attractive flowers or blooms.

## 5.2.313 Mentha arvensis piperascens

Japanese Mint

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Mentha arvensis piperascens is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods[5, 172, 183], they have a strong taste of peppermint[238]. A herb tea is made from the fresh or dried leaves[21, 183]. An essential oil from the plant is used as a flavouring in sweets and beverages[183]. The leaves contain about 0.2% essential oil[218].

tcanta Essential Repellent StrewingThe plant is used as an insect repellent[18, 20, 99]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. An essential oil is obtained from the plant[238]. It can be used as a substitute

common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Root SeedEdible Uses: Leaves - raw or cooked[2, 7, 9, 103]. One report says that they are rather bitter[5], but we have found them to have a fairly mild flavour, especially when the leaves are young, though the texture is somewhat chewy when they are eaten raw[7, K]. They make an excellent substitute for spinach[183]. In Northern England the leaves are an ingredient of a bitter Lenten pudding, called Easter ledger pudding, that is eaten at Lent[183]. The leaves are available from late winter in most years and can be eaten until the early autumn though they become much tougher as the season progresses[K]. The leaves are a good source of vitamins A and C[257], a nutritional analysis is available[218]. Seed raw or cooked[172]. The seed is very small and rather fiddly to utilize[K]. Root - raw or cooked[7, 172, 257]. Rich in starch and tannin, it is steeped in water and then roasted in order to reduce the tannin content[4, 115]. It is then said to be a tasty and nutritious food[4]. The root has also been boiled or used in soups and stews[183] and can be dried then ground into a powder and used in making bread[4]. The root contains 30% starch, 1% calcium oxalate and 15 - 36% tannin[218].

tcanta TanninThe roots contain up to 21% tannin[223]. dwatta Antidiarrhoeal Astringent Cholera Demulcent Diuretic Dysentery Epilepsy Febrifuge Laxative StypticBistort is one of the most strongly astringent of all herbs and it is used to contract tissues and staunch blood flow[254]. The root is powerfully astringent, demulcent, diuretic, febrifuge, laxative and strongly styptic[4, 218]. It is gathered in early spring when the leaves are just beginning to shoot, and then dried[4]. It is much used, both internally and externally, in the treatment of internal and external bleeding, diarrhoea, dysentery, cholera etc[4, 9, 13, 21, 147, 165, 172]. It is also taken internally in the treatment of a wide range of complaints including catarrh, cystitis, irritable bowel syndrome, peptic ulcers, ulcerative colitis and excessive menstruation[238, 254]. Externally, it makes a good wash for small burns and wounds, and is used to treat pharvngitis. stomatitis, vaginal discharge, anal fissure etc[238, 254]. A mouth wash or gargle is used to treat spongy gums, mouth ulcers and sore throats[254]. The leaves are astringent and have a great reputation in the treatment of wounds[4]. In Chinese medicine the rhizome is used for: epilepsy, fever, tetanus, carbuncles, snake and mosquito bites, scrofula and cramps in hands and feet [301]. Considered useful in diabetes [301].

nrakta Northern and central Europe, including Britain. mountains of S. Europe, western and central Asia. ksacta Damp meadows and by water, especially on acid soils[13,

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Container, Ground cover. Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. The plant repays generous treatment[1]. A very cold-hardy plant, tolerating temperatures down to at least -25°c[187]. Bistort was formerly cultivated as a medicinal and edible plant[4]. though it has now fallen into virtual disuse. Plants are somewhat spreading, forming quite extensive colonies[187] especially in low-lying pastures[4]. They seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Edible, Not North American native, Invasive, Suitable for cut flowers. Suitable for dried flowers. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if avail-

able. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.311 Melissa officinalis

Lemon Balm, Common balm, Bee Balm, Sweet Balm, Lemon

4 tlin 8 cyuc 3 kcak 3 tcan 5 dwat 0.7 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Melissa officinalis is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Can cause irritation in high concentrates. Avoid during pregnancy. Care if sensitive skin [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A pleasant lemon-like aroma and flavour, they are used mainly as a flavouring in salads and cooked foods[5, 7, 8, 9, 14, 27, 183]. A lemon-flavoured tea can be made from the fresh or dried leaves[21, 183]. A bunch of the leaves can be added to china tea, much improving the flavour, the leaves are also added to fruit cups etc[4]. They are used as a flavouring in various alcoholic beverages including Chartreuse and Benedictine[238].

tcanta Essential Pot-pourri RepellentLandscape Uses: Border, Container, Rock garden. The growing plant is said to repel flies and ants[14]. It is also rubbed on the skin as a repellent[238], though the essential oil would be more effective here[K]. An essential oil is obtained from the plant[100] (the exact part is not specified, it is probably the entire plant and especially the flowering stems). It is used medicinally. The whole plant is very pleasantly aromatic, the aroma lasting for a long time after the plant has been harvested. It is therefore a very useful ingredient in pot-pourri[4]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antianxiety Antibacterial Antidepressant Antiemetic Antispasmodic Antiviral Aromatherapy Carminative Diaphoretic Digestive Emmenagogue Febrifuge Sedative TonicLemon balm is a commonly grown household remedy with a long tradition as a tonic remedy that raises the spirits and lifts the heart[254]. Modern research has shown that it can help significantly in the treatment of cold sores[254]. The leaves and young flowering shoots are antibacterial, antispasmodic, antiviral, carminative, diaphoretic, digestive, emmenagogue, febrifuge, sedative, and tonic[4, 7, 9, 21, 165, 238]. It also acts to inhibit thyroid activity[238]. An infusion of the leaves is used in the treatment of fevers and colds, indigestion associated with nervous tension, excitability and digestive upsets in children, hyperthyroidism, depression, mild insomnia, headaches etc[4, 9, 238]. Externally, it is used to treat herpes, sores, gout, insect bites and as an insect repellent[238]. The plant can be used fresh or dried, for drying it is harvested just before or just after flowering[9]. The essential oil contains citral and citronella, which act to calm the central nervous system and are strongly antispasmodic[254]. The plant also contains polyphenols, in particular these combat the herpes simplex virus which produces cold sores[254]. The essential oil is used in aromatherapy. Its keyword is 'Female aspects' [210]. It is used to relax and rejuvenate, especially in cases of depression and nervous tension[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Melissa officinalis for nervousness and insomnia (see [302] for critics of commission E).

nrakta C. and S. Europe, W. Asia and N. Africa. Naturalized in Britain. ksacta Waste places and derelict land near human habitations[9].

propta Seed - sow spring or autumn in a cold frame. Germination can be slow[200]. Prick out the seedlings into individual pots as soon as they are large enough to handle and 2221. It is best harvested in the autumn from plants that its wound-healing activity, being effective against both interare two years old, and it can be dried for later use[4]. The roots should be at least 3 years old according to another report[7]. This remedy should not be prescribed for pregnant women[238]. An extract of the plant is a powerful antiseptic and bactericide, particularly effective against the organism that causes TB[213, 238]. The root contains alantolactone, which is strongly anthelmintic. In a 1:1000 dilution it kills the parasitic worm Ascaris in 16 hours[218]. Alantolactone has an anti-inflammatory action, it also reduces mucous secretions and stimulates the immune system[254]. The plant is sometimes recommended as an external wash for skin inflammations and varicose ulcers, but has been known to cause allergic reactions[238].

nrakta S.E. Europe. Naturalized in Britain. ksacta Fields, waysides, waste places, copses etc[17], often on moist soils in shade[4].

propta Seed - sow in spring or autumn in a cold frame[4]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it could be worthwhile trying an outdoor sowing in situ in the spring. Division in spring or autumn[111]. Fairly small pieces of root can be used, so long as each piece has a growth bud on it[4]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings in winter. Cut sections of root about 5cm long, place them in a warm greenhouse over the winter and they should grow away vigorously[4].

nwatta An easily grown plant, it grows well in moist shady positions in ordinary garden soil, though it grows best in a good loamy soil[4]. Succeeds in an ordinary garden soil in a sunny position[1]. Plants are also tolerant of considerable neglect, succeeding on our Cornwall trial ground even when left unweeded for four years[K]. Elecampane has a long history of cultivation as a medicinal herb, though it is not commonly grown nowadays[4]. When first dug up, the roots smell like ripe bananas, but as they dry they take on the scent of violets[245]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

# 5.2.275 Stachys palustris

Marsh Woundwort, Marsh hedgenettle 4 tlin 8 cyuc 3 kcak 1 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stachys palustris is a PERENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Avoid during pregnancy and breast feeding [301]. kcakta Edible Parts: Leaves Root SeedEdible Uses: Tubers - raw or cooked[K]. A wholesome and nutritious food[4]. they have a pleasant mild nutty flavour[K]. The tubers can be dried and ground into a powder that is used in making bread etc[2, 4, 12, 115, 183]. The tubers are formed in the autumn[17]. Although quite small, they are fairly smooth and produced in a reasonable quantity so are not too fiddly to utilize[K]. Young shoots - cooked. Used as an asparagus substitute[183]. A pleasant taste but the smell is disagreeable[4]. Seed[257]. No further details are given[257].

tcanta DveA vellow dve is obtained from the plant[207]. dwatta Antiseptic Antispasmodic Emetic Emmenagoque Expectorant Haemostatic Nervine Sedative Tonic Vulnerary-The plant is antiseptic, antispasmodic, emetic, emmenagoque, expectorant, haemostatic, nervine, sedative, tonic, vulnerary[4, 61, 218]. The plant has been highly valued for nal and external bleeding, and is also used in the treatment of gout, cramps and pains in the joints[4]. The herb is harvested in the summer when just coming into flower and can be dried for later use[4].

nrakta Europe, including Britain, south and east from Norway to Portugal and temperate Asia to Japan. ksacta By streams and ditches, also in swamps and fens. Occasionally found on arable land[17].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots once they are large enough to handle and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer

nwatta Requires a moist soil for good root production[2, 24]. A good bee plant[24]. All parts of the plant emit an unpleasant smell when bruised[245]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.276 Lilium canadense flavum

Meadow Lilv

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Lilium canadense flavum is a BULB growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[2, 105, 1771. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum). The taste is rather like raw green corn on the ear[207]. The bulb can be dried, ground into a powder and used in making bread etc[257]. A famine food, only used when better foods are not available[257]. The bulb is up to 5cm in diameter[235].

nrakta Eastern N. America. ksacta Meadows, low thickets and wet woods[43].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Dislikes lime[42]. Does well in open woodland but rapidly degenerates in deep shade[143]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°c[214]. A very ornamental plant[1], unlike the main species this form is easily grown in Britain[143]. Polymorphic, there are a number of sub-species. Closely related to L. michiganense. Hybridizes in nature with L. superbum but does not hybridize readily in the garden[143]. Stolonifer-ous[200], the bulbs should be planted 15-  $25\mathrm{cm}$  deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. Never plant out in the spring[143]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

# 5.2.277 Asclepias rubra

Red Silkweed

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 1.2 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Asclepias rubra is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274].

kcakta Edible Parts: Flowers Leaves SeedpodEdible Uses: Gum SweetenerFlower buds - cooked as potherbs or added to soups[207]. Young shoots and leaves - cooked as potherbs or added to soups[207]. Young seed pods, 3 - 4 cm long, cooked[207]. Flower clusters can be boiled down to make a sugary syrup[207]. A chewing gum can be made from the latex contained in the stem and leaves, but it is possibly toxic[207].

tcanta Fibre Gum Latex StuffingThe following reports refer to other members of this genus and are possibly also appropriate for this species[K]. A good quality fibre is obtained from the bark, used in making twine, cloth, paper etc[95. 112, 169]. It is of poor quality in wet seasons[112]. It is easily harvested in late autumn after the plant has died down by simply pulling the fibres off the dried stems[169]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[112, 159, 169, 171]. It is a Kapok substitute, used in Life Jackets or as a stuffing material[112]. Very water repellent, it can yield up to 550 kilos per hectare[112]. The floss has also been used to mop up oil spills at sea. Candlewicks can be made from the seed floss[112, 207]. Rubber can be made from latex contained in the leaves and the stems[46, 57, 102, 159]. It is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112]. Pods contain an oil and a wax which are of potential importance. The seed contains up to 20% of an edible semi-drying oil[74, 112]. It is also used in making liquid soap[74].

dwatta WartsThe latex is used as a cure for warts[168]. nrakta Eastern N. America - New Jersey and Pennsylvania to Florida, Missouri, Louisiana and Texas. ksacta Moist soils[235]

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the

summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Prefers a well-drained light rich or peaty soil and a sunny position[1, 134, 200]. A very ornamental plant[1], it is closely related to A. lanceolata[200]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207].

#### 5.2.278 Oenothera biennis

Evening Primrose, Sun Drop, Common evening primrose 4 tlin 8 cyuc 3 kcak 3 tcan 5 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Oenothera biennis is a BIENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies), bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Lowers the threshold for epileptic fits (avoid). Caution if on anticoagulants. Combining with phenothiazines (allopathic medication) can trigger seizures. Adverse effects: may cause headaches and nausea on an empty stomach. Diarrhoea with high doses. Seizures in schizophrenic patients on phenothiazines (allervy antihistamines) [301].

kcakta Edible Parts: Flowers Leaves Oil Root SeedpodEdible Uses: OilRoot - cooked. Boiled and eaten like salsify[4, 12, 27, 33, 66]. Fleshy, sweet and succulent[74]. Wholesome and nutritious[2]. A peppery taste[159]. The taste somewhat resembles salsify or parsnips[183]. Young shoots - raw or cooked[2, 12, 52, 85, 183]. Mucilaginous, with a peppery flavour, they are best used sparingly[159]. Another source suggests that the shoots should not be eaten[9]. Flowers - sweet. Used in salads or as a garnish[183]. Young seedpods - cooked. Steamed[183]. The seed contains 28% of a drying oil[114]. It is edible and a very good source of gamma-linolenic acid[141], an essential fatty acid that is not found in many plant sources and has numerous vital functions in the body. The seed, however, is very small and difficult to harvest, it has to be done by hand[160]. Overall yields are low, making the oil very expensive to pro-

tcanta Cosmetic Dye Miscellany OilThe oil from the seed is added to skin preparations and cosmetics. It is often combined with vitamin E to prevent oxidation[238]. A yellow dye is obtained from the flowers[7]. A finely ground powder made from the flowering stems is used cosmetically in face-masks to counteract reddened skins[7].

dwatta Anticholesterolemic Antipruritic Astringent Eczema Hypotensive Miscellany SedativeThe bark and the leaves are astringent and sedative[4, 21]. They have proved of use in the treatment of gastro-intestinal disorders of a functional origin, whooping cough and asthma[4]. A syrup made from the flowers is also an effective treatment for whooping cough[7]. The bark is stripped from the flowering stem and dried for later use, the leaves are also harvested and dried at this time[4]. Evening primrose oil has become a well-known food supplement since the 1980's. Research suggests that the oil is potentially very valuable in the treatment of multiple sclerosis, pre-menstrual tension, hyperactivity etc[66]. It is also taken internally in the treatment of eczema, acne, brittle nails, rheumatoid arthritis and alcohol-related liver damage[238]. Regular consumption of the oil helps to reduce blood cholesterol levels and lower the blood pressure[21, 66]. The seed is a good source of gamma-linolenic

medium lime-free loam in sun or semi-shade[3, 11, 200]. One report says that this species succeeds in alkaline soils[182] (a rather surprising comment considering the general needs of the genus - it is more likely that the plant can grow on limestone so long as the soil remains acid[K]). Shade tolerant[31] but plants produce less fruit when they are grown in the shade[200]. Prefers a cool damp position. A very ornamental plant, it is sometimes cultivated for its medicinal uses[1]. There are a number of named varieties developed for their ornamental interest[200]. The form 'Massachusetts' is an especially prostrate, free-flowering and free-fruiting form[183]. 'Anchor Bay', 'Point Reves' and 'Vulcan's Peak' have all been mentioned as good groundcover forms[200]. This is one of the first plants to colonize bare and rocky ground and burnt over areas[155]. It is often an indicator of poor soils in the wild[212]. Plants resent root disturbance and should be placed in their final positions as soon as possible[11, 134]. Hybridizes with other members of this genus especially A. columbiana. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen, A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

# 5.2.308 Physalis pruinosa

Strawberry Tomato

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Physalis pruinosa is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista All parts of the plant, except the fruit, are poisonous[19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, preserves etc[105]. A delicious bitter sweet flavour. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten

nrakta Eastern N. America - Wisconsin, New York and south to Florida. ksacta Dry open often sandy soils, old fields and wasteland[43].

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away well. Diurnal temperature fluctuations assist germination[170]

nwatta Succeeds in any well-drained soil in full sun or light shade[200]. The young growth in spring can be damaged by late frosts. Occasionally cultivated for its edible fruit, there are some named varieties. Similar to P. peruviana[200].

## 5.2.309 Hosta longipes

4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 0.3 m hkuc pcimhmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli

flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hosta longipes is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked. Sourish[105]. A very acceptable taste, but somewhat fibrous[K].

tcanta A good ground cover plant, succeeding in dense shade.

nrakta E. Asia - Japan, Korea. ksacta Usually found growing on trees or rocks in the wild[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Another report says that once established it is drought tolerant[187]. Does well in the semi-shade of a woodland[200] also succeeding in deeper shade[187]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A vigorous plant, forming medium sized clumps. The roots travel extensively[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. Hybridizes freely with other members of this genus, especially with H. kikuti[200].

# 5.2.310 Polygonum bistorta

Bistort, Meadow bistort, Snakeweed 4 tlin 7 cyuc 3 kcak 2 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Polygonum bistorta is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of

in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Fairly large and sweet but insipid raw[11, K]. The fruit is said to develop more flavour when it is cooked[183]. Another report says that the fruit is sour, bitter and unpalatable raw[3, 183], though this does not agree with the plants we are growing[K]. The fruit is about 30mm in diameter[200].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]. A good ground cover plant for a sunny position or light shade[3]. It spreads freely once established, but dies down over the winter and thus can allow other species to invade[K].

nrakta E. Asia - Japan. ksacta Thickets and waste ground[58].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[201].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Sometimes cultivated for its edible fruit and occasionally naturalized in Europe[50]. Plants spread freely when in a suitable site and are apt to become invasive[182]. The plant adopts an almost herbaceous habit and is botanically a sub-shrub, only a small amount of woody stem persists overwinter[K]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 5.2.307 Arctostaphylos uva

Bearberry

4tlin 8 cyuc 3 kcak 4 tcan 4 dwat 0.1 m hkuc pcimhmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Arctostaphylos uva-ursi is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from April to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil

pcista This plant is best not used by pregnant women since it can reduce the supply of blood to the foetus[172]. Large doses may lead to nausea and vomiting due to tannin content. Overdoes may result in tinnitus, nausea, vomiting, shortness of breath, convulsions and collapse [301].

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[3, 7, 8, 62, 161, 257]. Insipid, dry and meal[4, 101, 183], it becomes sweeter when cooked[212]. Added to stews etc, it is a good source of carbohydrates[101]. The fruit can also be cooked and eaten. They are used for preserves or made into jelly, marmalade, sauces and pastes. The ripe fruit can be soaked in water or butter to reduce the dryness. Plants are best harvested after the first frost which sweetens them. They can be left to lie all winter under the snow. [1-4]. The fruit can also be used to make a cooling drink or used for preserves etc[161, 183]. It can be dried and stored for later

use[257]. The fruit is about 6mm in diameter[200]. A tea is made from the dried leaves[177, 183].

tcanta Beads Dye Pioneer Soil stabilization Tannin WaterproofingA yellowish-brown dye is obtained from the leaves[57, 101], it does not require a mordant[168]. A grey-brown dye is obtained from the fruit[257]. The dried fruits are used in rattles and as beads on necklaces etc[99, 257]. The leaves are a good source of tannin[46, 61, 212]. The mashed berries can be rubbed on the insides of coiled cedar root baskets in order to waterproof them[257]. A good ground-cover for steep sandy banks in a sunny position[188, 200] or in light shade[197]. A carpeting plant, growing fairly fast and carpeting as it spreads[208]. It is valuable for checking soil erosion on watersheds[212]. This is also a pioneer plant in the wild, often being the first plant to colonize burnt-over areas, especially on poor soils[155]. There are a number of named varieties developed for their ornamental interest[200].

dwatta Antiseptic Astringent Birthing aid Diuretic Hypnotic Kidney Lithontripic Poultice Skin Tonic Urinary Women's complaintsBearberry was commonly used by many native North American Indian tribes to treat a wide range of complaints and has also been used in conventional herbal medicine for hundreds of years, it is one of the best natural urinary antiseptics[254]. The leaves contain hydroquinones and are strongly antibacterial, especially against certain organisms associated with urinary infections[238]. The plant should be used with caution, however, because hydroguinones are also toxic[222]. The leaves are antiseptic. astringent, diuretic, lithontripic, hypnotic and tonic[7, 9, 21, 102, 165, 172, 192]. The dried leaves are used in the treatment of a variety of complaints[4]. These leaves should be harvested in early autumn, only green leaves being selected, and then dried in gentle heat[4]. A tea made from the dried leaves is much used for kidney and bladder complaints and inflammations of the urinary tract such as acute and chronic cystitis and urethritis, but it should be used with caution and preferably only under the supervision of a qualified practitioner[4, 21, 46, 172, 222, 254]. The tea is more effective if the urine is alkaline, thus it is best used in combination with a vegetable-based diet[254]. Externally, a poultice of the infused leaves with oil has been used as a salve to treat rashes, skin sores etc. and as a wash for a baby's head[257]. An infusion of the leaves has been used as an evewash, a mouthwash for cankers and sore gums and as a poultice for back pains, rheumatism, burns etc[257]. The dried leaves have been used for smoking as an alternative to tobacco[238]. One report says that it is unclear whether this was for medicinal purposes or for the intoxicated state it could produce[192], whilst another says that the leaves were smoked to treat headaches and also as a narcotic[257]. The herb should not be prescribed to children, pregnant women or patients with kidney disease[238] Another report says that some native North American Indian tribes used an infusion of the stems, combined with blueberry stems (Vaccinium spp) to prevent miscarriage without causing harm to the baby, and to speed a woman's recovery after the birth[257]. Other uses: fluid retention and bed wetting. Claimed to strengthen the heart muscle and urinary tract and to return the womb to its normal size after childbirth [301]. Treatment should be short (seven days) and used with an alkaline diet [301]. Not recommended for children under 12

nrakta Britain. Northern N. America. N. Europe. N. Asia. ksacta Dry open woods, often on gravelly or sandy soils[212]. It is also found on sand dunes along the coast[212] and is also found on limestone in the European Alps.

propta Seed - best sown in a greenhouse as soon as it is ripe. Pre-soak dried seed in boiling water for 10 - 20 seconds or burn some straw on top of them and then stratify at 2 - 5°c for 2 months[11, 200]. The seed usually germinates in 2 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or greenhouse for at least their first winter. Plant out in late spring or early summer. Cuttings of side shoots of the current season's growth, 5 - 8cm with a heel, August to December in a frame. The cuttings are very slow and can take a year to root[1, 78]. Division in early spring. Take care because the plant resents root disturbance. Pot the divisions up and keep them in a lightly shaded position in a cold frame or greenhouse until they are growing away actively. Layering of long branches in early spring[200, 238].

nwatta Requires a deep moist well-drained light or

acid, an unsaturated fatty acid which assists the production of hormone-like substances[222, 238]. This process is commonly blocked in the body, causing disorders that affect the uterine muscles, nervous system and metabolism[238]. The poulticed root is applied to piles and bruises[222]. A tea made from the roots is used in the treatment of obesity and bowel pains[222].

nrakta Eastern N. America - Labrador, south to Florida and Texas. Naturalized in Britain. ksacta Dunes, roadsides, railway banks and waste places in Britain[17], often in sandy soils[4]

propta Seed - sow in situ from late spring to early summer[200]

nwatta Prefers a dryish well-drained sandy loam and a warm sunny position[1, 4, 200], though it is tolerant of most soils[4]. Heavy clay soils may induce winter rots[200]. Grows well on very poor soils[160, 238]. Established plants are drought resistant[160]. Formerly cultivated for its edible roots, the evening primrose is being increasingly cultivated for the oil contained in its seed which contains certain essential fatty acids and is a very valuable addition to the diet[66]. See the notes on medicinal uses for more details. The flowers open in the evening and are strongly scented with a delicious sweet perfume[245], attracting pollinating moths[4]. The seeds are a good food source for birds[200]. Plants usually self-sow freely if they are growing in a suitable position, they can naturalize in the wild garden[4, K]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

# 5.2.279 Prunus japonica

Korean Cherry, Japanese bush cherry 4 tlin 8 cyuc 3 kcak 1 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus japonica is an evergreen Shrub growing to  $1.5\ m$  (5ft) by  $1.5\ m$  (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. A sweet agreeable flavour, they make a good pie[183]. Cherry-like, a harsh sour taste[178]. A reasonable size, about 14mm in diameter with one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Aperient Carminative Demulcent Deobstruent Diuretic Lenitive OphthalmicThe kernels are aperient, carminative, demulcent, deobstruent, diuretic, hypotensive, laxative, lenitive and ophthalmic[147, 176, 178, 218, 238]. They are taken internally in the treatment of dry constipation, oedema and insomnia following a trauma[238]. The root is used in the treatment of constipation, children's fever, pinworms and teeth ailments[218]. Although no specific mention has been seen for this species, all members of the genus contain amyodalin and prunasin, substances which break

down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, Japan, Korea, Manchuria. ksacta Woodlands[238] in mountain valleys[178]. Forest on mountain slopes, thickets and sunny mountain slopes at elevations of 100 - 200 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants are hardy to at least -15°c[238]. A very ornamental plant[1], but it is subject to die-back[11]. Plants in this genus are notably susceptible to honey fungus[200]. The Korean cherry is sometimes cultivated for its edible fruit, there is at least one named variety[183]. The sub-species P. japonica nakai. (Lév)Rehd., which comes from Manchuria, has larger plum-like fruits up to 50mm in diameter[200]. This species is closely related to P. glandulosa[11, 58]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238].

#### 5.2.280 Ribes lacustre

Prickly Blackcurrant, Prickly currant 4 tiin 8 cyuc 3 koak 2 toan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes lacustre is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Skin contact with the spines can cause an allergic reaction in some people [101].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 85, 101, 257]. Tart and very juicy[183]. The fully ripe fruit has an agreeable flavour[256]. When crushed the fruit has a foul odour[43] but when eaten by the handful the odour is inoffensive (this sounds a bit strange!) and when cooked they make a good sauce[183]. The fruit can also be dried for later use or used to make jams and preserves[257]. The fruit is about 5mm in diameter[200] and is covered with weak gland-tipped bristles[235].

tcanta Needles StringThe roots have been boiled with cedar (Juniperus spp, Thuja sp.) and wild rose (Rosa spp) roots, then pounded and woven into rope[257]. The sharp thorns have been used as probes for boils, for removing splinters and for tattooing[257].

dwatta Analgesic Birthing aid Laxative Ophthalmic StomachicThe leaves or the bark can be chewed and then placed on sores caused by the prickles of this plant[257]. A decoction of the bark has been used as a wash for sore eyes[257]. The decoction has also been taken by women during labour to ease the birth[257]. A decoction of the root can be taken several times a day as a treatment for constipation[257]. A decoction of the twigs has been taken in the treatment of general body aches[257]. A decoction of dried branches has been used in the treatment of stomach complaints, diarrhoea and colds[257].

nrakta N. America - Newfoundland to Alaska, south to Massachusetts, New York, Pennsylvania and California. ks-acta Cold damp woods[43]. Swamps and wet woods[235].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4- 6 months cold stratification at about  $0^{\circ}c$  and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10-  $15 {\rm cm}$  with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Éasily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°c[200]. Although this plant has spines, it belongs to the blackcurrant section of the genus[101]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.281 Prunus fruticosa

Mongolian Cherry, European dwarf cherry 4 tlin 8 cyuc 3 kcak 1 tcan 1 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus fruticosa is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcistà Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. A cherry-like flavour but very harsh and acid[11, 105]. A tart flavour, it can also be made into preserves or dried for later use[183]. The fruit is about 15mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Europe to western and central Asia. ksacta Thickets and dry grassland[50]. Forest-steppes and steppe zone, broad-leaved forest margins, shrubby thickets, steppes and open dry slopes in Tibet[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[113]. Softwood cuttings from strongly growing plants in spring to early

summer in a frame. Layering in spring. Division of suckers during the dormant season. They can be planted out direct into their permanent positions.

nwatta Thrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Requires a sunny position[11, 45]. Trees are said to have withstood temperatures down to -45°c in their native habitat[183]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-21].

#### 5.2.282 Crambe tatarica

Tartar Bread Plant

4 tlin 8 cyuc 3 kcak 2 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Crambe tatarica is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves and young stems-raw or cooked[2, 46, 74]. Usually blanched in much the same way as seakale (C. maritima][61, 183]. Root - raw or cooked[105]. The root, which can be as thick as a person's arm, is fleshy and sweet[2, 183]. It can be used raw in salads, or be cooked as a vegetable[2]. It can be dried and ground into a powder, then mixed with cereal flours when making bread[2]. The root is rich in starch and sugars[74].

tcanta Attracts wildlife.

nrakta E. Europe to W. Asia. ksacta Bushy and grassy places[45], it is also found on chalky slopes[74].

propta Seed - sow March/April in a seedbed outdoors and either thin the plants out or move them to their permanent positions when about 10cm tall[111]. The young plants are very attractive to slugs so some protection will often be needed. Germination can be slow so it is best to sow the seed in pots in a cold frame[164]. Germination usually takes place in 3 - 26 weeks at 15°c[164]. Prick out the seedlings into individual nots as soon as they are large enough to handle and plant out into their permanent positions when they are at least 10cm tall. Division in spring or autumn[1, 111]. Dig up the root clump and cut off as many sections as you require, making sure they all have at least one growing point. The larger of these divisions can be planted out straight into their permanent positions, though small ones are best potted up and grown on in a cold frame until they are established. Root cuttings, 3 - 10 cm long, in spring[104]. These can be planted straight into the open ground or you can pot them up in the greenhouse and plant them out once they are growing

nwatta An easily grown plant, succeeding in a good loam and an open sunny position[1]. Prefers a slightly alkaline soil in a position sheltered from strong winds[200]. Tolerates poor soil and some shade[200]. Dislikes acid soils[1]. A deep-rooted plant[233], it dislikes root disturbance[164]. This is an aggregate species[54]. There is some confusion over the correct spelling of this species name, it is written as C. tataria in some books[50]. Plants can be grown in the summer meadow if the grass is not cut too low (since this would damage the growing point)[200]. A good bee plant[74].

# 5.2.283 Campanula lactiflora

Milky Bellflower 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 1 m hkuc milky breath of a tiny child[245].

# 5.2.303 Allium angulosum

Mouse Garlic

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium angulosum is an evergreen Bulb growing to  $0.5 \mathrm{\,m}$  (1ft  $8\mathrm{\,in}$ ). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[105]. It can be preserved for winter use by salting[2, 177]. The small bulbs are slender and elongated[203] and about 5mm wide[200]. Leaves - raw or cooked. There is a slight bitterness in the flavour[K]. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta C. Europe to E. Asia - Siberia. ksacta Damp meadows near rivers[50].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta An easily grown plant[203], it prefers a sunny position in a moist but well-drained soil[203]. Succeeds in leavy soils and in light shade[203]. The bulbs should be planted fairly deeply[1]. This species is often sold in nurseries as A. pyrenaicum[203]. Closely related to A. senescens, differing mainly in having keeled leaves[203]. The flowers do not have the usual onion smell[203]. Cultivated as a vegetable in Siberia[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.304 Claytonia lanceolata

Lanceleaf Spring Beauty, Idaho springbeauty, Pacific springbeauty, Peirson's springbeauty

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flat hpa7tmwatli xre7t hionli

drutta Claytonia lanceolata is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in March, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[61, 105, 161, 257]. Rather palatable[60]. The raw root has a pleasant radish-like taste, when baked it has the taste and texture of baked potato[212]. The roots can be dried, ground into a powder and stored for later use[257]. The globose tubers are up to 20mm in diameter[270]. Leaves - raw or cooked[61, 85].

nrakta Western N. America - southwards from British Columbia. ksacta Rich soils that are moist in spring from the foothills to alpine slopes[60, 85]. Sagebrush and montane foothills to alpine areas, particularly where snow persists, 500 - 3000 metres[270].

propta Seed - surface sow on a peat based compost in spring in a cold frame. Germination usually takes place within 2-4 weeks at  $10^{\circ} {\rm C}[164]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out in late spring or early summer after the last expected frosts. Division of offsets in spring or autumn.

nwatta Prefers a damp peaty soil and a position in full sun[1, 164]. Requires a lime-free soil[164].

# 5.2.305 Stellaria jamesiana

tuber starwor

4 tlin 9 cvuc 3 kcak 0 tcan 0 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stellaria jamesiana is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no mention has been seen for this species, the leaves of some members of this genus contain saponins. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Stellaria jamesiana Torr. is a synonym of Pseudostellaria jamesiana (Torr.) WA. Weber and R.L. Hartm.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - raw or cooked. Root - raw or cooked. Sweet and pleasant[85].

nrakta Western N. America. ksacta Moist woodland amongst shrubs, westwards from Wyoming and Texas[85].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta We have very little information on this species and do not know if it will be hardy outdoors in Britain, though judging by its native range it should succeed outdoors at least in the milder parts of the country. Prefers a moist loamy site[85]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 5.2.306 Rubus illecebrosus

Strawberry-Raspberry

hpa7tmwatli xre7t hionli

4 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

drutta Rubus illecebrosus is a deciduous Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is

nrakta Western Europe, including Britain, from Iceland and Norway to France and Spain. ksacta Chalk downs, dry grassland, heaths, dunes, screes and amongst rocks[17].

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Requires a light well-drained preferably calcareous soil in a sunny position[1, 200]. Succeeds in dry soils, tolerating drought once it is established[190]. Grows well between stepping stones on paths, tolerating light treading[183, 200]. Succeeds on walls. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Hardy to about -15°c[200]. Closely related to T. serpyllum[11], this plant is the true native wild thyme in Britain[11]. It is a very polymorphic plant, there are a number of named forms[183]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[1]. A good companion for most other plants[54], it makes a very good carpeting plant for the rockery or between paving stones[1]. The flowers are rich in nectar and are very attractive to honey bees[200].

## 5.2.301 Claytonia tuberosa

Tuberous Spring Beauty

4 tlin 8 cvuc 3 kcak 0 tcan 0 dwat 0.2 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flat hpa7tmwatli xre7t

drutta Claytonia tuberosa is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to July, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Root - raw or cooked[2, 74, 85, 105, 172]. It can be added to soups and stews[257]. It is rather small[172]. Leaves - raw or cooked[172]. A source of vitamins A and C, the leaves can be used as greens[257]. Flowers - raw[172].

nrakta Northwestern N. America - Alaska, to E. Asia -Siberia. ksacta Sphagnum tundra in the Arctic[74]. Wet to moist stony tundra slopes from sea level to 1200 metres in Alaska[270]

propta Seed - surface sow on a peat based compost in spring in a cold frame. Germination usually takes place within 2 - 4 weeks at 10°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out in late spring or early summer after the last expected frosts. Division of offsets in spring or autumn.

nwatta Prefers a damp peaty soil and a position in full sun[1, 164]. Requires a lime-free soil[164].

## 5.2.302 Primula veris

Cowslip, Cowslip primrose

4 tlin 8 cyuc 3 kcak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

wisslip hpa7tmwatli fvifxre7t hionli

drutta Primula veris is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and But-

terflies). The plant is self-fertile. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista Some people are allergic to the stamens of this plant, though such cases are easily treated[7]. Saponins may cause hypotension. Excessive/prolonged use may interfere with high blood pressure treatments. Possible Gastrointestinal irritation [301].

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves - raw or cooked in soups etc[4, 7, 115, 148, 183]. They are not that tasty, but are available in late winter which adds somewhat to their value[K]. The fresh or dried leaves are used as a tea substitute[177, 183]. Flowers - raw, cooked or used in conserves, as a garnish etc[4, 183]. They make an ornamental addition to the salad bowl[238, K]. This species has become much less common in the past 100 years due to habitat destruction, over-collecting from the wild and farming practices. When it was more abundant, the flowers were harvested in quantity in the spring and used to make a tasty wine with sedative and nervine properties[238]. A related species Primula elatior is listed by the Council of Europe as a natural food flavouring [301].

dwatta Anodyne Antianxiety Antiecchymotic Antiinflammatory Antispasmodic Diaphoretic Diuretic Expectorant Sedative SternutatoryCowslips are an underused but valuable medicinal herb. They have a very long history of medicinal use and have been particularly employed in treating conditions involving spasms, cramps, paralysis and rheumatic pains[238]. The plant contains saponins, which have an expectorant effect, and salicylates which are the main ingredient of aspirin and have anodyne, anti-inflammatory and febrifuge effects[238]. This remedy should not be prescribed for pregnant women, patients who are sensitive to aspirin, or those taking anti-coagulant drugs such as warfarin[238]. The flowers and the leaves are anodyne, diaphoretic, diuretic and expectorant[7, 9, 21, 165]. They are harvested in the spring and can be used fresh or dried[238]. The yellow corolla of the flower is antispasmodic and sedative[4]. They are recommended for treating over-activity and sleeplessness, especially in children[254]. They are potentially valuable in the treatment of asthma and other allergic conditions[254]. At one time an oil was produced by maceration of the flowers, this has an antiecchymotic effect (treats bruising)[7]. The root contains 5 - 10% triterpenoid saponins which are strongly expectorant, stimulating a more liquid mucous and so easing the clearance of phlegm [254]. It has been dried and made into a powder then used as a sternutatory[7]. The root is also mildly diuretic, antirheumatic and slows the clotting of blood[9, 254]. It is used in the treatment of chronic coughs (especially those associated with chronic bronchitis and catarrhal congestion), flu and other febrile conditions[9]. The root can be harvested in the spring or autumn and is dried for later use[9]. The leaves have similar medicinal properties to the roots but are weaker in action[254]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of kidney complaints and catarrh[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Primula veris for cough/bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain but absent from the extreme north, to temperate Asia, ksacta Grassy places, fields and woods with calcareous soils [7, 9, 13, 24].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in autumn. This is best done every other vear[200].

nwatta Prefers a medium to heavy moisture retentive humus rich loam in a cool position with light to medium shade[200]. Grows well in heavy clay soils and on chalk[187]. Prefers full sun and a well-drained alkaline soil if it is to survive well[187, 238]. Plants are hardy to about -20°c[187]. A very ornamental plant[1], it grows well in the spring meadow[24]. The flowers diffuse a sweet fragrance guite unlike all other flower scents. It has been likened by some to the breath of a cow (cuslippe is the Saxon word for this and thus the origin of the common name), by others to the sweet

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis aromatic flavouring in confections and pastries[2, 7]. Root hpa7tmwatli fyifxre7t hjonli

drutta Campanula lactiflora is a PERENNIAL growing to 1 m (3ft 3in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked. A mild flavour with a pleasant sweetness[K]. Flowers - raw. A decorative and tasty addition to salads[K].

nrakta Europe - Caucasus, Naturalized in Britain, ksacta Naturalized in Britain in waste and rough ground, often in damp places.

propta Seed - best sown as soon as it is ripe, otherwise surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c. Easy[221]. Plants, especially as they grow, resent root disturbance so, as soon as they are large enough to handle the seedlings should be pricked out into individual pots and grow them on in a cold frame for at least their first winter. It is generally better to grow the plants on in larger pots than average in order to ensure good root development[271]. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring. Easy[K]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy[221], larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. Another report says that it is difficult to divide the thick tenacious roots of mature plants, and that they resent the disturbance[271].

nwatta Succeeds in most fertile well-drained soils[233]. though it prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. A very tolerant plant, thriving even when growing in unkempt grassy areas[233]. There are some named forms, selected for their ornamental value [200]. Plants tend to be top-heavy and will need supports in windy gardens[233]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Although usually freely set, it is quite difficult to harvest the seed since it is readily dispersed by the plant as soon as it ripens[271]. The plant often self-sows in the garden and, if potted up whilst small, the seedlings usually transplant fairly well[271]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

# 5.2.284 Angelica sylvestris

Wild Angelica. Woodland angelica 4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 1.5 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Angelica sylvestris is a BIENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furocoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentLeaves, young shoots and stems - used as an aromatic addition to salads[7], or cooked and used as a vegetable[2, 5, 8, 13, 183]. The taste is somewhat bitter[5]. The chopped leaves are a good addition to cooked acid fruits, especially rhubarb[183]. The stem and leafstalks are used in candies and sweetmeats[2, 46, 105, 183]. Seed - used as an

cooked[2].

tcanta Dye ParasiticideThe pulverized fruits are used to kill head parasites[46, 61]. A good yellow dye is obtained from the plant (the report does not specify which part of the nlant)[4]

dwatta Antispasmodic Carminative Diaphoretic Diuretic Expectorant Parasiticide Stimulant Stomachic TonicThe root and the seeds are antispasmodic, aromatic, carminative, diaphoretic, diuretic, emmenagogue, expectorant, stimulant, stomachic, and tonic[7, 13, 21, 147, 218]. This plant is less rich in active principles than A. archangelica and so is much less used medicinally than that species[9, 244], but a decoction is sometimes used in the treatment of bronchial catarrh, coughs and dyspepsia[9]. Large doses have the effect of depressing the central nervous system[7].

nrakta Most of Europe, including Britain, to W. Asia and Siberia. ksacta Moist fields and hedgerows, open woods, marshes and fens, not usually found on acid soils[7, 13].

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sow in situ as soon as it is ripe.

nwatta Requires a deep moist fertile soil in dappled shade or full sun[200]. Succeeds in deep shade. Plants are reliably perennial if they are prevented from setting

#### 5.2.285 Aralia racemosa

American Spikenard

4 tlin 8 cyuc 3 kcak 2 tcan 3 dwat 1.8 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis npa7tmwatli xre7t hjonli

drutta Aralia racemosa is a PERENNIAL growing to 1.8 m (6ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit Leaves RootEdible Uses: CondimentYoung shoot tips - cooked[161]. Used as a potherb[207] or as a flavouring in soups[257]. Root - cooked. Large and spicy, it is used in soups[43, 105, 161, 177]. Pleasantly aromatic, imparting a liquorice-like flavour[183]. A substitute for sarsaparilla (Smilax spp.)[200], it is also used in making 'root beer' [183]. Fruit - raw or cooked [207]. Pleasant and wholesome to eat[207]. They can be made into a jelly[183, 207]. The fruit is about 4mm in diameter[200]. The roots have an aroma. The fruit are purple-brown [1-4].

tcanta A specialist nectary plant [1-2].

dwatta Alterative Antirheumatic Diaphoretic Eczema Expectorant Poultice Skin StimulantAmerican spikenard is a sweet pungent tonic herb that is often used in modern herbalism where it acts as an alterative[238]. It had a wide range of traditional uses amongst the North American Indians and was at one time widely used as a substitute for the tropical medicinal herb sarsaparilla[222, 257]. The root is alterative, diaphoretic, diuretic, pectoral and stimulant[4, 21, 46, 222]. The herb encourages sweating, is stimulating and detoxifying and so is used internally in the treatment of pulmonary diseases, asthma, rheumatism etc[4, 213, 238, 254]. Externally it is used as a poultice in treating rheumatism and skin problems such as eczema[4, 213, 238, 254]. The root is collected in late summer and the autumn and dried for later use[4, 213]. A drink made from the pulverised roots is used as a cough treatment[213]. A poultice made from the roots and/or the fruit is applied to sores, burns, itchy skin, ulcers, swellings etc[213, 222].

nrakta Eastern N. America - Quebec to Georgia, west to Kansas and Minnesota, ksacta Rich woodlands and thickets[21, 43].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78], Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta An easily grown plant, succeeding in sun or part shade in any fertile soil[233]. Prefers a good deep loam and a semi-shady position[1, 111, 134]. Requires a sheltered position[1]. Plants are hardier when grown in poorer soils[200]. The young growth in spring, even on mature plants, is frosttender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Grows well by water[111]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 5.2.286 Angelica archangelica

Angelica, Norwegian angelica 4 tlin 8 cyuc 3 kcak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Angelica archangelica is a BIENNIAL growing to 1.5 m (5ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furocoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238]

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: CondimentLeaves - raw or cooked[2, 4, 14, 27, 37, 52]. A liquorice-like flavour[183], they can be used as a flavouring in mixed salads[K]. They are also used to sweeten tart fruits[K]. Stalks and young shoots - cooked or raw[2, 37]. The stalks should be peeled[115], they can be used like celery[183]. They can also be used to sweeten tart fruits[52] and to make jam[244]. They are often crystallised in sugar and used as sweets and cake decorations[244]. The stems are best harvested in the spring[244]. An essential oil is obtained from the root and seeds, it is used as a food flavouring[46, 57, 100, 183]. Root - cooked[2]. Seed - used as a flavouring in liqueurs such as Chartreuse[244]. A tea can be made from the leaves, seed or roots[183].

tcanta EssentialAn essential oil from the root and seeds is used in perfumery, medicinally and as a food flavouring[4, 46, 57, 100]. The oil from the seeds has a musk-like aroma and is often used to flavour liqueurs [245]. The dried root contains 0.35% essential oil, the seed about 1.3%[240]. Yields of the essential oil vary according to location, plants growing at higher altitudes have higher yields with a better aroma[240].

dwatta Antispasmodic Appetizer Carminative Diaphoretic Diuretic Expectorant Stimulant Stomachic Tonic UrinaryAngelica has a long folk-history of use as a medicinal herb, in particular for the treatment of digestive disorders

and problems with blood circulation[4, 254]. The root is the most active medicinally, it should be harvested in the autumn of its first year of growth, sliced longitudinally if necessary and dried quickly[4]. If well stored, the root retains its medicinal virtues for many years[4]. The leaves and seeds can also be used[4]. The leaves are harvested and dried in late spring before the plant comes into flower[244]. The plant is antispasmodic, carminative, diaphoretic, diuretic, expectorant, stimulant, stomachic, tonic[4, 9, 14, 21, 46, 165]. An infusion is used to ease flatulence, indigestion, chronic bronchitis and typhus[244]. It stimulates blood flow to the peripheral parts of the body and so is of value in treating poor circulation - it is considered a specific treatment for Buerger's disease, a condition that narrows the arteries of the hands and feet[254]. Angelica is contra-indicated for people with a tendency towards diabetes since its use can increase sugar levels in the urine[4]. This plant should not be prescribed for pregnant women[238], nor should the juice be allowed to come into contact with the eyes[244]. An essential oil from the seeds is sometimes used as a rub to relieve rheumatic conditions[244] The German Commission E Monographs a therapeutic guide to herbal medicine, approve Angelica archangelica fruit for fevers and colds, infection of the urinary tract, dyspeptic complaints and loss of appetite. The root has been approved for dyspeptic complaints and loss of appetite. (see [302] for critics of commission E). No health hazards or side-effects if the proper administration of therapeutic dosages. Avoid sunbathing and intensive UV radiation for the duration of a treatment [301].

nrakta Europe. Naturalized in Britain[17]. ksacta Moist shady places in Britain[4, 14, 27, 37].

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sow in situ as soon as it is ripe.

nwatta Requires a deep moist fertile soil in dappled shade or full sun[52, 200]. Tolerates a pH in the range 4.5 to 7.3. A very hardy plant, tolerating severe frosts without damage[4]. Although by nature biennial, the plants are reliably perennial if they are prevented from setting seed[200]. Angelica is occasionally cultivated in the herb garden, mainly for its culinary uses[46]. The plants have a pervading aromatic odour[4]. The growing plant is almost untroubled by pests and diseases[4]. It attracts bees and hoverflies to the garden, helping to create a natural balance of insect pests and predators[24]. When well-sited, the plant will often selfsow - sometimes to the point of nuisance[245].

#### 5.2.287 Chaenomeles x californica

California Ouince

4 tlin 8 cvuc 3 kcak 2 tcan 1 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

drutta Chaenomeles x californica is a deciduous Shrub growing to 1.8 m (6ft) by 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Bees. Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista None Known

kcakta Fruit - very harsh and acid raw but fragrant when cooked. Used for jams, jellies etc and as a flavouring with cooked apples[K]. The fruit can be apple or pear-shaped and up to 6cm long x 6cm wide[200]. The flesh is firm, fragrant and acidic.

tcanta Plants can be grown to make a medium sized hedge[200]. Attractive flowers. Landscape Uses: Border. Erosion control, Ground cover, Massing, Woodland garden. Some cultivars of Chaenomeles x superba such as 'Crimson and Gold' produce suckers prolifically and are suitable for ground cover[182]. This may not by present in the hybrid.

dwatta Possibly some medical uses. C. x californica is a tri-species hybrid (Č. x superba x C. cathayensis). ChaenomeThis plant spreads vigorously by its running roots and can directly down [1-2]. be very invasive[1, 4]. It grows well in a meadow, or places where the grass is only cut occasionally [K]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 5.2.298 Ligusticum scoticum

Scottish Lovage, Scottish licorice-root, Hulten's licorice-root 4 tlin 8 cyuc 3 kcak 2 tcan 2 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ligusticum scoticum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: CondimentLeaves, flowers and young shoots - raw or cooked[2, 4, 5, 100]. Strong and not very pleasant[115]. Superb in salads[172]. The leaves are usually blanched in order to make the flavour milder[61, 183], though this also reduces the nutritional value[K]. A celery-like flavour, it is used as a seasoning in salads, soups etc[183]. Another report says that the flavour is more like parsley[245]. Stem - used as a flavouring in soups, stews etc[5, 17]. A celerylike flavour[238]. The green stem is peeled and eaten[183]. Root - raw or cooked[2, 5, 161], A sweet flavour[161], Seed - ground into a powder and used as a flavouring in soups and stews[172, 238, 245]. A sharp, hot taste it is used in the same ways as pepper[245]. The young shoots and roots are occasionally candied like angelica[183].

tcanta DeodorantScented. Deodorant.

dwatta Aromatic Carminative Deodorant StimulantThe root is aromatic and carminative[4]. It is used in the treatment of hysterical and uterine disorders[4, 238]. The seeds are sweetly aromatic and have been used as a carminative deodorant and stimulant[4, 172, 238]. They are also sometimes used for flavouring other herbal remedies[4].

nrakta Northwestern Europe, including Britain, from Denmark to Norway. ksacta Rocky coasts in northern Britain[17].

propta Seed - the seed only has a short period of viability and so is best sown as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown as early in the year as possible in a greenhouse or cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer if they have grown large enough. Otherwise, keep them in a cold frame for the first winter and plant them out in early summer. Division of the rootstock in early spring. Make sure that each section of root has at least one growth bud. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any well-drained soil in a sunny position[1, 200]. Dislikes shade. Succeeds in dry soils[238]. Plants are hardy to at least -15°c[238]. Scottish lovage has occasionally been cultivated as a pot herb, though it has been largely supplanted by celery[1, 4, 17]. All parts of the plant are aromatic when bruised, the aroma being likened to a mixture of parsley, angelica and pear skin[245]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going

# 5.2.299 Hydrophyllum canadense

John's Cabbage, Bluntleaf waterleaf 4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hydrophyllum canadense is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves raw or cooked[105, 177, 183]. A delicate potherb[183]. Only use when young, the leaves become bitter with age[159]. Root - cooked[2]. Only eaten in times of scarcity[161].

nrakta Eastern N. America - Vermont to New York, North Carolina, Ontario, Illinois and Kentucky. ksacta Damp rich woodland[43].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed usually germinates in early spring. Sow stored seed as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Requires a moist humus-rich soil in semishade[200]. Plants are growing well at Kew[K]. Slugs are particularly fond of this plant and will soon destroy it if given a chance[K]

# 5.2.300 Thymus praecox arcticus

4 tlin 8 cvuc 3 kcak 5 tcan 2 dwat 0.1 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Thymus praecox arcticus is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw in salads or added as a flavouring to cooked foods[183]. Retains its flavour well in long slow cooking. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200]. An aromatic tea is made from the leaves or dried flowers[183].

tcanta Deodorant Disinfectant Essential Fungicide RepellentAn essential oil from the leaves is used in perfumery, soaps, medicinally etc[200]. It has fungicidal properties[171]. The dried flowers are used to repel moths from clothing[4].

dwatta Anthelmintic Antiseptic Antispasmodic Carminative Deodorant Diaphoretic Disinfectant Expectorant Sedative TonicThe leaves, and especially the essential oil contained in them, are anthelmintic, antiseptic, antispasmodic, carminative, deodorant, diaphoretic, disinfectant, expectorant, sedative and tonic[4, 7, 21, 200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

drutta Balsamorhiza incana is a PERENNIAL growing to 0.9~m (3ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[105, 161, 177]. The thick root can be eaten raw[257]. Seed - raw or cooked. It can be ground into a powder and made into a bread.

dwatta Analgesic StomachicA decoction of the leaves, roots and stems has been used in the treatment of stomach pains and colds and as a steam bath for treating headaches[257].

nrakta North-western N. America ksacta Meadows and other moderately moist to moderately dry open places[60].

propta Seed - sow early spring in a greenhouse and only just cover the seed. Germination usually takes place within 2 - 6 days at 18°c. Either sow the seed in individual pots or pot up the seedlings as soon as they are large enough to handle and plant them out into their permanent positions in the summer[134]. Division in spring. Very difficult since the plant strongly resents root disturbance[134]. It is probably best to take quite small divisions, or basal cuttings, without disturbing the main clump. Pot these up into individual pots and keep them in light shade in the greenhouse until they are growing away well. Plant them out in the summer if they have grown sufficiently, otherwise over-winter them in the greenhouse and plant out in late spring.

nwatta Requires a deep fertile well-drained loam in full sun[134, 200]. Plants strongly resent winter wet[134, 200]. Hardy to at least -25°c[200]. Plants are intolerant of root disturbance and should be planted into their permanent positions whilst still small[134].

# **5.2.296** Fragaria

Strawberry, Beach strawberry, Pacific beach strawberry, Sandwich beach strawberry, Virginia strawber $4\ tlin\ 8\ cyuc\ 3\ kcak\ 0\ tcan\ 0\ dwat\ 0.2\ m\ hkuc$ 

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Fragaria is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to November, and the seeds ripen from June to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[K]. A delicious flavour, the fruit is almost as large as an average cultivated strawberry but it is not very freely produced[187, K]

tcanta The plant spreads rapidly by means of runners and can be used as a ground cover[K].

nrakta A hybrid of garden origin, F. x ananassa x Potentilla palustris. ksacta Not known in the wild.

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the sumer. This plant is a bi-generic hybrid and will not breed true from seed. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position. Tolerates semi-shade though fruit production will be reduced. This species is a hybrid of garden origin between two species from different genera, the cultivated strawberry, Fragaria x ananassa and the marsh cinquefoil, Potentilla palustris. It should eventually get a Latin name that combines parts of the two generic names,

422

but until then it is included here under Fragaria[K]. To date (1995) only one cultivar is available in garden centres etc. Called 'Pink Panda' it spreads very freely by means of runners, flowers heavily all through the summer, but does not produce much fruit[K].

# 5.2.297 Potentilla anserina

Silverweed

4 tlin 8 cyuc 3 kcak 2 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla anserina is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Possible stomach irritation.

kcakta Edible Parts: Leaves RootEdible Uses: TeaRootraw or cooked[66, 74, 183]. It can also be dried and ground into a powder then used in soups etc or mixed with cereals[5, 12, 13, 54]. A nice taste, crisp and nutty with a somewhat starchy flavour[85, 183]. The roots are rather thin, though perhaps their size cold be improved in cultivation[K]. Edible young shoots - raw[74]. A tea is made from the leaves.

canta Cleanser TanninA sprig placed in the shoe can help prevent blisters[66]. An infusion of the leaves makes an excellent skin cleansing lotion[66], it is also used cosmetically as a soothing lotion for reddened skin and for the delicate skins of babies[7]. All parts of the plant contain tannin, though the report does not give quantities[4]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Analgesic Antidiarrhoeal Antispasmodic Astringent Diuretic Foot care Haemostatic Odontalgic TonicContemporary medical herbalists believe that silverweed's main medicinal value lies in its astringency. It is less astringent than the related P. erecta, but it has a gentler action within the gastro-intestinal tract[254]. The whole plant is antispasmodic, mildly astringent, diuretic, foot care, haemostatic, odontalgic and tonic[4, 7, 9, 21]. A strong infusion is used to check the bleeding of piles and to treat diarrhoea, it is also used as a gargle for sore throats[4]. Externally, it is used as a powder to treat ulcers and haemorrhoids whilst the whole bruised plant, placed over a painful area, will act as a local analgesic[7, 254]. The roots are the most astringent part of the plant[4], they are harvested in late summer or autumn and dried for later use[254]. The leaves are harvested in early summer and dried for later use[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Potentilla anserina Silverweed for diarrhoea, inflammation of the mouth and pharynx, premenstrual syndrome (see [302] for critics of commission E).

nrakta Europe, including Britain, from Iceland south and east to Iran, the Himalayas, Manchuria, Japan. ksacta Ditches and moist calcareous soils[7]. A common weed of cultivation[1].

propta Seed - sow early spring or autumn in a cold frame. Prick out the seedlings into individual pots once they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Division is also very easy at almost any time the plant is in growth. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta A very easily grown plant, succeeding in almost any soil, thriving in moist clays, though rather dwarfed in dry dusty soils[4]. It grows best in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Silverweed was formerly cultivated for its edible root[5, 67]. It is still possibly cultivated in parts of Scotland (1992)[183].

les cathayensis fruits is antiemetic, antirheumatic, antispasmodic and digestive[176]. It is used in the treatment of rheumatic pain, convulsions of the calf muscles, vomiting, dyspepsia and diarrhoea[176]. No medical uses are known for Chaenomeles x superba.

nrakta Hybrid ksacta Garden Hybrid

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. This species is a hybrid and so will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta The hybrid C. x californica is a tri-species hybrid (C. x superba x C. cathayensis). Named cultivars are available in the horticultural trade. Chaenomeles x californica is a strong growing quince with an upright crown reaching 1.8m high and wide. 'Enchantress' is a compact shrub single white to pink flowers and large yellow edible fruits. ?'Masterpiece' has large ovate fruit and pink-red flowers. Easily cultivated in any reasonably good soil[1, 200]. Prefers a deep moist well-drained loam[4, 11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[188, 200]. Tolerates atmospheric pollution[200]. A very ornamental plant[1], it is hardy to about -25c[200]. Plants are subject to canker, especially when growing in the milder moister areas of Britain[49]. Plants in this genus are notably resistant to honey fungus[200]. Fruits are usually freely produced in Britain, but they do not always ripen[11, 182]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Landscape Uses: Border, Erosion control, Ground cover, Massing, Woodland garden. Special Features: Not North American native, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching; a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 5.2.288 Heracleum sphondylium

Cow Parsnip, Eltrot

4 tlin 8 cyuc 3 kcak 2 tcan 2 dwat 1.8 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Heracleum sphondylium is a BIEN-NIAL/PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Many members of this genus, including many of the sub-species in this species[65], contain furanocoumarins. These have carcinogenic, mutagenic and phototoxic properties. See below for more details.

kcakta Edible Parts: Leaves Root StemEdible Uses: SweetenerStem and young shoots - raw or cooked[5, 7, 9, 17]. Used as a green vegetable, when harvested just as they are sprouting from the ground they are somewhat like asparagus in flavour[183]. The rind is somewhat acrid[115]. The leaf stems are tied in bundles and dried in the sun until they turn yellow[238]. A sweet substance resembling sugar forms on the dried stems and is considered to be a great delicacy[2, 115, 183, 238]. The peduncles, before flowering, can be eaten as a vegetable or added to soups[183]. Root-cooked. It is usually boiled[7].

dwatta Antidiarrhoeal Antipsoriatic Aphrodisiac Digestive Expectorant SedativeThe roots and the leaves are aphrodisiac, digestive, mildly expectorant and sedative[7, 9, 238]. The plant is little used in modern herbalism but has been employed in the treatment of laryngitis and bronchitis[9, 238]. A tincture made from the aerial parts of the plant has also been used to relieve general debility, though it is uncertain how it works[7, 238]. The plant is harvested as it comes into flower and can be dried for later use[9].

nrakta Europe, including Britain, south of latitude 61° to western N. Africa, west and northern Asia. ksacta Moist grassland and ditches, by hedges and in woods[7, 17].

propta Seed - sow mid to late spring or early autumn in situ. Division in autumn.

nwatta A very easily grown plant, succeeding in any ordinary garden soil[1, 238], doing best in moist soils or deep woodland[1]. Grows well in full sun or partial shade[238]. This species contains a large number of sub-species. Some, but by no means all of them, can cause various problems as detailed at the top of this record. Subspecies transylvanicum, pyrenaicum, montanum, orsinii and alpinum are distinctly phototoxic, subspecies sphondylium and sibiricum are not phototoxic whilst subspecies granatense and ternatum vary in their toxicity[65]. A good bee plant[108]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 5.2.289 Mentha arvensis villosa

American Wild Mint

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha arvensis villosa is a PERENNIAL growing to  $0.6 \mathrm{~m}$  (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Fragrant and pleasant tasting, the leaves are used as a flavouring in salads or cooked foods[183, 257]. A herb tea is made from the leaves[183, 257].

tcanta Essential Repellent StrewingThe plant is used as an insect repellent[18, 20, 99]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. An essential oil is obtained from the leaves, it is used as a flavouring for toothpastes etc[61]. It contains thymol and pulegone[213].

dwatta Antiseptic Carminative Febrifuge Stomachic American wild mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A decoction of the ground leaves and stems is used to treat feelings of nausea[213]. The tea is also used in the treatment of colds, fevers, sore throats, gas, colic, indigestion etc[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[2221].

nrakta N. America - New Brunswick to Manitoba, British Columbia, Virginia, New Mexico and Nevada. ksacta Moist places at low to moderate elevations[204].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them

out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. This species tolerates much drier conditions than other members of the genus[238]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to at least -15°c[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The whole plant has a very strong smell of mint[245]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near brassicas and tomatoes, helping to deter insect pests[20]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.290 Allium sphaerocephalon

Round-Headed Leek

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Allium sphaerocephalon is a BULB growing to  $0.6\,\mathrm{m}$  (2ft) by  $0.1\,\mathrm{m}$  (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Edible bulb - raw or cooked[2, 46, 61, 177]. An onion substitute[22]. The bulbs are up to 35mm in diameter[200]. Leaves - raw or cooked[177]. They can be dried for later use[183]. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Western Europe, including Britain, south to the Mediterranean. ksacta Limestone rocks and fields in dry places[17, 90].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta An easily grown plant[203]. it prefers a sunny position in a light well-drained soil[1, 90]. Established plants are fairly drought tolerant[190]. The bulbs should be planted fairly deeply[1]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Plants often divide freely at the roots[233]. A good bee plant[163]. The flowers are very attractive to bees[203]. The flowers are sometimes replaced with bulbils[90]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.291 Epilobium latifolium

River Beauty

4 tlin 8 cyuc 3 kcak 1 tcan 2 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Epilobium latifolium is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: TeaYoung shoots - cooked. Used like asparagus[85, 105, 172]. Very poor quality[2]. Young leaves - raw[172, 183]. They become bitter with age[85]. A good source of vitamins A and C[257]. Flower stalks - raw or cooked. Eaten when the flowers are in bud[85]. The dried leaves are used as a tea substitute[85, 177, 183]. The core of mature stems is eaten raw. Slightly sweet, tender and pleasant tasting[85, 172]. Very fiddly though[85].

tcanta Attractive flowers.

dwatta Analgesic Antidote Antiinflammatory Antipruritic Antirheumatic FebrifugeThe entire plant is used in Tibetan medicine, it is said to have a bitter taste and a cooling potency[241]. Analgesic, antidote, anti-inflammatory, antipruritic, antirheumatic and febrifuge, it is used in the treatment of fevers and inflammations, plus also itching pimples[241].

nrakta N. Europe to Northern N. America. ksacta River gravels, margins of streams and damp slopes[43].

propta Seed: sow early spring in situ or as soon as the seed is ripe. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a well-drained but moisture retentive soil in a sunny position[200]. Succeeds in most soils[1]. The roots are somewhat spreading and the plant can become invasive[233]. The plant is heat tolerant in zones 7 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

# 5.2.292 Erythronium albidum

White Trout-Lily, White fawnlily 4 tlin 8 cyuc 3 koak 0 tcan 0 dwat 0.1 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli drutta Erythronium albidum is a BULB growing to  $0.1\,\mathrm{m}$  (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to April, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, the following notes have been seen for another member of this genus and so some caution is advised. Skin contact with the bulbs has been known to cause dermatitis in sensitive people[65].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[105, 161]. A delicious flavour[183]. Rather small, it is about 25mm long[235]. Young leaves - raw or cooked. Crisp, tasty, tender and mild when eaten raw[183]. Eating the leaves will greatly reduce the vigour of the bulb, so can only be recommended in times of emergency[K]. Flowers, flower buds and flower stems - raw or cooked[183].

nrakta Eastern N. America - Ontario to Minnesota, south to Georgia, Tennessee and Texas. ksacta Moist woods, thickets and meadows[43, 90, 235]. Mesic bottomlands, upland forests, woodlands, clay and silt bottomlands, flo

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame. Water lightly in summer, it should germinate in autumn or winter[164, 200]. Stored seed requires a period of cold stratification[164]. Sow as early in spring as possible in a cold frame. Sow the seed thinly so that it will not be necessary to prick them out for their first year of growth. Give an occasional liquid feed to the seedlings to make sure that they do not become nutrient deficient. When the plants are dormant, pot up the small bulbs putting 2 - 3 bulbs in each pot. Grow them on in a shady position in the greenhouse for another 2 3 years and then plant them out into their permanent positions when they are dormant in late summer. Division in summer as the leaves die down. This species does not produce offsets[200].

nwatta Prefers slightly acid soil conditions but succeeds in chalky soils so long as they contain plenty of humus[164]. Requires semi-shade, preferably provided by trees or shrubs. and a well-drained soil[164]. Succeeds in almost any light soil, preferring one that is rich in humus[1]. This species is closely related to E. americanum[235], but is unsatisfactory in cultivation outdoors in Britain[90]. It comes into growth early in the year and the flowers probably need more heat than is available in this country if they are to open properly[90]. A clump seen growing in light shade at Kew early in April 1995 was growing vigorously, spreading well and had lots of flower buds, but was not yet in flower[K]. Erythronium albidum often forms extensive colonies in which nonflowering, 1-leaved plants far outnumber flowering, 2leaved ones[270]. Flowers are produced in 3 - 4 years from seed[164]. This species does not produce offsets[200].

# 5.2.293 Cardamine amara

Large Bittercress

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine amara is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to June, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moit soil

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw[2, 61, 115]. A hot cress-like flavour[183], nice in small quantities in a salad and available all year round in most years[K]. A somewhat bitter flavour[9].

dwatta Antiscorbutic Diuretic StimulantAntiscorbutic, diuretic, stimulant[132].

nrakta Most of Europe, including Britain, north to 64° N., east to the Balkans and W. Asia. ksacta By springs, in fens and on streamsides, preferring a peaty soil[17]. Often found in trickling water[187]. Often the dominant ground flora in aider woods with moving damp water[17].

propta Seed - sow outdoors in situ in a shady position in

nwatta Easily grown in most moist soils[187]. Prefers a moist humus rich soil in shade or semi-shade[200]. Plants are hardy to at least -20°c[187]. An invasive plant spreading freely by self-sowing, it is best suited to the wild garden[187]. A polymorphic species[132].

#### 5.2.294 Viola adunca

Western Dog Violet, Hookedspur violet, Kirk's violet 4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Viola adunca is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[177, 183]. When added to soup they thicken it in much the same way as okra[62, 85, 159]. A tea can be made from the dried leaves[183].

tcanta DyeA blue dye can be obtained from the flowers[2,57].

dwatta Analgesic Antiasthmatic Birthing aid Ophthalmic Poultice SalveAn infusion of the leaves and roots has been used to treat stomach problems and asthma in children[257]. An infusion of the roots and leaves has been used as a wash and poultice on sore and swollen joints[257]. The roots and leaves have been chewed by women during childbirth[257]. A poultice of the chewed leaves has been applied to sore eyes[257]. A poultice of the crushed flowers has been applied to the side or chest in the treatment of pain[257].

nrakta Eastern and Western N. America - Alaska to California, also Ontario to Quebec and New Brunswick. ksacta Damp banks and edges of meadows in most forest communities, 1500 - 2400 metres from Alaska to N. California

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5[200]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159]. There is at least one named form selected for its ornamental value[200]. 'Alba' has white flowers[200]. Flowers formed late in the season are cleistogamous (lacking petals, the flowers do not open but are self-pollinated)[2121.

# 5.2.295 Balsamorhiza incana

Hoary Balsamroot

4 tlin 8 cyuc 3 kcak 0 tcan 1 dwat 0.9 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli more than a part of M. sieboldii by many botanists[58]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:Not North American native, Fragrant flowers. Attractive flowers or blooms.

# 5.2.430 Malus halliana spontanea

4tlin 8 cyuc 2 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus halliana spontanea is a deciduous Tree growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is slightly larger than the type species, to 1cm in diameter[200].

nrakta E. Asia - Japan? ksacta Not known in a truly wild

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. This sub-species has slightly larger fruits than the type, they are up to 1 cm in diameter[200]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.431 Rubus deliciosus

Rocky Mountain Raspberry, Delicious raspberry 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rubus deliciosus is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit is not highly valued[183]. It is delicious[2]. Dry and of no flavour[1, 11]. The fruit is rather on the dry side and has lots of seeds to very little flesh, but

the flavour is delicious[K]. The hemispherical fruit is about 15mm in diameter[200].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta Western N. America - Colorado, New Mexico and Arizona. ksacta Scrub and rocky slopes in the Rocky mountains [184].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in a sunny position[184]. A very ornamental plant[1, 11], it is hardy to about -20°c[184]. The flowers have a delicious perfume[245]. This species is very closely related to R. trilobus[200]. The plant has perennial stems and should not be pruned like normal raspberries[200]. Instead it is sufficient to prune out any dead stems. There are no prickles on the stems[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.432 Polygonum sachalinense

Giant Knotweed

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 3.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Polygonum sachalinense is a PERENNIAL growing to 3.6 m (11ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is inflower from July to October, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Seed StemEdible Uses: Young shoots in spring - raw or cooked[46, 61, 116, 183]. They can be added to salads or cooked as an asparagus substitute[183]. They have an acid flavour and we find that they are more like a rhubarb substitute. Older stems and shoot tips - cooked. The stems are best peeled. Tasting like a mild version of rhubarb, they have a superior quality with a hint of lemon in the flavour[183]. Seed - cooked[105]. The seed can be ground into a powder and used as a thickener and flavouring in soups etc, or as an extender in flour. It is rather small and fiddly to utilize.

tcanta BiomassA potential source of biomass. Plants are very vigorous and could be grown as a ground cover[208].

nrakta E. Asia - Japan. Occasionally naturalized in Britain[17]. ksacta Along ravines and by streams in montane areas of Sakhalin Island[58].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted

named varieties selected for their ornamental value[200]. 'Dickson's Gold' has golden-green leaves with a pleasant mild flavour[K]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.339 Viola epipsila

Dwarf Marsh Violet

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik

hpa7tmwatli xre7t hionli

drutta Viola epipsila is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Young leaves and flower buds - raw or cooked[172]. When added to soup they thicken it in much the same way as okra[85, 159]. Flowers - raw[172]. A tea can be made from the leaves[85].

tcanta The dried root has been used as an incense[257].
nrakta E. Europe. Northern N. America. ksacta Cool
swampy places.

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5[200]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159].

# 5.2.340 Arisaema triphyllum

Jack In The Pulpit, Dragonroot, Indian Turnip 4 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Arisaema triphyllum is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

kcakta Edible Parts: RootEdible Uses: Tuber - it must be thoroughly dried or cooked before being eaten[2, 21, 55, 57, 95, 102]. The roots can be cut into very thin slices and allowed to dry for several months, after which they are eaten like potato chips, crumbled to make a cereal or ground into a cocoa-flavoured powder for making biscuits, cakes etc[177, 183]. They can also be pounded into a powder, this is thern left to dry for several weeks when it becomes safe to use[213]. The root is up to 5cm long and 2cm wide[4]. Caution is advised, see the notes above on toxicity.

tcanta Musical StarchA starch obtained from the roots is used as a stiffener for clothes[207]. It is very harsh to the

hands, causing blisters and swellings[207]. The seeds have been used in rattles[257].

dwatta Acrid Antirheumatic Antiseptic Contraceptive Diaphoretic Expectorant Irritant Poultice StimulantThe root is acrid, antiseptic, diaphoretic, expectorant, irritant and stimulant[21, 46, 222, 238, 257]. It is harvested in early spring and dried for later use[4]. The fresh root is considered to be too dangerous and intensely acrid to use, whilst the dried roots become inactive, so fresh, partially dried roots are used[213]. Due to the potentially toxic nature of this plant, it should only be used internally under the supervision of a qualified practitioner[K]. The root was applied as a poultice on headaches, scrofulous sores, rheumatism, boils, abscesses and ringworm[222, 257]. A decoction of the root has been used as a wash for sore eyes[257]. The root was used as a contraceptive by the N. American Indians. One teaspoonful of the dried powdered root in cold water was said to prevent conception for a week whilst two teaspoonfuls in hot water was said to induce permanent sterility[213].

nrakta Eastern N. America - Quebec to Louisiana and Kansas. ksacta Wet woods, bogs and swamps[43].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame[134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1 - 6 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Landscape Uses:Massing, Woodland garden. Prefers a cool peaty soil in the bog garden, woodland garden or a sheltered border in semi-shade[90, 134, 200]. Prefers a loamy or peaty soil and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too hot or exposed[1, 200]. Tubers should be planted about 10cm deep[233]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants need protection from slugs[200]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year. Special Features: Attracts birds, Attractive foliage, North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant.

#### 5.2.341 Tussilago farfara

Coltsfoo

4 tlin 8 cyuc 3 kcak 3 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Tussilago farfara is a PERENNIAL growing to  $0.2\,\mathrm{m}$  (0ft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from February to April, and the seeds ripen from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista The plant contains traces of liver-affecting pyrrolizidine alkaloids and is potentially toxic in large doses[222]. These alkaloids have not proved toxic at low dosages in tests and there is no suggestion that this plant should not be used medicinally[238]. Contraindicated during pregnancy and lactation [301]

kcakta Edible Parts: Flowers Leaves OilEdible Uses: Oil Salt TeaFlower buds and young flowers - raw or cooked[46, 183]. A pleasant aniseed flavour[K], they add a distinctive aromatic flavour to salads[9]. Young leaves - raw or cooked[9, 46, 183]. They can be used in salads, added to soups, or cooked as a vegetable[238]. The leaves have a bitter taste unless they are washed after being boiled[179]. An aromatic tea is made from the fresh or dried leaves and flowers[183]. It has a liquorice-like flavour[238]. The dried and burnt leaves are used as a salt substitute[102, 183]. The slender rootstock is candied in sugar syrup[183].

tcanta Compost Oil Soil stabilization Stuffing TinderThe soft down on the underside of the leaves is used as a stuffing material[53, 54]. When wrapped in a rag, dipped in saltpetre and dried in the sun it makes an excellent tinder[4]. Plants have an extensive root system and are used to stabilize banks[200]. The leaves are a valuable addition to the compost heap[200].

dwatta Antitussive Astringent Bitter Demulcent Diaphoretic Eczema Emollient Expectorant Skin Stimulant TonicAn effective demulcent and expectorant herb, coltsfoot is one of the most popular European remedies for the treatment of a wide range of chest complaints[254]. It is widely available in health food shops. The leaves are commonly used in Europe, though the flowering stems (which contain higher levels of pyrrolizidine alkaloids) are preferred in China[254]. They are rich in mucilage and are the main parts used, though the root is also sometimes employed[4, 244]. Pyrrolizidine alkaloids have a toxic effect upon the liver, but are largely destroyed when the plant is boiled to make a decoction[254]. Some caution should be employed in the use of this remedy - the flowers should not be used except under professional supervision, the leaves should not be used for more than 4 - 6 weeks at a time, the herb should not be taken whilst pregnant or breast-feeding and it should not be given to children under the age of six[254]. Modern research has shown that extracts of the whole plant can increase immune resistance[254]. In a Chinese trial 75% of patients suffering from bronchial asthma showed some improvement after treatment with this plant, though the anti-asthmatic effect was short-lived[254]. The leaves are harvested in June and early July, the flowers are harvested when fully open and the root is harvested in the autumn. All can be dried and used as required[4]. The plant is antitussive, astringent, demulcent, emollient, expectorant, stimulant and tonic. It is widely used in the treatment of coughs and respiratory problems [4, 7, 9, 13, 21, 54, 165, 176, 218] and is often candied so that it can be sucked as a sweet[4]. The plant is of particular use in the treatment of chronic emphysema and silicosis, helping to relieve the persistent cough associated with these conditions[244]. Coltsfoot is particularly effective when used in combination with liquorice (Glycyrrhiza species), thyme (Thymus vulgaris) and wild cherry (Prunus serotina)[254]. A poultice of the flowers has a soothing effect on a range of skin disorders including eczema, ulcers, sores, bites and inflammations[7, 238]. A bitter, tonic and diaphoretic preparation can be obtained from the root[7].

nrakta Europe, including Britain, from Norway south and east to N. Africa, western and northern Asia. ksacta Damp habitats, frequently on alkaline clays, in hedgebanks. roadsides, wasteland, often as a pioneer, and on dunes and shingle in coastal zones[200]

propta Seed - the plant does not usually require help with spreading itself around, but if required the seed can be sown in situ in early spring or autumn. Division of the roots is very easy and succeeds at almost any time in the year. The divisions can be planted out direct into their permanent po-

nwatta A very easily grown plant, it succeeds in most soils when grown in full sun[14]. It prefers a moist neutral to alkaline soil and will also succeed in partial shade[238]. Plants are hardy to about -29°c[238]. Coltsfoot is a very tough plant that is more than capable of looking after itself. When well sited its roots will spread very freely sending up new shoots at some distance from the clump even if growing amongst dense weed competition[K]. This can make it a problem weed in gardens[200], so either choose your site with care or find some means of restraining it such as by planting in a large tub that is buried in the ground[K]. The rhizomes can lay dormant in the soil for many years, emerging when the soil is disturbed[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

# 5.2.342 Iuniperus communis nana

4 tlin 10 cyuc 3 kcak 4 tcan 3 dwat 0.5 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasilutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus communis nana is an evergreen Shrub growing to 0.5 m (1ft 8in) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 2 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Although the fruit of this plant is quite often used medicinally and as a flavouring in various foods and drinks, large doses of the fruit can cause renal damage. Juniper should not be used internally in any quantities by pregnant

kcakta Edible Parts: FruitEdible Uses: Coffee Condiment TeaFruit - raw or cooked[2, 5, 9, 15]. It is usually dried [12]. The fruit is often used as a flavouring in sauerkraut, stuffings, vegetable pates etc, and is an essential ingredient of gin[183]. The aromatic fruit is used as a pepper substitute according to one report[183]. An essential oil is sometimes distilled from the fruit to be used as a flavouring[183]. Average yields are around 1%[7]. The cones are about 4 - 8mm in diameter and take 2 years to mature[200]. Some caution is advised when using the fruit, see the notes above on toxicity. The roasted seed is a coffee substitute[177]. A tea is made by boiling the leaves and stems[161]. A tea made from the berries has a spicy gin-like flavour[183].

tcanta Fibre Fuel Hair Incense Repellent Resin Strewing TinderA decoction of the branches is used as an anti-dandruff shampoo[172]. Yields the resin 'Sandarac', used in the production of a white varnish[74]. The stems were at one time used as a strewing herb[14]. The whole plant can be burnt as an incense and fumigant[66, 102, 146]. It makes a good insect repellent[102, 172]. The bark is used as cordage[61] and as a tinder[172]. An excellent fuel wood[66]. Many forms of this species are good ground cover plants for sunny situations[208]

dwatta Antiseptic Aromatic Carminative Diaphoretic Diuretic Rubefacient Stomachic Tonic UrinaryJuniper fruits are commonly used in herbal medicine, as a household remedy, and also in some commercial preparations. They are especially useful in the treatment of digestive disorders plus kidney and bladder problems[4]. The fully ripe fruits are strongly antiseptic, aromatic, carminative, diaphoretic, strongly diuretic, rubefacient, stomachic and tonic[4, 7, 9, 21, 46, 165, 240, 254]. They are used in the treatment of cystitis, digestive problems, chronic arthritis, gout and rheumatic conditions[254]. They can be eaten raw or used in a tea[222], but some caution is advised since large doses can irritate the urinary passage[4]. Externally, it is applied as a diluted essential oil, having a slightly warming effect upon the skin and is thought to promote the removal of waste products from underlying tissues[254]. It is, therefore, helpful when applied to arthritic joints etc[254]. The fruits should not be used internally by pregnant women since this can cause an abortion[9]. The fruits also increase menstrual bleeding so should not be used by women with heavy periods[254]. When made into an ointment, they are applied to exposed wounds and prevent irritation by flies[4]. The essential oil is used in aromatherapy. Its keyword is 'Toxin elimination'[210].

nrakta Northern temperate zone, incl Britain, south to the mountains of N. Africa, Himalayas and California ksacta Rocks and moors on mountains and lowland bogs in N. Wales. N. England and Scotland[17].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 811. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year.

polyculture design as well as the above-ground architecture adaptogenic, analgesic, anti-inflammatory, antipyretic and (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

# 5.2.427 Vaccinium amoenum

Large-Cluster Blueberry 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlut hpa7tli frusflat hna7tmwatli xre7t hionli

drutta Vaccinium amoenum is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The fruit is about 8mm in diameter[200].

nrakta South-eastern N. America. ksacta Acid bogs, meadows, woods and thickets[72].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame [78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. This species is closely related to V. virgatum[1]. Plants in this genus are notably resistant to honey fungus[200].

#### 5.2.428 Eleutherococcus sessiliflorus

4 tlin 8 cvuc 2 kcak 0 tcan 3 dwat 4.5 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eleutherococcus sessiliflorus is a deciduous Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Drink TeaYoung leaves - raw or cooked and used as a vegetable[105. 177, 1831. Old leaves are dried and used as a tea substitute[105, 177, 183]. A wine is made from the bark. It is highly fancied by the Chinese[183]. It is probably used mainly for medicinal purposes[K].

dwatta Adaptogen Analgesic Antiinflammatory Antipyretic DiureticThe root bark contains saponins, acanthosides, cardiac glycosides and polysaccharides[279]. It is diuretic[176, 218, 279]. It is used in Korea in the treatment of lumbago, neuralgia, arthritis and oedema[279].

nrakta E. Asia - China, Korea, Manchuria. ksacta Moist woods, wooded riverbanks, forest edges and clearings[51,

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Succeeds in an open loamy soil[1], preferring a well-drained humus-rich soil in full sun[200]. Tolerates poor soils and atmospheric pollution[200]. A very cold resistant plant[74] if it is sheltered from cold winds, tolerating temperatures down to at least -15°c[200]. A very ornamental plant[74], it spreads vigorously by means of suckers[200]. This species is closely related to E. divaricatus[200].

# 5.2.429 Malus sargentii

Sargent's apple, Sargent Crabapple 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus sargentii is a deciduous Shrub growing to 4 m (13ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves. but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. Large for a crab apple[183], it is up to 1cm in diameter[200].

nrakta E. Asia - Japan. ksacta Mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away guickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta Landscape Uses:Border, Pest tolerant, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1]. 2001. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. Of doubtful botanical standing, it is considered to be synonymous with M. sieboldii by some Japanese botanists[182]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. This species is considered to be no kcakta Edible Parts: SeedEdible Uses: Seed - cooked[2, 22, 105, 177]. It can be dried and ground into a powder and used as a gruel. The seed is quite large and easily harvested, though it is rarely produced in Britain[11]. Unfortunately, it is rich in bitter-tasting saponins and these need to be leached out before the seed can be eaten. See notes on toxicity above. The following notes apply to A. californica, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213]. Most of the minerals etc would also have been leached out by this treatment[K].

tcanta Miscellany Soap WoodSaponins contained in the seed are used a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. Plants can be used as a tall ground cover for large areas of land[208]. They are slow to establish but eventually form large spreading clumps[208]. Wood - easily worked. Used for making water troughs, packing cases, tea boxes, ornamental articles etc[194].

dwatta Antiperiodic Antirheumatic MiscellanyAntiperiodic, antirheumatic[194]. Used in the treatment of colic, piles, constipation and whooping cough[194].

nrakta Southern N. America - Georgia and Alabama to Florida. ksacta Wooded bluffs and rich woods, also by streams, on the coastal plain[72, 184].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer. Root cuttings 5 - 7 cm long in December. Store the roots upside down in sand and pot them up in March/April[78]. Grow them on until they are 20cm or more tall and then plant them out into their permanent positions, preferably in late spring or early summer after the last expected frosts. Division of suckers in the dormant season[200]. The suckers can be planted out direct into their permanent positions if required.

nwatta Landscape Uses:Border, Massing, Specimen, Woodland garden. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. Succeeds in most situations in sun or shade[126, 200]. Plants are very shade tolerant[200]. A very ornamental plant[1, 11], it is hardy to about -20°c[184] though it is slow to establish[208]. The young growth in spring can be damaged by late frosts. The flowers have a delicate honey perfume[245]. This species does best on the western side of Britain according to one report[126] whilst another says that it is best in a continental climate, which would suggest that it was best grown in the eastern half of the country[200]. Trees rarely fruit in Britain except after a long hot, dry summer[11, 130]. Spreads freely by suckers[182]. Grows well on a lawn[11]. Most members of this genus transplant easily, even when fairly large[11]. Special Features: Attractive foliage. North American native. All or parts of this plant are poisonous, Wetlands plant, Blooms are very showy.

#### 5.2.426 Ouercus prinoides

Dwarf Chinkapin Oak

4 tlin 8 cyuc 2 kcak 2 tcan 2 dwat 4 m hkuc hmimhtut cyutli kyuctcup hwicli hyisjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus prinoides is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow

in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[105, 161, 177]. A sweet taste[227]. The seed is up to 15mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed might contain bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent TanninThe leaves of most species in this genus are more or less rich in tannins. A mulch of the partially decayed leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc, and these will in time break down to add humus and nutrients to the soil. Fresh leaves should be used with caution, however, since as these decay they utilize some of the nitrogen in the soil and thus can inhibit plant growth[20, K]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff and is also used by many cultures to make ink[4] , 331 ]. The bark of oak trees is also usually rich in tannins and can be used as a dyestuff and for waterproofing rope[331 , K ]. As a source of wood and lumber the genus Quercus is one of the most important of all groups of trees. We have no specific information for this species, but in general he timber is noted for its strength, durability, and beauty, and is used everywhere for innumerable purposes, ranging from fuel to railroad ties, construction of buildings and ships, interior trim, flooring, and all grades of furniture. The woods of different species vary as to their physical qualities; some of them are very hard and tough, others are lighter in weight. softer, and less tough[331]. The wood of many Oak species is a favoured fuel - burning well and giving off a lot of heat [331]

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern and Central N. America - Maine to Minnesta, south to Alabama and Texas. ksacta Sunny sites, often in rocky or acid sandy soils[227] on dry plains, rocks, thickets and woodland edges[43].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Whereas trees in the wild can reach 5 metres or more in height, they rarely exceed 1.5 metres in Britain[11]. Plants produce suckers[11] and often form thickets[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Trees produce heavy crops every year or every other year in the wild[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. This species is often confused with Q. michauxii, Q. muehlenbergii and Q. prinus[200]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. For

Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in hot dry soils and in poor soils. Succeeds in most soils so long as they are well drained[186], preferring a neutral or slightly alkaline soil. Does well in chalky soils[1]. Grows well in heavy clay soils. Tolerates a pH range from 4 to 8[186]. Succeeds in light woodland but dislikes heavy shade[186]. Established plants are very tolerant of drought[186]. Although the fully dormant plant is cold-tolerant throughout Britain, the young growth in spring can be damaged by late frosts. A very polymorphic species, there is a huge range of cultivars of widely diverse habits[11. 81]. At least some forms tolerate maritime exposure[186]. there is a thriving colony in an exposed position at Land's End in Cornwall[81]. Seed takes 2 - 3 years to ripen on the plant[11]. Plants are usually very slow growing, often only a few centimetres a year[186]. Resists honey fungus[88]. Plants are sometimes attacked by a rust, this fungus has an aecidial stage on hawthorn (Crataegus spp.)[1]. Dioecious. Male and female plants must be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

## 5.2.343 Viola sororia

Wooly Blue Violet, Common blue violet 4 tlin 8 cyuc 3 kcak 3 tcan 1 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Viola sororia is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from March to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[159, 177]. A mild flavour, they make an acceptable addition to mixed salads[K]. The leaves are often mixed with stronger tasting leaves from the cabbage family[183]. When added to soup they thicken it in much the same way as Okra[62, 85, 159, 183]. The leaves are rich in vitamins A and C[159, 183]. Flowers - raw. A mild flavour, they are an excellent attractive garnish for salads[K]. Rich in vitamin C[159]. The flowers can also be made into jams, jellies etc[183]. A tea can be made from the leaves[85] or from the flowers[159].

tcanta IncenseAn infusion of the root has been used to soak corn seeds before planting in order to keep off insects[257]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch. Faunal Associations: The flowers are not often visited by insects (hence the need for cleistogamous flowers), but sometimes they attract bees (e.g., Mason, Halictid), skippers, Syrphid flies, and other insects. The Syrphid flies, however, feed only on stray pollen and are non-pollinating. The caterpillars of many Fritillary butterflies feed on the foliage, including Speveria diane (Diana). Euptoieta claudia (Variegated Fritillary), Speyeria aphrodite (Aphrodite Fritillary), Boloria bellona (Meadow Fritillary), and Boloria selene myrina (Silver-Border Fritillary). The seeds have soft appendages that attract ants, which are in part distributed by them. Various upland gamebirds and small mammals occasionally eat the seeds, including the Wild Turkey, Bobwhite, Mourning Dove, and White-Footed Mouse. Wild Turkeys also eat the leaves and fleshy roots of Viola spp. (Violets). Although it is not a preferred food source, mammalian herbivores occasionally

eat the foliage of violets, including the White-Tailed Deer, Cottontail Rabbit, and livestock [1-6].

dwatta Analgesic Dysentery Poultice Vitamin CA poultice of the leaves has been used to allay the pain of a headache[257]. An infusion of the plant has been used in the treatment of dysentery, coughs and colds[257]. A poultice of the crushed root has been applied to boils[257].

nrakta Eastern N. America - Quebec to Wyoming and south to Oklahoma and N. Carolina. ksacta Moist meadows, low woods and shady banks[43, 187], often on sandy substrates[274].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5. There are a number of named varieties selected for their ornamental value [187]. Plants produce cleistogamous flowers as well as the usual insect pollinated flowers[187]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159]. Sometimes misspelt as Viola sororaria For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

## 5.2.344 Aegopodium podagraria

Ground Elder, Bishop's goutweed, Goutweed, Ground Elder, Bishop's Weed

4 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 0.6 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aegopodium podagraria is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is polinated by Bees, flies. The plant is self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 4, 5, 12, 54, 100]. An unusual tangy flavour[183], the majority of people we give it to do not like it[X] although some reports say that it makes a delicious vegetable[244]. The leaves are best harvested before the plant comes into flower, they can be used in salads, soups, or cooked as a vegetable[9].

tcanta This species makes a good ground-cover for semiwild situations[200]. Make sure that it has plenty of room since it can be very invasive and is considered to be a weed in many gardens[208].

dwatta Antirheumatic Diuretic Sedative Vulnerary-Ground Elder has a long history of medicinal use and was cultivated as a food crop and medicinal herb in the Middle Ages. The plant was used mainly as a food that could counteract gout, one of the effects of the rich foods eaten by monks pishops etc at this time. The plant is little used in modern herbalism. All parts of the plant are antirheumatic, diuretic, sedative and vulnerary[9, 13, 53, 54, 61]. An infusion is used in the treatment of rheumatism, arthritis and disorders of the bladder and intestines[9]. Externally, it is used as a poultice on burns, stings, wounds, painful joints etc[9, 268]. The plant is harvested when it is in flower in late spring to mid-summer and can be used fresh or be dried for later use[9, 238]. A

homeopathic remedy is made from the flowering plant[9]. It is used in the treatment of arthritis and rheumatism[9].

nrakta Most of Europe, including Britain, to western Asia and Siberia. ksacta Hedgerows and cultivated land[17]. A common garden weed[17].

propta Seed - sow spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Very easy, divisions can be carried out at almost any time of the year and the divisions can be planted out straight into their permanent positions.

nwatta Landscape Uses:Border, Container, Foundation. Ground cover, Woodland garden. Prefers damp shady conditions[12, 13, 200] but succeeds in most soils[200]. Prefers a well-drained soil, succeeding in sun or shade[238]. Plants are hardy to at least -15°c[200]. This species was cultivated in the Middle Ages as a medicinal and food plant[5, 17, 177]. 268]. A very invasive plant, spreading freely at the roots[4, 53, 208], though it seldom sets seed in Britain[208]. Once established it can be very difficult to eradicate because any small piece of root left in the ground can regrow[K]. If introducing this plant to your garden, it might be best to restrict the roots by growing the plant in a bottomless container buried in the soil[238]. There is a variegated form of this species that is less invasive and is sometimes grown in the ornamental garden[208]. Plants seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing, Wetlands plant. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

#### 5.2.345 Spinacia oleracea

Spinach

4 tlin 8 cyuc 3 kcak 1 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nvanhien hionli

drutta Spinacía oleracea is a ANNUAL growing to 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves of most varieties of spinach are high in oxalic acid[218]. Although not toxic, this substance does lock up certain minerals in a meal, especially calcium, making them unavailable to the body. Therefore mineral deficiencies can result from eating too much of any leaf that contains oxalic acid. However, the mineral content of spinach leaves is quite high so the disbenifits are to a large extent outweighed by the benefits. There are also special low-oxalic varieties of spinach that have been developed. Cooking the leaves will also reduce the content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238]. Possible methaemoglobinaemia from nitrates in children under 4 months. Anticoagulant patients should avoid excessive intake due to vitamin K content [301].

kcakta Edible Parts: Leaves SeedEdible Uses: ColouringLeaves - raw or cooked[1, 2, 16, 37, 132]. Tender young leaves can be added to salads, older leaves are used as greens or added to soups etc[183, 201]. The leaves contain oxalic acid (6 - 8% in young leaves, 23 - 27% in the cotyledons)[218], see the notes above on toxicity. A nutritional analysis of the leaves is available[218]. Seeds - raw or cooked. It can be sprouted and added to salads[183]. Chlorophyll extracted from the leaves is used as an edible green dye[142].

tcanta DyeA yellow dye is obtained from the leaves[100].
dwatta Appetizer Carminative Febrifuge Hypoglycaemic
Laxative UrinaryThe plant is carminative and laxative[218].

In experiments it has been shown to have hypoglycaemic properties[218]. It has been used in the treatment of urinary calculi[240]. The leaves have been used in the treatment of febrile conditions, inflammation of the lungs and the bowels[240]. The seeds are laxative and cooling[240]. They have been used in the treatment of difficult breathing, inflammation of the liver and jaundice[240].

nrakta The origin of this plant is uncertain, it probably arose in S.W. Asia. ksacta Not known in the wild.

propta Seed - sow in situ from March to June for a summer crop. Make successional sowings, perhaps once a month, to ensure a continuity of supply. The seed germinates within about 2 weeks and the first leaves can be harvested about 6 weeks later. Seed is sown in situ during August and September for a winter crop.

nwatta Plants grow best and produce their heaviest crop of leaves on a nitrogen-rich soil[16, 37, 200]. They dislike very heavy or very light soils[37]. They also dislike acid soils, preferring a neutral to slightly alkaline soil[200]. Plants require plenty of moisture in the growing season, dry summers causing the plants to quickly run to seed[27]. Summer crops do best in light shade to encourage more leaf production before the plant goes to seed[27], winter crops require a warm dry sunny position[1, 27]. Young plants are hardy to about -9°c[200]. Spinach is often cultivated for its edible leaves, there are some named varieties[132, 183]. These varieties can be grouped into two main types as detailed below:- Forms with prickly seeds. These are the more primitive forms. Their leaves are more lobed and they are in general more cold tolerant and also more resistant of summer heat[264]. They were more often used to produce a crop in the winter[200. 264]. Forms with round seeds have been developed in cultivation, These have broader leaves, tend to be less cold hardy and were also more prone to bolt in hot weather[264]. They were used mainly for the summer crop[200]. Most new cultivars are of the round seeded variety and these have been developed to be more resistant to bolting in hot weather, more cold tolerant, to produce more leaves and also to be lower in calcium oxalate which causes bitterness and also has negative nutritional effects upon the body[264]. Some modern varieties have been developed that are low in oxalic acid. Edible leaves can be obtained all year round from successional sowings[200]. The summer varieties tend to run to seed fairly quickly, especially in hot dry summers and so you need to make successional sowings every few weeks if a constant supply is required. Winter varieties provide leaves for a longer period, though they soon run to seed when the weather warms up. Spinach grows well with strawberries[18, 20]. It also grows well with cabbages, onions, peas and celery[201]. A fast-growing plant, the summer crop can be interplanted between rows of slower growing plants such as Brussels sprouts. The spinach would have been harvested before the other crop needs the extra space[200]. Spinach is a bad companion for grapes and hyssop[201]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 5.2.346 Tragopogon porrifolius

alsify

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tragopogon porrifolius is a BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Flowers Leaves Root Seed StemEdible Uses: GumRoot - raw or cooked[2, 5, 27, 33, 37, 89]. The young root can be grated in salads[12], older roots are best cooked[183]. The flavour is mild and sweet, and is said pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked in pies, preserves etc, or dried for later use[62, 101, 183]. A bitter flavour[212]. The fruit becomes sweeter and so tastes best after a frost, it can also be bletted if it is going to be eaten raw[K]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit of many species has a delicious taste, somewhat like a luscious tropical fruit. The fruit is up to 5mm across[200].

tcanta WoodThe wood is soft and weighs 37lb per cubic foot[235].

dwatta Enuresis Febrifuge TonicAn infusion of the branches has been given to young children with bed-wetting problems[257]. The bark is febrifuge and tonic[257]. It has been used in the treatment of general sickness[257]

nrakta N. America - Labrador to Alaska, south to Maine, Pennsylvania, Michigan, Colorado and Utah. ksacta Canyons and wooded slopes, 1200 - 2700 metres in California[71]. Moist and wet soils of hills and mountains to 2,700 metres[212].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188].

## 5.2.424 Crataegus rivularis

River Hawthorn

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 4 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus rivularis is a deciduous Tree growing to 4 m (13ft ini). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[212]. The flesh is thin, dry and mealy[227]. The fruit can also be dried for later use or for making into pemmican[212]. The fruit is high in sugar but low in fats and protein[212]. The fruit is about 10mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it

to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Western N. America - Wyoming to Idaho, New Mexico, Arizona and Nevada. ksacta Thickets and rocky ground[43]. Borders of streams, 900 - 2,500 metres in Texas[227].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. There is some doubt over the correct name for this species. [200] suggests that it is a synonym for C. douglasii but also records it as a distinct species[K]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 5.2.425 Aesculus parviflora

Bottlebrush buckeye

4 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 4 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus parviflora is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins[169]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Border, Espalier, Pollard, Screen, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -18°c[202]. This species is closely related to C. crus-galli[11]. It hybridizes freely with other members of the genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Special Features: Attracts birds, North American native, Blooms are very showy.

## 5.2.421 Smilax glauca

Cat Greenbrier

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 5 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nvanhien hionli

drutta Smilax glauca is an evergreen Climber growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root cooked[161, 257]. It can be boiled and made into a jelly or dried and ground into a powder then used with cereals when making bread etc[61, 105, 159]. Young shoots in spring - raw or cooked[159].

dwatta Birthing aid Poultice RubefacientThe stem prickles have been rubbed on the skin as a counter-irritant to relieve localised pains, muscle cramps and twitching[222]. A tea made from the leaves and stems has been used in the treatment of rheumatism and stomach problems[222]. The wilted leaves are applied as a poultice to boils[222, 257]. A tea made from the roots is used to help the expelling of afterbirth[222]. Reports that the roots contain the hormone testosterone have not been confirmed, they might contain steroid precursors, however[222].

nrakta South-eastern N. America - New England to Florida, west to Texas and Indiana. ksacta Dry to moist sandy thickets, open woods and fields[43]. Dry to wet woods, thickets, hedge-rows, roadsides from sea level to 800 me-

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most soils in sun or semi-shade[200]. Hardy to at least -20°c[200]. A vigorous plant, it can be grown through trees or shrubs or over tree stumps[200]. Dioecious. Male and female plants must be grown if seed

## 5.2.422 Malus halliana

Hall crab apple

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus halliana is a deciduous Tree growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. 6 - 8 mm in diameter[200]. A healthy tree at Kew in September 1989 had small acid fruits[K].

nrakta E. Asia - Japan? ksacta Not known in a truly wild

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away guickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. The sub-species M. halliana spontanea. (Mak.)Koidz. has slightly larger fruits than the type, they are up to 1 cm in diameter [200]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.423 Sorbus scopulina

Western Mountain Ash. Greene's mountain ash. Cascade mountain ash

4 tlin 8 cvuc 2 kcak 0 tcan 1 dwat 4 m hkuc

476

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus scopulina is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid. neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. to resemble ovsters[183, K]. The roots are harvested as required from October until early spring, or can be harvested in late autumn and stored until required[4]. Young shoots raw or cooked[2, 12, 27, 33, 37, 52, 183]. The new growth is used in spring. A sweet taste[200]. Flowering shoots raw or cooked[200]. Used like asparagus. Flowers - raw. Added to salads[183]. The sprouted seeds can be added to salads or sandwiches[183]. The root latex is used as a chewing gum[61, 105, 161, 183].

dwatta Antibilious Aperient Deobstruent DiureticSalsify is a cleansing food with a beneficial effect upon the liver and gallbladder[254]. The root is antibilious, slightly aperient, deobstruent and diuretic[4, 21]. It is specific in the treatment of obstructions of the gall bladder and jaundice[240] and is also used in the treatment of arteriosclerosis and high blood pressure[254].

nrakta Europe - Mediterranean. Naturalized in Britain[17], ksacta Found near the sea and estuaries in S.E. England[17].

propta Seed - sow in situ as early in the year as possible, in March if weather conditions permit[4]. Seed sowings often fail unless the soil is kept moist until the seedlings are growing well[4].

nwatta Succeeds in ordinary garden soils, including heavy clays[4, 200]. Plants do not grow well in stony soils[4]. Prefers an open situation[37] and a cool moist root run[14. 20]. Salsify is occasionally cultivated in the garden for its edible root[2, 89], there are some named varieties[183]. Grows well with mustard[20].

## 5.2.347 Callirhoe involucrata

Poppy Mallow, Purple poppymallow, Winecup, Finger Poppy

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Callirhoe involucrata is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Leaves RootEdible Uses: Root cooked[2, 105, 161, 177]. The root is long and tapering[2], it is sweet and starchy with a pleasant taste somewhat like that of a sweet potato[183]. Leaves - cooked. A pleasant flavour with a mucilaginous texture, they are good for thickening soups[183].

dwatta AnodyneA decoction of the root is used to treat internal pain[61, 222, 257]. The root was also dried, then burnt and the smoke either inhaled or allowed to bathe the affected part of the body[222, 257].

nrakta Central N. America - Minnesota and Iowa to Texas, Utah and New Mexico. ksacta Grows in dry soils on the plains[43, 235]. Sandy, eroding dry ground and roadsides in Texas[274].

propta Seed - sow outdoors or in a cold frame. Plants resent root disturbance so the seed is best sown in situ in April[138], though the slugs will have a field day if you do not protect the plants[K]. If seed is in short supply then sow it in pots in a cold frame, putting a few seeds in each pot, and plant the pots out in early summer once the plants have put on at least 15cm of growth. Germination usually takes place within 1 - 6 months at 15°c[138]. Cuttings of young basal shoots in a frame in sand[1, 200]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division[200]. With care since the plant resents root disturbance. We have found that it is best not to disturb this plant and so do not try to divide it, relying instead on taking basal cuttings since these do not disturb the main clump[K].

nwatta Landscape Uses: Border, Ground cover, Rock garden. Prefers a light rich sandy loam and a sunny position[1, 200]. Likes a hot dry position[200], growing well on a dry sunny bank[260]. This species is hardy to about -15°c[200]. A deep-rooting plant[235], it strongly resents root disturbance and should be planted into its final position as soon as possible[138]. Slugs are strongly attracted to this plant and can destroy even established plants by eating out all the young shoots in spring[K]. Special Features: North American native, Naturalizing, Extended bloom season in Zones 9A and above. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# **5.2.348** Cardamine pratensis

Cuckoo Flower

4 tlin 8 cvuc 3 kcak 2 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine pratensis is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and young shoots - raw or cooked[2, 5, 12, 52, 115]. Rich in vitamins and minerals[268], especially vitamin C[238], but with a bitter and pungent flavour[27]. The leaves and young shoots are harvested in the spring and taste rather like water cress[9]. The leaves can be available early in the year[K] and when used in small quantities make a very acceptable addition to salads[183, K]. Flowers and flower buds - raw. A pungent cress-like flavour[183, K]. The white flowers are very attractive, they make a pleasant nibble and also add a delicious flavour to salads[K].

tcanta Attracts wildlife.

445

dwatta Antirheumatic Antiscorbutic Antispasmodic Carminative Digestive Diuretic Stimulant Vitamin CCuckoo flower is seldom used in herbalism, though an infusion of the leaves has been used to treat indigestion and promote appetite[268]. The leaves and the flowering plant are antirheumatic, antiscorbutic, antispasmodic, carminative, digestive, diuretic, stimulant[9, 146, 172, 238, 240]. They are used internally in the treatment of chronic skin complaints. asthma and hysteria[238]. The plant is harvested in spring and early summer and is best used when fresh[9, 238].

nrakta Most of Europe, including Britain, N. Asia and N. America. ksacta Moist, slightly shady places in meadows and by streams[13, 31, 187], usually in acid soils[9].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division in spring or autumn[238]. The plant produces young plants at the base of its leaflets. When large enough, these can be easily separated from the main plant and grown on as individual plants[K].

nwatta Succeeds in most soils[1, 111] so long as they are moist or wet[187, 188]. Prefers a cool damp soil[111]. Succeeds in full sun or partial shade[238]. Cuckoo flower was at one time much used as a spring salad plant and was often sold in local markets. It has, however, fallen out of favour and is scarcely used at present[268]. A polymorphic species[17]. A very ornamental plant, non-invasive and well suited to the wild garden though it may require protection from wood pigeons who eat out the young buds in spring[187]. It grows well in the spring meadow[24]. A food plant for the grange tip butterfly[24]. There is at least one named variety, selected for its ornamental value. 'Flore Pleno' is a double flowered form[187]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.349 Allium oleraceum

Field Garlic

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Allium oleraceum is a BULB growing to 0.6 m (2ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2, 22]. Used as a garlic flavouring in soups etc[12, 105, 115, 177]. The bulbs are 10 - 20mm in diameter[200]. Leaves - raw or cooked. The young leaves are used as a garlic flavouring in soups and stews, but are inferior to that species[2, 61]. Flowers - raw. Used as a garnish on salads. Used mainly as a flavouring in soups and stews[183]. Bulbils - raw or cooked.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Most of Europe, including Britain, east to the Caucasus. ksacta Dry grassy places, waysides etc[17, 200].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required. Bulbils can be harvested in late summer and planted out immediately.

inwatta An easily grown plant, it prefers a sunny position in a light well-drained soil[1]. The bulbs should be planted fairly deeply[1]. Seed is rarely if ever produced in Britain[17]. The plant usually produces many small bulbils in the flowering head and these can spread themselves freely around the garden[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201].

Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.350 Stellaria graminea

Lesser stitchwor

4 tlin 8 cyuc 3 kcak 2 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Stellaria graminea is a deciduous Perennial growing to 0.5 m (Ift 8in) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista The leaves contain saponins[7, 65]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Report of paralysis attributed to excessive intake. Should not be used during pregnancy or during breastfeeding [301].

kcakta Leaves and shoots used in salads or lightly cooked as a vegetable. Harvest young shoot in spring to summer [1-9].

tcanta Faunal Associations: The nectar and pollen of the flowers attract small bees and flies primarily. The caterpillars of several moth species feed on the foliage of Chickweeds, including Agrostis venerabilis (Venerable Dart), Lobocleta ossularia (Drab Brown Wave), and Haematopis grataria (Chickweed Geometer). Mourning Doves and various sparrows occasionally eat the seeds of Chickweeds, while rabbits and groundhogs eat the foliage [1-6]. Attractive flowers. A good bee plant.

dwatta The common name Stitchwort is a reference to a herbal remedy in which the various stitchwort plant were used - allegedly to cure that pain in the side known as 'stitch', which afflicts many people when they try to run after a long lavoff from sporting activities.

nrakta Native to Eurasia but it is widespread around other parts of the temperate world as an introduced species and a common weed. ksacta Agricultural fields, roadsides, trail edges, gravel pits, waste areas. Part shade, sun; sandy or gravelly disturbed soil. In New Zealand in wetlands and margins of water bodies and wet grassland.

propta Seed - broadcast in spring [1-9].

nwatta A rhizomatous perennial herb producing branching stems which are prostrate, sprawling, trailing, or erect. An attractive chickweed. Typical growing conditions are full sun and moist to mesic soil. Grows quite well in loam or clay-loam. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshv. Thick or swollen - fibrous or tap root [2-1].

## 5.2.351 Hydrophyllum capitatum

Cat's Breeches, Ballhead waterleaf, Alpine waterleaf, Thompson's waterleaf

4 tlin 8 cyuc 3 kcak 0 tcan 0 dwat 0.5 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hydrophyllum capitatum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

# 5.2.419 Lonicera japonica

Japanese Honeysuckle

4 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 5 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lonicera japonica is an evergreen Climber growing to 5 m (16ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Moths. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The leaves ontain saponins[179]. Saponins are quite toxic but are poorly absorbed by the human body and so most pass through without harm. They can be found in many common foods such as some beans. Thorough cooking, and perhaps changing the cooking water once, will normally remove most of the saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaLeaves - cooked. The parboiled leaves are used as a vegetable[183]. Some caution is advised, see notes above on toxicity. Flowers - sucked for their sweet nectar[183], used as a vegetable or made into a syrup and puddings[183]. A tea is made from the leaves, buds and flowers[177, 183].

tcanta Basketry InsecticideA very vigorous climbing plant, it makes a good dense ground cover plant where it has the space to run over the ground but it will swamp smaller plants[197, 200]. The sub-species L. japonica repens is especially used for this purpose on the continent[182]. The cultivar 'Halliana' has also been recommended[188, 197]. This cultivar should be clipped back severely in the spring if it gets untidy, it responds well to such conditions[208]. Plants should be spaced about 1 metre apart each way[208]. The plant is said to be insecticidal[218]. The stems have been used in making baskets[257].

dwatta Antibacterial Antiinflammatory Antispasmodic Antiviral Depurative Diuretic Dysentery Febrifuge Skin TB VDThe stems and flower buds are alterative, antibacterial, anti-inflammatory, antispasmodic, depurative, diuretic, febrifuge[147, 174, 176, 178, 238]. The plant is also used to reduce blood pressure[174, 176, 238]. The stems are used internally in the treatment of acute rheumatoid arthritis, mumps and hepatitis[238]. The stems are harvested in the autumn and winter, and are dried for later use[238]. The stems and flowers are used together as an infusion in the treatment of upper respiratory tract infections (including pneumonia) and dysentery[238]. An infusion of the flower buds is used in the treatment of a wide range of ailments including syphilitic skin diseases and tumours, bacterial dysentery, colds, enteritis, pain, swellings etc[174, 176, 218, 222, 238, 279]. Experimentally, the flower extracts have been shown to lower blood cholesterol levels and are antibacterial. antiviral and tuberculostatic[222, 279]. Externally, the flowers are applied as a wash to skin inflammations, infectious rashes and sores[238]. The flowers are harvested in early morning before they open and are dried for later use[238]. The plant has a similar action to Forsythia suspensa and is usually used in combination with that species to achieve a stronger action[176]. This plant has become a serious weed in many areas of N. America, it might have the potential to be utilized for proven medical purposes[222].

nrakta E. Asia - China, Japan, Korea. Locally naturalized in Britain[50]. ksacta Thickets in hills and mountains all over Japan[58]. Woods in the mountains and lowlands of Korea[279].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a

cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good moist soil with its roots in the shade and its top climbing into the light[200]. Succeeds in any soil in part shade[184]. Established plants are drought tolerant[190]. They succeed in dry shade, the cultivar 'Halliana' is especially recommended for such a situation[188]. Plants are hardy to about -20°c[184]. The foliage can be damaged in severe wind-chill conditions but the plant usually recovers in the spring[202]. Fruit is only formed after a hot summer[202]. A rampantly growing plant[190], it climbs by twining around other plants[182] and makes an excellent screen for a north or east facing fence or an unsightly object[190]. This species has the potential to become a rampant weed, it has escaped from cultivation in N. America whre it can outcompete native species[274]. The plant has powerfully scented flowers. The white-flowered cultivar 'Halliana' has a pronounced lemon-like perfume[245]. There are several named varieties, developed for their ornamental value[182, 200]. Special Features:Not North American native, Invasive, Naturalizing, Fragrant flowers, Attractive flowers or blooms

## 5.2.420 Crataegus canbyi

Cockspur hawthorn, Dwarf Hawthorn, Cockspur Hawthorn 4 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 5 m hkuc

hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus canbyi is a deciduous Shrub growing to 5 m (16ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[82]. The fruit is about 12mm in diameter and is borne in small clusters[200]. It has a thick, bright red, juicy flesh[82]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - fine-grained, tough, hard and heavy. Used for tool handles etc[82].

dwatta Cardiac HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

nrakta Eastern N. America - Pennsylvania and Delaware ksacta Hedges and thickets[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. There are several named varieties selected for their ornamental value[200]. 'Wynema' has large edible fruits up to 5cm in diameter. It has a biennial bearing habit[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.416 Calystegia hederacea

Japanese false bindweed 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calystegia hederacea is a PERENNIAL CLIMBER growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, at least some, if not all members of this genus are purgative[173], some caution is advised.

kcakta Edible Parts: Leaves RootEdible Uses: Root cooked[105, 177], then washed and steamed. Considered to be very nutritious, it is rich in starch and sugar but it should not be eaten regularly[179]. Young shoots - cooked[105,

dwatta DiureticThe seed is simmered in water as a diuretic to stimulate kidney secretions[218].

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Sunny grassy places and thickets in lowland and hills of C. and S. Japan[58].

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary garden soil in a sunny position, but plants are apt to become invasive[1, 200]. Nearly all taxa in Calystegia intergrade geographically into neighboring taxa with the exception of the widespread coastal species, C. soldanella (Linnaeus) R. Brown. It is impossible to draw clearly defined specific limits, and intermediate forms are always found where two taxa approximate geographically[266].

#### 5.2.417 Malus glaucescens

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus glaucescens is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Aromatic, it is 3 - 4cm in diameter[200].

tcanta The wood weighs 44lb per cubic foot[235].

nrakta Eastern N. America - Ontario to Michigan, south to New Jersey, South Carolina, Iowa and Missouri. ksacta Glades and open woods in rich soils[82].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away guickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. This species is closely related to M. glabrata[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.418 Berchemia flavescens

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Berchemia flavescens is a deciduous Climber growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - eaten raw when fully ripe[272]. The sausage-shaped fruit is about 12mm long[11].

nrakta E. Asia - Himalayas in India, Nepal, Sikkim, Tibet and Bhutan, ksacta Wet shaded places in forested areas at elevations of 2000 - 3400 metres[272]. Often found in thickets or forests on slopes at elevations of 1200 - 4000 metres[266].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Cuttings of mature wood of the current season's growth, November to January in a frame. Root cuttings in winter[200]. Layering of young stems in winter[200].

nwatta Requires a good moist well-drained loam, succeeding in full sun if the soil does not dry out otherwise it is best in light shade[11, 200]. Suitable for growing along fences, against walls with wire supports or for growing through other shrubs[200]. Plants climb by means of twining around supports[182]. Flowers are produced on the current years growth[200]. It takes almost 12 months from flowering to ripening the fruit[266].

der young shoots - cooked as a potherb[207, 212]. Root cooked[207]. Large and fleshy[212].

nrakta Western N. America - Alberta to British Columbia, south to Oregon and Colorado. ksacta Rich moist soils, most often in the shade, from valleys to around 2,700 metres[212].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed usually germinates in early spring. Sow stored seed as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Requires a moist humus-rich soil in semishade[200]. Grows well in an open woodland garden[200]. The leaves are shaped in such a way that they collect rainwater in a cavity[212]. Slugs are particularly fond of this plant and will soon destroy it if given a chance[K].

# 5.2.352 Yucca angustissima

Narrowleaf yucca, Kanab yucca, Toft's yucca, Yucca 4 tlin 9 cyuc 3 kcak 4 tcan 0 dwat 0.4 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Yucca angustissima is an evergreen Shrub growing to 0.4 m (1ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill

kcakta Edible Parts: Flowers Fruit StemEdible Uses: Fruit - the immature fruit is cooked[85]. Baked in an oven[216]. A bitter taste, the bitterness is in the skin[85]. The fruit is about 6cm long and 2.5cm wide[200]. Flowers - raw or cooked. They are delicious raw, or can be dried. crushed and used as a flavouring[85]. Flowering stem peeled, cooked and used like asparagus. The whitish inner portion is used[85].

tcanta Basketry Broom Brush Fibre SoapA fibre obtained from the leaves is used for making ropes, baskets and mats[85]. The leaves are very fibrous and can be used as paint brushes[92] or as a broom or woven to make mats etc[85]. They are also used in basketry[216]. The roots are rich in saponins and can be used as a soap substitute[85, 2161.

nrakta South-western N. America. ksacta Sandy places, sandstone outcrops, rocky hillsides of deserts at elevations of 900 - 2200 metres in Arizona, New Mexico and Utah[270].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept at a temperature of 20°c. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings

kcakta Edible Parts: Leaves RootEdible Uses: Ten- in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established[78].

nwatta Landscape Uses:Border, Massing, Specimen. Thrives in any soil but prefers a sandy loam and full exposure to the south[11]. Plants can succeed in light shade[K]. They are hardier when grown on poor sandy soils[200]. Established plants are very drought resistant, this species is also tolerant of damp weather[11]. Plants are not hardy in the colder areas of the country, they tolerate temperatures down to about -10° if in a suitable location[11, 200]. Closely allied to Y. glauca[11]. The plant has a thick prostrate rootstock[11]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is reguired, hand pollination is necessary. This can be guite easily and successfully done using something like a small paint brush. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in later years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]. Special Features:North American native, Fragrant flowers, Attractive flowers or blooms

#### 5.2.353 Allium condensatum

4 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium condensatum is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. The bulb is about 20mm in diameter[266], Leaves - raw or cooked[177], Flowers - raw, Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta E. Asia - China, Mongolia, Siberia. ksacta Conglomerates and rocks[74]. Slopes and meadows from near sea level to 2000 metres in northern China[266].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained soil[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the

other[201]. Members of this genus are rarely if ever troubled **5.2.355 Ulmus japonica** by browsing deer[233].

## 5.2.354 Picea purpurea

Purple-Coned Spruce 4 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 45 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Picea purpurea is an evergreen Tree growing to 45 m (147ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food, it is only used when all else fails. Seed - raw. Too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172].

tcanta WoodWood - soft, not strong, resinous. Used for general construction[46, 61]. It is also valued for its use in the pulp industry to make paper[171]. This species produces a fine quality timber similar to that from P. likiangensis[266].

nrakta E. Asia - W. China. ksacta Forests, 3000 - 3600 metres in N.W. Sichuan and S. Ghansu[109]. Mountains, predominantly on north facing slopes, at elevations of 2600 -3800 metres[266].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame[78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Tolerates various sites[81]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. Although dormant trees are cold-hardy, the young shoots in spring are often damaged by late frosts[1]. In some upland areas, especially over granitic or other basepoor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Fairly fast growing after a slow start, trees can average height increases of 30 - 40cm a year [185]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

Japanese Elm

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 35 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulmus japonica is a deciduous Tree growing to 35 m (114ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to May, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Leaves - raw or cooked[105, 177]. Young fruits cooked[105, 177]. The fruit is about 15mm long and 10mm wide[200]. Inner bark - cooked. It is usually dried, ground into a powder and then used as a thickening in soups or added to cereal flours when making bread etc[105, 177].

tcanta Fibre WoodA fibre is obtained from the inner bark[189]. The bark is soaked for 7 - 10 days in water, the inner and outer barks are then separated and the inner bark is stripped into strands and made into thread by chewing it. It is made into a coarse fabric[189]. Wood - heavy, difficult to work. Used for axles, hubs etc[46, 61].

dwatta Diuretic Nervine PurgativeThe bark is diuretic, nervine and purgative[218].

nrakta E. Asia - China, Japan, Korea. ksacta Slopes, waterlands near stream and in valleys below 2000 - 2300 metres[266].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very guickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. This species is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200]. Closely related to U. davidiana[200], and considered to be no more than a subspecies of that species by some botanists[266].

## 5.2.356 Fagus crenata

Japanese Beech

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 35 m hkuc

pcimhmimhtut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Fagus crenata is a deciduous Tree growing to 35 m (114ft 10in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 177]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. It is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Hedge HedgeVery tolerant of trimming, it can even be cut right back into the old wood and will soon resprout. It makes a good hedge[74]. Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia - northern China, Mongolia, Siberia. ksacta Open forests, forest edges, river banks etc[74].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 5.2.414 Malus kansuensis

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus kansuensis is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil.

Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A very acid flavour even when fully ripe[K]. We have seen fruit that has bletted whilst still on the tree - at this stage the flesh has become very soft and mealy but still has a very acid flavour [K]. The fruit can be up to 1cm in diameter[200].

nrakta E. Asia - N. China. ksacta Mixed forests, among shrubs at elevations of 1500-3300 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year, Cuttings of mature wood. November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation [200]. This species is closely related to M. toringoides[11]. It hybridizes freely with other members of the genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.415 Malus x soulardii

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus x soulardii is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves. but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[200]. Fairly large, the fruit is up to 5cm in diameter[200].

nrakta A hybrid of garden origin, probably M, joensis x M. pumila[200]. ksacta Not known in the wild.

propta Seed - this is a hybrid species and will not breed true. The seed is best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might

The bruised leaves are refreshingly aromatic whilst the flowers cast a pleasing scent[245]. Dioecious. Male and female plants must be grown if seed is required.

#### 5.2.411 Malus lancifolia

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus lancifolia is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cvanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Up to 3cm in diameter[200].

tcanta The wood weighs 43lb per cubic foot.

nrakta Eastern N. America - Pennsylvania to Virginia, Illinois and North Carolina. ksacta Thickets[235].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood. November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. There is some confusion over the correct name of this species. [43] gives the name as a synonym of M. coronaria lancifolia (along with M. bracteata for which we also have a record) whilst [200] recognizes it as a separate species. In [82] it is treated as part of M. coronaria. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.412 Crataegus ionesiae

Miss jones' hawthorn

4 tlin 8 cvuc 2 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli

flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus jonesiae is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Sweet and mealy in one report[82], juicy according to others[11, 200]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 1.5cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained, Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Maine. ksacta Rocky shores of sounds and bays[82].

propta Seed - this is best sown as soon as it is rine in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit. they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Closely related to C. chrysocarpa and considered to be no more than a form of that species by some botanists[229]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 5.2.413 Crataegus sanguinea

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus sanguinea is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

this species, large quantities of the seed of many species in this genus are thought to be toxic.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Coffee OilYoung leaves - raw[105]. A very nice mild flavour but the leaves quickly become tough so only the youngest should be used. New growth is usually produced for 2 periods of 3 weeks each year, one in spring and one in mid-summer. Edible seed - raw or cooked[105, 177]. Rich in oil. The seed should not be eaten in large quantities, see the notes above on toxicity. It can be dried and ground into a powder. An edible semi-drying oil is obtained from the seed[105, 177]. The roasted seed is a coffee substitute.

nrakta E. Asia - Japan, ksacta Forests all over Japan. propta Seed - the seed has a short viability and is best sown as soon as it is ripe in the autumn in a cold frame. Protect the seed from mice. Germination takes place in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are slow growing for the first few years and are very susceptible to damage by late frosts. The seed can also be sown in an outdoor seedbed in the autumn. The seedlings can be left in the open ground for three years before transplanting, but do best if put into their final positions as soon as possible and given some protection from spring frosts.

nwatta Thrives on a light or medium soil[11], doing well on chalk[1], but it is ill-adapted for heavy wet soils[1]. Young trees are very shade tolerant, but are subject to frost damage so are best grown in a woodland position which will protect them[200]. Although very cold hardy, this species requires hotter summers than are normally experienced in Britain so is not usually a success here and is very slow growing[200]. Trees have surface-feeding roots and also cast a dense shade. This greatly inhibits the growth of other plants and, especially where a number of the trees are growing together, the ground beneath them is often almost devoid of vegetation.

### 5.2.357 Ouercus variabilis

Chinese Cork Oak

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 30 m hkuc

hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ouercus variabilis is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[105, 177]. Very nutritious, but it needs to be leached[179]. The seed is up to 2cm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Cork Dve Repellent Roofing Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates

pcista Although no specific mention has been seen for and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is a source of cork[11, 123]. A 10 metre tall tree at Kew has less than 4cm thickness of cork on it[K]. A black dye is obtained from the seed cupules[61, 109]. The bark is used for roofing[109]. Wood. Used for boat making and construction[109].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea. ksacta Mixed woods, occasionally in pure stands, 800 - 1600 metres in W. China[109]. Evergreen and deciduous forests below 3000 metres[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Experimental Crop Industrial Cork Industrial Crop: Tannin Management: Standard-Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A very ornamental tree[1]. Closely related to O. acutissima[1]. Trees respond well to coppicing[109]. The seed ripens in its second year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus [200]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.358 Picea glehnii

Sakhalin Spruce

4 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 30 m hkuc

htut cyutli tcuphja7n hwicli hyishrasjlutnyikfrip hpa7tli frusflatprikslip hpa7tmwatli hjonli

drutta Picea glehnii is an evergreen Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid and neutral soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food, it is only used when all else fails. Seed - raw. Too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C. can be made from the young shoot tips[172].

tcanta WoodWood - beautifully grained. Used for pianos. violins, interiors of buildings etc[46, 61]. It is also valued for its use in the pulp industry to make paper[171].

nrakta E. Asia - N. Japan. ksacta Bogs in N. and C. Japan[58]. It is also found on very alkaline serpentine rocks.

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame[78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very windfirm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Another report says that it grows wild on very alkaline soils so it might be suitable for cultivation on alkaline soils. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Fairly fast growing in Britain, able to average 30cm a year for at least the first 50 years[185]. Another report says that it is not a good grower in Britain[1]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Special Features: Inconspicuous flowers or blooms.

# 5.2.359 Ouercus shumardii

Shumard Oak, Schneck oak 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 30 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Quercus shumardii is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked. Up to 25mm long and wide[227], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - heavy, hard, strong, close grained[82, 149, 227]. It weighs 57lb per cubic foot[227]. A very valuable timber, it is used for lumber, flooring, furniture, veneers, cabinet making etc[82, 149, 229].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Michigan to Florida and west to Texas. ksacta Borders of streams and swamps in rich moist soils[82]. Usually found in clay soils[227].

propta Seed - it quickly loses viability if it is allowed to dyout. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A moderately fast-growing tree in the wild, it commences bearing seeds when about 25 years old[229]. Seed production is cyclic, a year of high yields being followed by 1 - 3 years of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Plants in the wild are very susceptible to the disease 'oak wilt'[274]. Closely related to Q. rubra and Q. coccinea[11]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus [200]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.360 Acer pseudoplatanus

Sycamore, Great Maple, Scottish Maple, Planetree Maple 4 tlin 7 cyuc 2 kcak 4 tcan 1 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Acer pseudoplatanus is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves Sap SeedpodEdible Uses: SweetenerThe sap contains sugar and can be used as a drink or be concentrated into a syrup by boiling off the water[183]. The syrup is used as a sweetener on many foods. It can be harvested in late winter but is not produced in economic quantities[2, 4, 13, 105]. About 25 grams of sugar is obtained from a litre of the sap[4]. The sap can also be used to make a wine[183]. The flow is best on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. The keys of the developing seeds have a sweet exudation on them and this is often sucked by children[183]. The leaves can be wrapped round food such as buns when baking them and they impart a sweet flavour[66]. The related Oregon Maple (Acer macrophyllum) has yellow flower clusters, sweet with nectar, eaten raw[183]. No information was found for this species

tcanta Charcoal Fuel Pioneer Preservative Shelterbelt WoodThe trees are fast-growing and make a good windbreak for exposed and maritime areas[11, 200]. They are often used in shelterbelt plantings[200]. This species usually self-sows freely and is often the first tree to invade disused farmland, cleared woodland etc. Its ability to tolerate difficult environments make it a good pioneer species for re-establishing woodlands. When grown in Britain it is usually gradually displaced over a period of 200 years or more by native species until it becomes just a minor component of the woodland[K]. The leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - very hard, heavy, elastic, easy to work, fairly resistant to insects. Used for carving, small domestic items, veneer etc[4, 13, 46, 171]. It is a good fuel and

Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit[177]. The fruit is about 4 - 5mm in diameter[200] and is carried in small bunches like grapes[K]. Leaves[177]. No more details.

nrakta E. Asia - China, Japan, Korea ksacta Woodlands and thickets, 900 - 1500 metres[109].

propta Seed - sow in pots in a cold frame in the autumn or stratify for 6 weeks at 5°c and sow in the spring[200]. Germination can be quite slow, sometimes taking more than a year. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. When they are more than 20cm tall, they can be planted out into their permanent positions, preferably in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long, July/August in a frame[78]. Cuttings or eyes in late autumn or winter. Either place them in the ground in a greenhouse or cold frame, or put them in pots. An eye cutting is where you have just one bud at the top and a short length of stem with a small part of the bark removed. These normally root well and grow away vigorously, being ready to plant into their permanent positions the following autumn. Layering into pots in late summer. Partially sever the stem in spring and then lift the new plants in the autumn[78].

nwatta Prefers a deep rich loam in a warm sheltered position in sun or semi-shade[11, 200]. Dormant plants are hardy to at least -25°c if the wood is fully ripened[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A very ornamental plant[1], it is closely related to A. bodinieri[11]. Plants rarely produce fruits in Britain unless there is a long hot summer[200]. Plants climb by means of coiling tendrils but large plants often need tying in to support the weight of foliage[200].

#### 5.2.409 Ptelea trifoliata

Hop Tree, Common hoptree, Pallid hoptree 4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ptelea trifoliata is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Carrion flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista This species can cause photosensitization of the skin[274].

kcakta Edible Parts: FruitEdible Uses: CondimentFruit. A very bitter flavour, though it is eaten by young children[161]. The fruit is also used as a hop substitute when making beer and it is added to yeast to make it rise more quickly when making bread[2, 159, 183]. The fruit is produced abundantly in Britain[61], though very little of it is fertile[11]. The fruit is very thin and about 25mm long[200].

tcanta Hedge Hedge Miscellany WoodSometimes used as a hedge plant in N. America[226]. Wood - hard, heavy, close grained[82, 149]. It weighs 51lb per cubic foot[227] but the tree does not grow large enough for commercial exploitation[229].

dwatta Anthelmintic Antibacterial Antiperiodic Antirheumatic Malaria Miscellany Stomachic TonicThe rootbark is anthelmintic, antibacterial, antiperiodic, stomachic and tonic[4, 21, 46, 82, 238]. It has been mixed with other medicines in order to give added potency[213, 222, 257]. It has a soothing influence on the mucous membranes and promotes the appetite, being tolerated when other tonics cannot be retained[4]. It is also taken in the treatment of intermittent fevers such as malaria, heartburn, roundworms, pinworms and poor digestion[238]. Externally it is applied to wounds[238]. The roots are harvested in the autumn, the bark peeled off and dried for later use[238]. The roots are a

tonic, used in the treatment of asthmatic breathing, fevers, poor appetite etc[222]. The leaves are said to be useful in the treatment of wounds and also in the destruction of intestinal worms[213, 222].

nrakta Eastern N. America - Quebec and New York to Florida, west to Texas and Kansas. ksacta Moist places, rocky slopes, edges of woods[21], alluvial thickets and gravels[43]. It is found in many different soil types[227].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires 3 months cold stratification at 5°c and should be sown as early as possible in the year[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Very little of the seed produced in Britain is viable[11]. Cuttings of half-ripe wood, July/August in a frame[113]. Layering.

nwatta Succeeds in any fertile well-drained moisture retentive soil in full sun or light part day shade[11, 200]. The young growth in spring can be damaged by late frosts. A very ornamental plant[50], it is slow-growing and short-lived in the wild[229]. The sub-species P. trifoliata mollis. Torr. and Gray. is the form that is eaten by children[161]. The leaves are aromatic[188]. All parts of the plant emit a disagreeable odour[227]. The flowers are especially pungent and are pollinated by carrion flies[229]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.410 Humulus iaponicus

Japanese Hop

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Humulus japonicus is a PERENNIAL CLIMBER growing to 6 m (19ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves OilEdible Uses: OilYoung leaves and young shoots - cooked[105, 177, 179]. Use before the end of May.

tcanta OilThe seed oil is used to make soap[266]. dwatta Diuretic Tonic UrinaryThe whole plant is diuretic

dwatta Diuretic Tonic UrinaryThe whole plant is diuretic and a genito-urinary tonic[178, 266].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and roadsides in lowland areas all over Japan[58]. Forest margins, wastelands and along the sides of streams in China[266].

propta Seed - sow spring in a cold frame[37]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring as new growth begins[1]. Take the divisions when the new shoots are about  $10\mathrm{cm}$  above ground level. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in March. Harvest the shoots when they are about  $10 \cdot 15\mathrm{cm}$  long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Easily grown in a good garden soil in sun or semishade[1, 200]. Prefers a deep rich loam[1]. A fast growing plant, with annual stems of up to 10 metres long being produced[219]. Plants rarely survive the winter outdoors in Britain, so are best grown as annuals[219]. This report needs confirmation since the plant is also reported as being hardy in zone 5 which would mean that it should succeed outdoors virtually anywhere in Britain[K]. A climbing plant, supporting itself by twining around the branches of other plants[219].

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: TeaFruit - raw or cooked[2, 105, 177, 179, 183]. The fruit is quite small, about 15mm in diameter[200]. Leaves - cooked[179, 183]. Flowers[2, 183]. Dried, powdered and made into cakes[179]. The dried leaves are used to make tea[179].

tcanta Miscellany RootstockThis species has long been used as a rootstock for the cultivated pears by the Chinese[11], it is recently also being used as a rootstock in N. America and in Europe[183, 200].

dwatta Cholera MiscellanyThe leaves are used in the treatment of cholera, colic and cramps[218]. The cooked fruit is used to treat mucous diarrhoea[218].

nrakta E. Asia - N. China. ksacta Open slopes and plains from sea level to  $1800 \; metres [266].$ 

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at  $1^{\circ}c$  and should be sown as early in the year as possible[200]. Temperatures over 15 -  $20^{\circ}c$  induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200]. A fast growing tree[11].

#### 5.2.406 Pyrus salicifolia

Willow-Leaved Pear 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 7.5 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus salicifolia is a deciduous Tree growing to 7.5 m (24ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit - raw or cooked[2, 177]. The fruit is about 2 - 3cm long[200]. Harsh and of no value[11]. The fruit is nice when it has been bletted[74].

tcanta Oil Soil stabilizationPlants have extensive root systems and can be used for binding sands[74].

nrakta S.E. Europe to W. Asia. ksacta Dry stony sites, forest edges  ${\rm etc}[74].$ 

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at  $1^\circ c$  and should be sown as early in the year as possible[200]. Temperatures over 15 -  $20^\circ c$  induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. The dormant plant is very frost resistant[74]. A very ornamental plant[1].

## 5.2.407 Malus hupehensis

Chinese Crab, Chinese crab apple, Tea Crabapple, Flowering Tea Crabapple

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 7 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Malus hupehensis is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[105, 177]. Up to 1 cm in diameter[200], it has a sour taste[183]. The leaves are a tea substitute[11, 46, 105]. Palatable and thirst quenching, it is much used in China and leaves are exported from Shasi for this purpose[183].

tcanta Rootstock ShelterbeltA vigorous branching tree, it makes a good windbreak[245]. This species is used as stock to graft apple trees in Hubei and Sichuan[266].

nrakta E. Asia - China, Japan. ksacta Mixed forests, slopes and valley thickets from sea level to 2900 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta Landscape Uses:Border, Espalier, Standard, Specimen. An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. Plants usually produce seed apomictically (a method that does not involve sexual fusion, so the seedlings are clones of the parent) and therefore they breed true to type[11, 200]. A very ornamental plant[1]. The flowers are sweetly scented[245]. The fruit is a good wildlife food source, especially for birds. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

# 5.2.408 Ampelopsis humulifolia

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli jlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ampelopsis humulifolia is a deciduous Climber growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: medium (loamy) soils.

also makes a good charcoal that can be used as a fuel[115].

dwatta Astringent VulneraryThe bark has mild astringent properties and has been used to make a wash for skin problems and an eyewash for sore eyes[21]. The inner bark of the tree, containing the sweet sap, can be used as a dressing for wounds[21].

nrakta Europe. Extensively naturalized in Britain[17]. ksacta Found in woodland, hedgerows etc. in Britain, in all but very poor soils[17].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. Seed should not be dried below 35% moisture[98]. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cultivars can be budded onto rootstocks of the species. Any grafting is best carried out in September rather than February.

nwatta Landscape Uses:Firewood, Seashore, Specimen, Street tree. Of easy cultivation, it prefers a good moist welldrained soil and a sunny position[11, 17], but tolerates most conditions including poor soils and some shade[13, 17, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Dislikes wet soils[115]. Grows better in the cooler areas of the country[11]. Very wind-resistant, tolerating maritime exposure though it is often wind and salt pruned in very exposed areas[4, 11, 17]. A fairly aggressive tree, it self-sows freely and inhibits the growth of nearby plants[18, 20]. It is often one of the first trees to colonize open land. It is fast growing and establishes rapidly. It can supplant native trees, at least in the short-term, though recent evidence suggests that in the long term it does not usually become the dominant tree in British woodlands and it is often recommended for planting in broad-leaved woods by the Forestry Commission, especially in windy areas[K]. Plants are subject to sooty bark disease - this is not fatal and occurs most often in years that follow hot summers[11]. There are many named forms that have been selected for their ornamental value[200]. Trees take 25 years to come into bearing from seed[98]. Special Features: Not North American native, Naturalizing, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 5.2.361 Corvlus x vilmorinii

Chinese Trazel

4tlin 8 cyuc 2 kcak 0 tcan 0 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Corylus x vilmorinii is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 5. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[177]. Rich in oil. The seed ripens in mid to late

autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

nrakta A hybrid, C. chinensis  $\boldsymbol{x}$  C. avellana. ksacta Not known in the wild.

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. This species is a hybrid and will not breed true from seed. Layering in autumn. Easy, it takes about 6 months[78, 200].

nwatta An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. This species is an artificial hybrid, produced by crossing C. chinensis x C. avellana. The Chinese parent contributes a characteristic rounded nut with a slightly thinner shell than C. colurna.

# 5.2.362 Kalopanax septemlobus

Tree Aralia, Castor aralia 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 25 m hkuc

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Kalopanax septemlobus is a deciduous Tree growing to 25 m (82ft 0in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and young shoots - cooked[177, 179].

tcanta InsecticideThe bark and the leaves are used as an insecticide[178]. Wood[266].

dwatta Antifungal Expectorant Hepatic Skin Stomachic-The bark contains a range of bio-active constituents, including saponins, flavonoids and lignans[279]. It has antifungal and liver protecting properties[279]. It is used in Korea in the treatment of contusions, beri-beri, lumbago, neuralgia and pleurisy[279]. An infusion of the leaves is used to make a stomachic tea[218]. The root is expectorant[218]. A decoction of the wood is used for skin diseases[178, 218].

nrakta E. Asia - China, Japan. ksacta Cool deciduous forests from near sea level to elevations of 2500 metres[11, 200, 266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. Stored seed probably requires a period of cold stratification and should be sown as soon as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Root cuttings in late winter.

nwatta Requires a deep fertile moisture-retentive soil in sun or part shade[200]. Young shoots, especially on young plants, can die back over winter if they are not fully ripened[11]. Young plants are slow-growing[200]. The tree is widely cultivated for timber in China[266]. A polymorphic species[11].

#### 5.2.363 Ouercus coccinea

Scarlet Oak

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 25 m hkuc

hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis 5.2.364 Picea omorika hpa7tmwatli hionli

drutta Quercus coccinea is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed, which is up to 25mm long and 15mm wide[82, 229], contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff[4]. Wood - strong, hard, heavy, coarse grained[46, 82, 171, 229]. It weighs 46lb per cubic foot[235]. Inferior to wood from the white oaks, it is used in construction, furniture etc[46, 82, 171, 229].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - Maine and Ontario to Minnesota, North Carolina and Missouri, ksacta Found on upland sites such as ridges and middle and upper slope, it grows in a variety of soils doing well on poor, dry, sandy, or gravelly

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Aggressive surface roots possible, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A very ornamental tree[1], it is fast-growing but short-lived in the wild[229]. Seed production is cyclic, a year of high vields being followed by 3 - 4 years of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

Serbian Spruce

4 tlin 7 cvuc 2 kcak 0 tcan 0 dwat 25 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli hjonli

drutta Picea omorika is an evergreen Tree growing to 25 m (82ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower in May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food, it is only used when all else fails. Seed - raw. Too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172].

tcanta Shelterbelt WoodModerately wind resistant, it is sometimes planted in shelterbelts. Wood. It is valued for its use in the pulp industry to make paper[171].

nrakta Europe - Serbia. ksacta Plants are confined to a few stands on limestone mountains[11].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame [78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame, Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6 but it also succeeds in pure chalk soils[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. There are a number of named forms selected for their ornamental value, most of these are dwarf cultivars[200]. A fast growing tree from its second year of growth. Two to three years after planting out new shoots 1 metre long may be produced[185]. Growth takes place from mid-May to the end of July. Height increase is moderate over a long term basis, averaging around 50cm a year[185]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Occasionally planted as a timber tree in Britain, it produces almost the same bulk of timber as the Norway spruce (Picea abies) but is more frost tolerant and can be grown in frosty hollows[185] because it comes into leaf quite late and it is not damaged by late frosts[11]. This species is widely cultivated as a timber tree in regions too dry or liable to late frosts for P. sitchensis to do well[200]. This species is notably susceptible to honey

#### 5.2.402 Acer argutum

4 tlin 8 cvuc 2 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Acer argutum is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or the sap can be concentrated into a syrup by boiling off the water [105, 177]. The syrup is used as a sweetener on many foods. The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - central and southern Japan. ksacta Ir cool temperate to lower subalpine forests, usually growing in moist sites at streamsides at elevations of 800 - 1900 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cuttings of this species root well.

nwatta Of easy cultivation, it prefers a good moist welldrained soil in a sunny position but tolerates some shade. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. This species prefers its trunk in the shade[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Dioecious, male and female plants must be grown if seed is required.

# 5.2.403 Styrax iaponica

Japanese Storax

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Styrax japonica is a deciduous Tree growing to 8 m (26ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit raw[105, 177]. The fruit is about 14mm in diameter[200].

tcanta Beads Oil WoodThe fruits are used as beads in rosaries etc[182]. An oil is obtained from the seed[46, 61]. No further details are given. Wood - fine-grained. Used to make umbrella handles[46, 61].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and thin woods in mountains and hills all over Japan[58].

propta Seed - requires stratification and is best sown in a cold frame as soon as it is ripe[11]. Stored seed requires 3 months warm then 3 months cold stratification[113]. Germination is usually good, prick out the seedlings into individual pots once they are large enough to handle. Overwinter in a greenhouse for the first winter and plant out in late spring. Cuttings of half-ripe wood, July/August in a frame[113]. Layering in autumn.

nwatta Requires a light lime-free soil in sun or semishade[11, 200]. If planted out when young into a planting hole that has been filled with a light lime-free soil the plants will successfully grow into the surrounding soil[11]. Prefers a warm sheltered position with protection from the morning sun[11]. Dormant plants are hardy to about -15°c[200] but the young growth is liable to be damaged by late frosts[11]. A very ornamental plant[1] but it is slow to establish itself and is slow growing[200]. There are some named varieties[182]. The sub-species S. japonica fargesii is stronger growing in Britain[182]. The flowers have an exquisite scent[245]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.404 Pyrus phaeocarpa

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Pyrus phaeocarpa is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is up to 2cm long[200].

tcanta RootstockThis species is often used as stock to graft pear cultivars[266].

nrakta E. Asia - N. China. ksacta Slopes, mixed hillside forests of the Loess Plateau at elevations of 100 - 1200 me-

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to about -15°c[200].

#### 5.2.405 Pyrus betulaefolia

Birch-Leaved Pear

4 tlin 8 cvuc 2 kcak 0 tcan 1 dwat 7.5 m hkuc

hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus betulaefolia is a deciduous Tree growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. About 15mm in diameter[200]. The fruit is abundantly produced and hangs on the tree well into winter[200]. The flavour improves when the fruit has been frosted, so it is best to delay harvesting as long as possible[K].

nrakta E. Asia - China. ksacta Thickets on slopes at elevations of 2000 - 3000 metres[266]. Up to 3600 metres in Szechwan[109].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

mwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. A very ornamental plant[1], the fruit is a good wildlife food source, especially for birds[200]. This species is closely related to M. transitoria[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.400 Malus florentina

Hawthorn-leaf crab apple

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus florentina is a deciduous Tree growing to 8 m (26ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in June, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. The oval fruit is about  $15 \mathrm{mm}$  long and  $8 \mathrm{mm}$  wide, it ripens in mid autumn and usually bletts on the tree. When bletted, it has a mealy texture with a soft acid flesh, we found it refreshing in small quantities[K].

nrakta Europe - Northern Italy. ksacta Not known

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in

a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. This species is a very good pollinator for the cultivated apples[200]. The fruit is a good wildlife food source, especially for birds[200]. A very ornamental tree, especially when flowering in the spring, it makes a good specimen tree in a lawn[11]. Some botanists believe this species to be a bigeneric hybrid between M. sylvestris and Sorbus torminalis. They have assigned the name Malosorbus florentina to the plant, but this is not generally accepted[11]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.401 Malus transitoria

4tlin 8 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus transitoria is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. About 15mm in diameter[200]. The fruits on our trees in Cornwall are a bit larger, up to 25mm in diameter[K]. The flavour is acid and astringent, but tolerable, in mid-October. It improves once the fruit has been frosted and so it is best to delay harvesting as long as possible[K].

tcanta RootstockThis species has been used as stock to graft apple trees in NE and NW Shaanxi[266].

nrakta E. Asia - China. ksacta Thickets on slopes or hills of the Loess Plateau at elevations of 1500 - 3900 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertiles soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. This species is resistant to drought and cold temperatures[266]. This species is closely related to M. toringoides[200]. It hybridizes freely with other members of the genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey funqus[200].

fungus[200]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

# 5.2.365 Fagus japonica

Japanese Beech

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 22 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Fagus japonica is a deciduous Tree growing to 22 m (72ft 2in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, large quantities of the seed of many species in this genus are thought to be toxic.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Coffee OilYoung leaves - raw. A very nice mild flavour, but the leaves quickly become tough so only the youngest should be used. New growth is usually produced for 2 periods of 3 weeks each year, one in spring and one in mid-summer. Edible seed - raw or cooked. Rich in oil. The raw seed should not be eaten in large quantities, see the notes above on toxicity. It can be dried and ground into a powder. An edible semi-drying oil is obtained from the seed[105, 177]. The roasted seed is a coffee substitute.

nrakta E. Asia - Japan. ksacta Mountains in C. and S.

propta Seed - the seed has a short viability and is best sown as soon as it is ripe in the autumn in a cold frame. Protect the seed from mice. Germination takes place in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are slow growing for the first few years and are very susceptible to damage by late frosts. The seed can also be sown in an outdoor seedbed in the autumn. The seedlings can be left in the open ground for three years before transplanting, but do best if put into their final positions as soon as possible and given some protection from spring frosts.

nwatta Thrives on a light or medium soil[11], doing well on chalk[1], but ill-adapted for heavy wet soils[1]. Young trees are very shade tolerant, but are subject to frost damage so are best grown in a woodland position which will protect them[200]. Although very cold hardy, this species requires hotter summers than are normally experienced in Britain so is not usually a success here and is very slow growing[200]. Trees have surface-feeding roots and also cast a dense shade. This greatly inhibits the growth of other plants and, especially where a number of the trees are growing together, the ground beneath them is often almost devoid of vegetation.

#### 5.2.366 Picea orientalis

Caucasian Spruce

4tlin 7 cyuc $^2$ kcak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Picea orientalis is an evergreen Tree growing to 20 m (65ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in May, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. Inner bark - dried, ground into a powder and then used as

a thickener in soups etc or added to cereals when making bread[172]. An emergency food, it is only used when all else fails. Seed - raw. Too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172].

tcanta Resin Tannin WoodTannin is obtained from the bark[74]. Turpentine is obtained from the bark and branches[74]. Wood - soft, white, easily cleaves, light, durable, has a good resonance. Used for construction, furniture etc[74]. It is also valued for its use in the pulp industry to make paper[171].

nrakta E. Europe to W. Asia. ksacta Found in pure stands or mixed with beech, pine and hornbeam, especially on shaded slopes, preferring deep protected ravines with adequate soil moisture at elevations of 300 - 2100 metres[74].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame [78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery hed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils [200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. In some upland areas, especially over granitic or other basepoor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. There are a number of named forms selected for their ornamental value, most of these are dwarf cultivars[200]. Young trees are slow growing at first but from the age of about 5 - 6 years they can grow up to 1 metre a year and this can be maintained for the next 70 years or so. Growth virtually ceases by the time the tree is 90 - 100 years old[185]. Increases in girth follow the same pattern as height increases[185]. Trees probably do not live much longer than 100 years in Britain[185]. They are occasionally planted on a small scale in Europe as a timber tree[50]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. The bruised leaves have a resinous aroma[245]. Special Features: Not North American native, Inconspicuous flowers or

## 5.2.367 Fagus orientalis

Oriental Beech

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 20 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flat-priklwis hpa7tmwatli hjonli

drutta Fagus orientalis is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, large quantities of the seed of many species in this genus are thought to be toxic.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Coffee OilYoung leaves - raw. A very nice mild flavour, but the leaves quickly become tough so only the youngest should be used. New growth is usually produced for 2 periods of 3 weeks each year, one in spring and one in mid-summer. Seed - raw or cooked. Rich in oil. The seed should not be eaten raw in large quantities. It can be dried and ground into a powder and then used with cereal flours when making bread, cakes etc. An edible semi-drying oil is obtained from the seed[105, 177 1831

nrakta E. Europe to W. Asia. ksacta Forests.

propta Seed - the seed has a short viability and is best sown as soon as it is ripe in the autumn in a cold frame. Protect the seed from mice. Germination takes place in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are slow growing for the first few years and are very susceptible to damage by late frosts. The seed can also be sown in an outdoor seedbed in the autumn. The seedlings can be left in the open ground for three years before transplanting, but do best if put into their final positions as soon as possible and given some protection from spring frosts.

nwatta Thrives on a light or medium soil, doing well on chalk, but ill-adapted for heavy wet soil[1, 11]. Fairly tolerant of most conditions, this is the most successful nonnative species of Fagus in Britain[200]. Young trees are very shade tolerant, but are subject to frost damage so are best grown in a woodland position which will protect them[200]. Hybridizes in nature with F. sylvatica[11]. Large mature trees at Kew produced a very good crop of seed in 1999[K]. Trees have surface-feeding roots and also cast a dense shade. This greatly inhibits the growth of other plants and, especially where a number of the trees are growing together, the ground beneath them is often almost devoid of vegetation.

# 5.2.368 Aesculus glabra

Ohio Buckeve. Fetid Buckeve 4 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus glabra is a deciduous Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: SeedEdible Uses: Seed cooked[222]. It can be dried, ground into a flour and used as a gruel. The seed is quite large, up to 35mm in diameter[82], and is easily harvested[K]. It is guite rich in saponins and needs to be leached of these toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days. By this time most of the minerals etc would also have been leached out[K].

tcanta Miscellany Soap WoodSaponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. Wood - close-grained, light, soft,

white, but often blemished by dark lines of decay[82, 229]. It weighs 28lb per cubic foot[235]. It is easy to carve and resists splitting. Ideal to use in making artificial limbs, it is also used for woodenware, pulp etc and is occasionally sawn into lumber[82, 229, 235].

dwatta Antispasmodic MiscellanyMinute doses of the seed are used internally in the treatment of spasmodic coughs, asthma and internal irritations[222]. It is used externally as a tea or an ointment in the treatment of rheumatism and piles[222]. An extract of the bark has been used as an irritant of the cerebro-spinal system[82].

nrakta South-eastern and Central N. America - Pennsylvania to Nebraska, south to Tennessee and Oklahoma. ksacta Usually found in moist sites such as river bottoms and streambank soils, but it is sometimes also found on drier sites though does not grow so well there[229].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable 80, 1131. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer

nwatta Landscape Uses:Specimen, Street tree. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. This species is the state tree of Ohio[229]. Its growth-rate is moderate in the wild, with trees living up to 100 years[229]. In Britain, it grows best in eastern and south-eastern areas of England probably needing a continental climate in order to thrive[126, 200]. Although the trees are hardy when dormant, the new growth can be damaged by late spring frosts[11]. The twigs, bark, flowers and leaves all produce a foetid odour if crushed[229]. Most members of this genus transplant easily, even when fairly large[11]. Special Features: Attractive foliage, North American native, Fragrant foliage, All or parts of this plant are poisonous, Blooms are very showy.

# 5.2.369 Vitis coignetiae

Crimson Glory Vine

454

4 tlin 8 cyuc  $\dot{2}$  kcak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis coignetiae is a deciduous Climber growing to 20 m (65ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or

kcakta Edible Parts: Fruit Leaves StemEdible Uses: Fruit - raw or dried for winter use[105, 177, 183]. The fruit is about 12mm in diameter and is carried in bunches, but it is scarcely edible[200]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked. Young stems and leafstalks boiled[105, 177, 183].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168]. Plants can be used as a ground cover in a sunny position[188]. They are best spaced about 3.5 metres apart each way[208]. They can be encouraged to cover the ground by laying brushwood flat on the ground and pegged into position. The twigs would eventually rot and the plant would assume complete and constant control[208].

nrakta E. Asia - Japan, Korea. ksacta Grows into trees in

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their

drutta Prunus buergeriana is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. The fruit is small, about 5mm in diameter[266], and of inferior quality, though it is sometimes gathered and pickled in salt then used as a condiment or appetizer[2, 177]. It contains a single large seed. Seed - raw or cooked. It is usually salted in the Orient[177]. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, Japan, Korea. ksacta Hillsides and mountains in C. and S. Japan[58]. Dense forests on slopes, along trails and sunny places on slopes at elevations of 1000 - 3400 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.398 Prunus davidiana

Chinese Wild Peach

4 tlin 8 cvuc 2 kcak 0 tcan 3 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Prunus davidiana is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: Fruit SeedEdible Uses: The seed is used in China as a flavouring in confectionery and some special dishes. They are somewhat bitter due to the presence of prussic acid so should be used in strict moderation[177, 183]. Fruit[183]. The fruit is about 3cm in diameter and contains one large seed[200].

tcanta Dve RootstockUsed as a disease-resistant lowchill rootstock for the cultivated peach. Prunus persica[183]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Analgesic Antiasthmatic Anticoagulant Antitussive Aperient Emollient HaemolyticThe seed is analgesic, antiasthmatic anticoaculant antitussive aperient emollient and haemolytic[176]. It s used in the treatment of amenorrhoea, dysmenorrhoea, traumatic pain due to blood stasis, constipation of aged and debilitated patients, coughs and asthma[176]. The seed contains amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, ksacta Forests, thickets, slopes, mountain valleys and waste fields at elevations of 800 - 3200 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. There are some named varieties selected for their ornamental value[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants flower very early in the year and the flowers are often damaged by late frosts[188]. Plants in this genus are notably susceptible to honey fungus[200].

### 5.2.399 Malus toringoides

Cutleaf crab apple

467

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus toringoides is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is suckering with new plants from underground runners away from the plant

## 5.2.395 Celtis bungeana

Bunge's hackberry

4 tlin 8 cyuc 2 koak 0 tcan 0 dwat 10 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Celtis bungeana is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaThe plant is a tea substitute[105, 177]. This probably refers to the leaves[K]. Leaves are a savoury addition to rice[105, 177]. Fruit - raw[105, 177]. The fruit is 6 - 8mm in diameter containing a seed 4 - 5mm in diameter[266].

nrakta E. Asia - China, Korea. ksacta Roadsides, thickets and banks of streams to 1600 metres[109]. Forests, among shrubs, roadsides, mountain slopes at elevations of 100 - 2300 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cuttings

nwatta Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soil[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Established plants are very drought resistant[74, 200]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. An 8 year old plant at Kew in 1989 was 3m tall and very healthy with no sign of die-back[K]. Trees can be very long-lived, perhaps to 1000 years[200]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.396 Crataegus phaenopyrum

Washington Thorn, Washington Hawthorn 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus phaenopyrum is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in

October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62]. A dry flesh[43]. Very small, about 5mm in diameter, it often hangs on the tree all winter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to Georgia, Illinois and Kansas. ksacta Thickets, open woods[43] and banks of streams in rich soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it. should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta Landscape Uses:Espalier, Firewood, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit. they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant, there are some named varieties[1, 11, 200]. Special Features: North American native, Attractive flowers or blooms

# 5.2.397 Prunus buergeriana

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15-  $30 {\rm cm}$  long or they can be of short sections of the stem about  $5 {\rm cm}$  long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about  $3 {\rm cm}$  long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Cuttings are difficult from this species[219]. Layering. This is the best method for this species[219].

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The fully dormant plant is hardy to about -25°c, though the young growth in spring can be damaged by late frosts. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. A fast growing climber[11, 202], attaching itself by means of tendrils[182], it is ideal for growing into large trees. Plants are often slow to establish, taking 1 - 2 years from planting out before they make much new growth[202]. A very ornamental plant[1] with its large leaves which colour well in the autumn. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.370 Quercus imbricaria

Shingle Oak, Northern Laurel Oak 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus imbricaria is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed, which is up to 18mm long and wide[82, 229], contains bitter tannins - these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, heavy, rather coarse grained[46, 61, 82, 171, 235]. It weighs 47lb per cubic foot[235]. It is occasionally used in construction and for making furniture, clap boards and shingles[46, 61, 82, 171].

dwatta Antiseptic Astringent Dysentery Emetic Febrifuge TonicAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The bark is antiseptic, astringent, emetic, febrifuge and tonic[257]. It has been used in the treatment of chronic dysentery, indigestion, asthma and intermittent fevers[257]. The bark has been chewed in the treatment of mouth sores[257]. An

infusion of the bark has been used as a wash for sore and chapped skin[257].

nrakta Eastern and Central N. America - Pennsylvania to Alabama, west to Kansas. ksacta Found in a variety of habitats from dry upland ridges to rich and moist river bank soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Closely related to Q. phellos[1]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

## 5.2.371 Vitis cordifolia

Frost Gran

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 20 m hkuc

hmimhtut cyutli kyuctcup hwicii hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis cordifolia is a deciduous Climber growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit raw, cooked or dried for winter use[1, 2, 161]. They are said to be unpalatable until they have been touched by frost[1, 11, 43, 182, 200]. A spicy flavour[177]. Quite tasty[219]. The fruit is about 8 - 12mm in diameter[200] and is produced in fairly large bunches[235]. Leaves - cooked[55]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked[55, 85]. The twigs are a tea substitute[161].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern and Eastern N. America - New York to Florida. Locally naturalized in Europe[50]. ksacta River banks, bottom lands and rich thickets[43].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200], doing well when lime rubble is incorporated into the soil[245]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. A very vigorous plant[200], climbing by means of tendrils[182]. It grows particularly well into elm trees[18]. The flowers are sweetly scented[245]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This species is often confused with V. vulpina[182]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.372 Vitis palmata

Red Grape, Catbird grape 4 tiin 8 cyuc 2 kcak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis palmata is a deciduous Climber growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or dried for winter use[159, 177]. A sweet flavour when mature[274]. The fruit is up to 10mm in diameter and is carried in small bunches[235]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour[159]. Young tendrils - raw or cooked. Used as a snack[159]

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern and Central N. America - Illinois, Missouri and Arkansas. ksacta Sandy banks and rocky places[72]. Borders of sloughs and ponds[159].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Lavering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.373 Ouercus aliena

Oriental White Oak

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli ilutnyik hpa7tli flatpriklwis

hpa7tmwatli hjonli

drutta Quercus aliena is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant)

and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[105, 177]. The seed is about 25mm long, it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood. Of local value, it is used mainly for boat building[61].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea. ksacta Woods, 1000 - 1600 metres in W. China[109]. Mixed mesophytic forests at elevations of 100 - 2700 metres[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

mwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. The seed ripens in its first year[200]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 5.2.374 Ouercus pubescens

Oowny Oak

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 20 m hkuc

hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus pubescens is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. A famine food, used when all else fails[177]. The seed is up to 2cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be

# 5.2.393 Acer carpinifolium

Hornbeam Maple

4 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Acer carpinifolium is a deciduous Shrub growing to 10 m (32ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (A. saccharum). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - central and southern Japan ksacta Valleys and ravines in mountains all over Japan[58]. Common in temperate deciduous forests, usually in moist sites along streams at elevations of 200 - 1300 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Grafting is impossible for this species because no compatible rootstock has been discovered.

nwatta Of easy cultivation, it prefers a good moist well-drained soil[11], preferring a sunny position but tolerating some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. This species is dioecious, at least one male plant needs to be grown with up to 5 females if seed is required. Special Features:Not North American native, Inconspicuous flowers or blooms.

# 5.2.394 Fagus grandifolia

American Beech

4 tlin 8 cyuc 2 kcak 3 tcan 2 dwat 10 m hkuc

pcimhmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Fagus grandifolia is a deciduous Tree growing to 10 m (32th) by 10 m (32th) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic

(mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the raw seed may be toxic[159].

kcakta Edible Parts: Inner bark Leaves Oil Oil SeedEdible Uses: Coffee Oil OilYoung leaves - raw or cooked as a potherb[183]. A very nice mild flavour but the leaves quickly become tough so only the youngest should be used. New growth is usually produced for 2 periods of 3 weeks each year, one in spring and one in mid-summer. Seed - raw or cooked. Small but very sweet and nutritious[82, 117, 171. 183, 227], it is sold in local markets in Canada and some parts of America[82]. Rich in oil, the seed also contains up to 22% protein[213]. The raw seed should not be eaten in large quantities since it is believed to cause enteritis[159, 226] It can be dried and ground into a powder, then used with cereal flours in making bread, cakes etc[183]. The germinating seeds can be eaten raw, they are tender, crisp, sweet and nutty[183]. The roasted seed is a coffee substitute[183, 213]. An edible semi-drying oil is obtained from the seed[177, 183]. Inner bark[177]. Dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[213].

tcanta Charcoal Oil Oil WoodThe oil obtained from the seed has been used as a fuel in oil lamps[226]. Wood strong, hard, heavy, very close grained, not durable, difficult to cure[61, 82, 227]. It weighs 43lb per cubic foot[227]. Harvested commercially, it is used for furniture, flooring, tool handles, crates etc[227]. It makes an excellent charcoal and is used in artwork[61, 227]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Pectoral Skin VermifugeA decoction of the boiled leaves has been used as a wash and poultice to treat frostbite, burns, poison ivy rash etc[213, 222, 257]. The nuts have been eaten as a vermifuge[222, 257]. A tea made from the bark has been used in the treatment of lung ailments[222, 257]. It has also been used to procure an abortion when the mother was suffering[257].

nrakta Eastern N. America - New Brunswick to Florida, west to Texas and Ontario. ksacta Rich uplands and mountain slopes, often forming nearly pure forests[82]. In the south of its range it is also found on the margins of streams and swamps[43, 82].

propta Seed - the seed has a short viability and is best sown as soon as it is ripe in the autumn in a cold frame. Protect the seed from mice. Germination takes place in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are slow growing for the first few years and are very susceptible to damage by late frosts. The seed can also be sown in an outdoor seedbed in the autumn. The seedlings can be left in the open ground for three years before transplanting, but do best if put into their final positions as soon as possible and given some protection from spring frosts.

nwatta Landscape Uses: Firewood, Pest tolerant, Hedge, Aggressive surface roots possible, Screen, Specimen, Woodland garden. Thrives on a light or medium soil[11], doing well on chalk[1], but ill-adapted for heavy wet soils[1]. Young trees are very shade tolerant, but are subject to frost damage so are best grown in a woodland position which will protect them[200]. Although very cold hardy, this species requires hotter summers than are normally experienced in Britain so is not usually a success here and is very slow growing[200]. The seeds are dispersed after the first frosts[227], they are sometimes gathered and sold in local markets in N. America[82, 227]. Good crops are produced every 2 - 3 years in the wild[227]. This species produces suckers[11] and often forms thickets in the wild[227]. Trees have surface-feeding roots and also cast a dense shade, this greatly inhibits the growth of other plants and, especially where a number of the trees are growing together, the ground beneath them is often almost devoid of vegetation[226, 227]. Special Features: North American native, All or parts of this plant are poisonous, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures.

as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Quebec to Georgia, west to Louisiana. Locally naturalized in Europe[50]. ksacta Thickets and open ground, especially in dry or rocky places[43]. Usually found on the slopes of low hills in rich soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta Landscape Uses:Border, Espalier, Pollard, Screen, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -18°c[202]. A very ornamental plant[1, 11]. There are many named forms, selected for their ornamental value[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This plant is often confused in cultivation with C. prunifolia. 'Splendens'[11]. Special Features:Attracts birds, North American native, Blooms are very showy.

#### 5.2.391 Halesia tetraptera

Silverbell or Mountain Silverbell

4 tlin 8 cyuc 2 kcak 2 tcan 0 dwat 10 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Halesia tetraptera is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known

koakta Edible Parts: FruitEdible Uses: The ripe fruit is chewed for its acidity and very tart [183]. Unripe fruits are sometimes pickled[2, 183]. The fruit is about 4cm in diameter[200].

tcanta Wood - soft, light, close-grained[82]. It weighs 35lb per cubic foot[235]. Good for carving, turnery, crafts, woodenware, pulp [1-2]. Trees occasionally grow large

enough for saw timber and are then cut and used for panelling and cabinet making[229]. Coppices readily [1-2].

nrakta Native to the southeastern United States. ksacta Moist woods along the sides of streams in the mountains[43, 184].

propta Seed - best sown as soon as it is ripe in a cold frame [78, 113, 200]. It takes 18 months to germinate [113]. Warm stratifying the seed for 2- 3 months at 14-  $25^{\circ}c$  then cold stratifying for 2- 3 months at 0-  $5^{\circ}c$  can reduce the germination time. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of greenwood, 5- 8cm with a heel, May/June in a frame. Roots in 28 days. A fair percentage [78]. Layering in early spring as the buds break. Takes 12 months. High percentage [78].

nwatta A small understory tree with a broad, rounded crown or a large shrub. It grows well with azaleas and rhododendrons and requires the same environmental conditions of moist, acidic, organically rich soil in part shade. Welldrained[202]. Requires a lime-free soil[200]. Dormant plants are hardy to about -25°c[184]. A very ornamental plant[1, 11], it has a moderate rate of growth and lives about 100 years[229]. It can flower when only 1.2 metres tall[113]. The flowers have a delicate sweet perfume[245]. The subspecies H. tetraptera monticola forms a tree about 24 metres tall. Plants in this genus are notably resistant to honey fungus[200]. Halesia tetraptera has a dense crown providing 0 to 33% open space in their silhouette and cast deep shade [1-2]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

# 5.2.392 Pyrus elaeagnifolia

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus elaeagnifolia is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The flesh is rather tough and gritty, but has a reasonable flavour when it is fully ripe[K]. The fruits are up to 2cm long[200].

nrakta S.E. Europe to W. Asia. ksacta Dry places in S. Europe[50]. Deciduous and coniferous forests, forest remnants etc, from sea level to 1700 metres in Turkey[93].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at  $1^{\circ}$ c and should be sown as early in the year as possible[200]. Temperatures over 15 -  $20^{\circ}$ c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200]. The branches are thorny[200]. This species is closely related to P. nivalis[11].

leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, durable even under water, not very elastic. Used for furniture etc[46, 61].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe. ksacta Woods and dry hills[100] in both siliceous and limestone soils[11].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted. The seed ripens in its first year. Closely related to Q. petraea[1]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.375 Ouercus dentata

Japanese Emperor Oak, Daimyo oak 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Quercus dentata is a deciduous Tree growing to 20 m (65ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[105, 177]. The seed is up to 23mm long and 15mm wide[266]. Rich in starch[105]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tanning, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[177].

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff[41]. Tannin is obtained from the bark[46].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea. ksacta Sunny slopes and thickets in lowland and mountains all over Japan[58]. Mixed mesophytic forests below 100 - 2700 metres[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Prefers an acid soil[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Trees are fast growing[200], but they prefer warmer summers than are usually experienced in Britain and often grow poorly in this country[11], failing to properly ripen their wood which results in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. The seed ripens in its first year[200]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

### 5.2.376 Acer campestre

Field Maple, Hedge maple 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hionli

drutta Acer campestre is a deciduous Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta The sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[4]. The concentration of sugar is considerably lower than in the sugar maples (A. saccharum). The syrup is used as a sweetener on many foods. The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta Charcoal Fuel Hedge Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A fast growing plant and bearing clipping well, it makes an excellent clipped hedge and can also be used as part of a native wildlife hedge where it is only trimmed every 3 - 4 years[200, K]. It has also been used in topiary[200]. Wood - fine-grained, tough, elastic, hard to split, takes a high polish and is seldom attacked by insects. Trees are seldom large enough to supply much usable timber, but when available it is much valued by cabinet makers[4, 7, 13, 46, 115]. It is also used for cups bowls etc[115]. The wood of the roots is often knotted and is valued for small objects of cabinet work[4]. The wood is an

excellent fuel[4]. A charcoal made from the wood is a good fuel[4, 115].

dwatta Anticholesterolemic AstringentThe bark is astringent and slightly anticholesterolemic[7]. A decoction has been used to bathe sore eyes[7]. The bark should be sundried and then stored in a dry place until required[7].

nrakta Europe, including Britain, from Sweden to Spain and east to western Asia and the Caucasus. ksacta Open deciduous woods, hedgerows and scrub, usually on basic soils171.

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting. rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the

nwatta Landscape Uses:Firewood, Pollard, Screen, Standard, Superior hedge, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil[11] in a sunny position but tolerates some shade[11, 200]. Does well on chalky soils, tolerating a pH as high as 8, but becoming a shrub in such conditions[186]. Does not thrive in soils with a pH much below 6[186]. Grows well in heavy clay soils. Tolerates atmospheric pollution[200]. Growth is fast once the trees are established, but this later slows down and trees take about 50 years to reach maturity[186]. Frequently found as a shrub in light woodland, especially under oak. It is one of the first trees to colonize chalk grassland[186]. The field maple is a bad companion plant, inhibiting the growth of nearby plants[18, 20]. A good bee plant[7]. This species has often been coppiced in the past for its wood[17]. Trees produce seed in about 10 years from sowing[98]. Special Features: Not North American native, Inconspicuous flowers or

#### 5.2.377 Smilax hispida

Hag Briar

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Smilax hispida is a deciduous Climber growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves and young shoots - raw or cooked[102]. Root - cooked. It can be dried, ground into a powder and then used with cereals for making bread etc[2, 62, 102]. It can also be used as a gelatine substitute[2, 62, 102].

dwatta Birthing aid Poultice RubefacientThe stem prickles have been rubbed on the skin as a counter-irritant to relieve localised pains, muscle cramps and twitching[222]. A tea made from the leaves and stems has been used in the treatment of rheumatism and stomach problems[222]. A tea made from the roots is used to help the expelling of afterbirth[222]. Reports that the roots contain the hormone testosterone have not been confirmed, they might contain steroid precursors, however[222]. nrakta Eastern and Central N. America - Connecticut to Ontario, Minnesota, Nebraska, N. Carolina and Texas. ks-acta Rich, often calcareous, soils in woods, thickets and bottoms[43].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most soils in sun or semi-shade[200]. Plants are hardy to about -15°c[200]. A very ornamental plant[1], it thrives in Britain[11]. Dioecious. Male and female plants must be grown if seed is required.

## 5.2.378 Vitis amurensis

Amur River Grape, Amur grape

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 15 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Vitis amurensis is a deciduous Climber growing to 15 m (49ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Édible Parts: Fruit LeavesEdible Uses: Fruit - raw, cooked or dried for winter use[183]. It can also be made into drinks[177]. The fruit is much esteemed[151]. Small and somewhat harsh in flavour[151], it is succulent but usually bitter[200]. The fruit is about 16mm long and 10mm wide[2001]. Young leaves - cooked[179]. Used as a boiled vegetable[183]. The leaves can also be wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

dwatta TonicThe root is tonic[218].

nrakta E. Asia - C. and N. Korea. ksacta Rich damp woodland soils[200].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Lavering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Very hardy, tolerating temperatures down to about -40°c, this species is a potential source of hardiness in a breeding programme with the common grape, Vitis vinifera[183]. Plants

patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cuttings

nwatta Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soils[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Established plants are very drought resistant[200]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. Trees can be very long-lived, perhaps to 1000 years[200]. Plants in this genus are notably resistant to honey funqus[200].

#### 5.2.388 Ulmus laciniata

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulmus laciniata is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Leaves - raw or cooked. Inner bark - cooked. It can be dried, ground into a powder and used as a thickening in soups or added to cereal flours when making bread etc[105, 177].

nrakta E. Asia - China, Japan, Korea. ksacta Temperate forests all over Japan[58].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. Closely related to U. glabra[11]. This species is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridized freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[2001]

## 5.2.389 Lonicera ciliosa

Orange Honeysuckle

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lonicera ciliosa is an evergreen Climber growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium

(loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit NectarEdible Uses: Fruit - raw or cooked[105, 177, 212]. Not tasty enough to be widely sought[212]. The fruit is about 5mm in diameter[200]. Children enjoy sucking the nectar from the base of the flowers[256, 257].

tcanta Fibre Hair MiscellanyAn infusion of the stems is used as a hair shampoo and tonic to make it grow[99, 257]. A fibre obtained from the stem is used in making mats, bags, blankets etc[99]. The stems were used as building materials by the native North American Indians. They were used with willow withes to reinforce suspension bridges across canyons and rivers. They were also twisted with coyote willow to lash together the framing poles of underground pit houses and to make a pilable ladder[257].

dwatta Contraceptive Epilepsy Miscellany Poultice TB Women's complaintsThe leaves are contraceptive and nonic[257]. An infusion has been used as a contraceptive and also as a treatment for problems in the womb[257]. A decoction has been used in the treatment of colds and tuberculosis[257]. A poultice of the chewed leaves has been applied to bruises[257]. An infusion of the woody part of the plant has been drunk in small amounts, or used as a bath, in the treatment of epilepsy[257].

nrakta Western N. America - British Columbia to N. Carolina. ksacta Woods and thickets from sea level to moderate elevations[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good loamy soil and cool moist conditions at the roots[11, 200]. Succeeds in partial shade[200]. Subject to attacks by aphis, especially in hot dry spells[11]. Climbs by twining around other plants[182].

# 5.2.390 Crataegus crus

Cockspur Thorn, Cockspur hawthorn, Dwarf Hawthorn 4 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 10 m hkuc

hmimhtut cyutli hgatkyuctcuphja7n hwicil hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus crus-galli is a deciduous Shrub growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[62, 101, 105]. A dry flesh, it is used in jellies[43]. The fruit is about 1cm in diameter and is borne in small clusters[200]. It often persists on the tree until spring[200]. This suggests that it does not make very good eating[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Hedge Hedge WoodVery amenable to trimming, the plant can even be cut right back into very old wood and will resprout freely. It is often used as a hedge[82]. Wood-fine-grained, hard and heavy. Used for tool handles etc[46, 61, 227].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine

for several hours[257]. The bark has been used as a thatching on the roofs of buildings[257]. The dried seeds have been used as beads or as the 'rattle' in rattles[216]. An infusion of the plant has been used as a hair wash[257]. The plant has been burnt as an incense and fumigant in the home[257]. Wood - soft, close-grained, slightly fragrant[82]. It is used occasionally for fuel, fencing etc[82, 229].

dwatta Analgesic Antiseptic Blood tonic Diuretic Kidney Laxative Odontalgic Poultice SalveDesert juniper was widely employed medicinally by a number of native North American Indian tribes who used it to treat a variety of complaints, especially those connected to the bladder and kidneys and to the skin[257]. It is little, if at all, used in modern herbalism The leaves are antiseptic, blood tonic and laxative[216, 257]. A decoction is used in the treatment of constipation[216]. A poultice of the leaves has been applied to the jaw to treat toothaches and sore and swollen gums[257]. A decoction of the young twigs has been used in the treatment of stomach aches, kidney complaints, haemorrhages, coughs and colds[257]. Fumes from the burning twigs have been inhaled in the treatment of headaches and colds[257]. The branches have been used in a sweat bath to treat rheumatism[257]. A strong decoction has been used as an antiseptic wash on sores[257]. A poultice of the mashed twigs has been used as a dressing on burns and swellings[257]. The seeds are analgesic[257]. They have been eaten in the treatment of headaches[257]. The fruits are analgesic, blood tonic and diuretic[257]. A decoction has been used to relieve the pain of menstrual cramps, to induce urination and to treat kidney complaints, fevers, coughs and colds[257]. Externally, a decoction has been used as a poultice on rheumatic joints[257].

nrakta South-western N. America - California to New Mexico and Wyoming. ksacta Thin, dry rocky or gravelly soils[229] on mountain slopes and high plains in desert regions between the Rocky mountains and the Sierra Nevada[62].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11]. Thrives in calcareous soils[1]. A drought tolerant plant once established, succeeding in hot dry positions[200]. A slow-growing but long-lived tree, specimens several centuries old have been recorded[229]. It grows better in dry areas with hot summers, western Britain is generally to cool and wet for this species to thrive[200]. Good crops of fruit are produced in alternate years in the wild[229]. Closely related to J. californica[1, 82]. This species is resistant to honey fungus[88]. The seed takes 2 years to mature[200]. Plants are usually dioecious, though occasional trees with both male and female flowers are sometimes found[229]. Male and female plants must usually be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

# 5.2.386 Sorbus intermedia

Swedish Whitebeam

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hionli

drutta Sorbus intermedia is a deciduous Tree growing to 12 m (39ft) by 12 m (39ft) at a medium rate. See above for

USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cvanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3]. A mild, though slightly bitter flavour with a mealy texture[K]. The fruit is up to 13mm across[200] and is produced in quite large clusters, making harvesting eas-

tcanta Hedge Hedge ShelterbeltResistant to maritime exposure, this tree can be used as a part of a shelterbelt planting[75, 200]. If regularly trimmed it can be used as a dense deciduous hedge[200].

nrakta Europe. Freely naturalized in some areas of Britain[17]. Possibly of hybrid origin. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good well-drained soils in an open sunny position[11]. Tolerates very acid or alkaline soils[200] and light shade[188], though it fruits better in a sunny position[K]. Suitable for very exposed sites, including maritime exposure[75, 200]. Tolerates atmospheric pollution[11, 200]. Resistant to fireblight[11]. The trees usually have apomictic flowers. They thus produce seed asexually, each seedling being a clone of the parent[11]. The fruits are very attractive to birds[11].

#### 5.2.387 Celtis koraiensis

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 12 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Celtis koraiensis is a deciduous Tree growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177]. The fruit is about 10mm in diameter[200] with a thin flesh and a single large seed[K]

nrakta E. Asia - China, Japan, Manchuria. ksacta Waysides in C. Korea[151]. Forests, valleys and slopes at elevations of 100 - 1500 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white

climb by means of tendrils[182]. Any pruning should be car- and heavy (clay) soils and prefers well-drained soil. Suitried out in winter when the plants are dormant otherwise they bleed profusely[182]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.379 Nyssa sylvatica

Black Tupelo, Blackgum, Sour Gum, Black Tupelo 4 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hionli

drutta Nyssa sylvatica is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf from May to October, in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A thin sharply acid pulp that is pleasant to roll in the mouth as a masticatory[183], it is also used in preserves[177, 183]. Pleasantly acidulous[2]. The fruit is up to 15mm in diameter and is borne in small clusters of 2 - 3[82, 200].

tcanta WoodWood - tough, not durable, soft, heavy, hard to work and warps easily. It has an intricately contorted and twisted grain[82]. It weighs 40lb per cubic foot and is used for making boxes, soles of shoes, wooden pipes, wheel hubs, veneer etc[43, 46, 61, 82, 171, 227, 235].

dwatta Emetic Ophthalmic VermifugeThe bark is emetic. ophthalmic and vermifuge[257]. An infusion has been used as a bath and also given to children with worms[257]. A strong decoction is used to cause vomiting when unable to retain food[257]. A strong ooze from the roots is used as eye drops[257].

nrakta Eastern N. America - Maine to Florida, west to Ontario and Texas. ksacta Low acid woods, swamps and shores in imperfectly drained soils[11, 43]. Also found on high wooded slopes in the south of its range[82].

propta The seed can be sown in late winter in a cold frame[78] but would probably benefit from an earlier sowing if the seed can be obtained any sooner. Three months stratification at 5°c improves germination[200], Germination rates are variable[78]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Give the plants some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood, July/August in a frame. Layering.

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen. Although this is a plant of swamps and other wet soils in the wild, once established it can succeed in Britain when growing in an ordinary good loamy soil in sun or semi-shade[11, 200]. It prefers a neutral to alkaline soil according to one report[200], whilst another says that it requires a lime-free soil [98]. Tolerates atmospheric pollution and growing in maritime regions[200]. A very ornamental tree[1], it has a moderate rate of growth and moderate longevity[229]. Resents root disturbance, it is difficult to transplant except when young[11]. The tree does not come into leaf until late May. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds. North American native. Wetlands plant. Attracts butterflies, Inconspicuous flowers or blooms.

## 5.2.380 Ulmus davidiana

Japanese Elm

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ulmus davidiana is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy)

able pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Leaves - raw or cooked[105, 177]. Young fruits cooked[105, 177]. Inner bark - dried, ground into a powder and used as a thickening in soups or added to cereal flours when making bread etc[105, 177].

tcanta Fibre WoodA fibre is obtained from the inner bark[189]. The bark is soaked for 7 - 10 days in water, the inner and outer barks are then separated and the inner bark is stripped into strands and made into thread by chewing it. It is made into a coarse fabric[189]. Wood - heavy, difficult to work. Used for axles, hubs etc[46, 61].

nrakta E. Asia - China, Japan, Korea. ksacta Slopes, wetlands near streams and valleys at elevations of 2000 - 2300 metres[266].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but it is easily grown in any soil of at least moderate quality so long as it is well drained[1]. This species is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200]. Closely related to U. japonica[200].

# 5.2.381 Ulmus pumila

Siberian Elm, Hybrid elm

4 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 15 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flat-

priklwis hpa7tmwatli xre7t hjonli

drutta Ulmus pumila is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower in April, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Leaves - raw or cooked[105, 177, 183]. Used as a potherb[218]. Inner bark - cooked. It can be dried and made into noodles[105, 177, 183]. The dried inner bark can also be ground into a powder and then used as a thickener in soups or added to cereal flours when making bread etc. Fruit - raw or cooked[105, 177]. Used when immature, it can be made into a sauce and a wine[183]. The fruit is about 10mm in diameter[200].

tcanta Fibre Fodder Shelterbelt WoodA coarse cloth is made from the inner bark[149]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - hard, heavy, tough, difficult to split. Used for agricultural implements, boat making etc[149].

dwatta Antibilious Antidote Demulcent Diuretic Febrifuge Lenitive Lithontripic PoulticeThe leaves are diuretic and febrifuge[218]. They are used as a pot herb and are then said to be antibilious, antidote and lithontripic[218]. The stem bark is demulcent, diuretic, febrifuge and lenitive[218]. It is mixed with oil and vinegar then used as a poultice on abscesses, mastitis and swellings[218].

nrakta E. Asia - China, E. Siberia, Turkestan. ksacta Dry sandy or stony soils, pebbles of river valleys, slopes and occasionally on rocks[74]. Slopes, valleys and plains at elevations of 1000 - 2500 metres[266].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global CropLandscape Uses:Firewood, Aggressive surface roots possible. Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. Succeeds in a hot dry position[200]. Established plants are drought resistant[11, 200]. Fairly wind-tolerant[200]. This species, or at least some of its cultivars[200], is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200]. Special Features: Not North American native, Invasive, Naturalizing, Inconspicuous flowers or blooms.

#### 5.2.382 Quercus serrata

Bao li 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 15 m hkuc

hminhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus serrata is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: CoffeeSeed - cooked. Highly nutritious[179]. The seed is about15mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost[179]. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. Leaves - cooked. A famine food when all else fails[179]. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - very hard, strong, red-brown in colour. Used for farm implements etc[61, 146].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea, Himalayas. ksacta Deciduous forests below 100 - 2000 metres[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

mwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Trees are often coppiced in China[109]. The seed ripens in its first year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

## **5.2.383** Ilex opaca

American Holly

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta llex opaca is an evergreen Shrub growing to 15 m (49ft) by 1.5 m (5ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to June, and the seeds ripen from November to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274]. The fruits can cause violent vomiting[222].

kcakta Edible Parts: Edible Uses: TeaThe roasted leaves are used as a tea substitute[161, 177]. They do not contain caffeine[183]. The drink was a very popular tea substitute during the American Civil war[183].

tcanta Dye Hedge Hedge Shelterbelt WoodA number of cultivars of this species are used for hedging[200]. Fairly wind-resistant, this species is also used in shelterbelt plantings[200]. A dye has been made from the berries - the colour is not given[257]. Wood - light, tough, not strong, close grained, highly shock resistant, easily worked[82, 149, 171, 229]. A strikingly white wood, it is valued for use in veneers and inlay[274]. It weighs 36lb per cubic foot[235]. Too small for commercial exploitation, but it is valued for use in cabinet making and the interior finishes of houses[82], it is also used for making small items such as tool handles[149, 171, 229]. The wood can also be stained to imitate ebony[171].

dwatta Antiperiodic Diuretic Emetic Epilepsy Laxative Malaria Ophthalmic SkinThe berries are laxative, emetic and diuretic[222]. They are used in the treatment of children's diarrhoea, colic and indigestion[222]. A tea made from the leaves has been used as a treatment for measles, colds etc[222, 257]. The leaves have also been used externally in the treatment of sore eyes, sore and itchy skin[222, 257]. A tea made from the bark was once used in the treatment of malaria and epilepsy[222]. It has also been used as a wash for sore eyes and itchy skin[257].

nrakta Eastern N. America - Massachusetts to Florida and west to Texas. ksacta Grows in a variety of soil types, but it is generally found in deep moist bottomlands[229]. Moist woods, hedges and fields[43, 184].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

mwatta Succeeds in most soils so long as they are not water-logged. Fairly wind-resistant[200]. Plants are hardy to about -25°c[184]. A slow-growing and long-lived species in the wild[229], but it does not thrive or fruit well in British gardens[182]. Plants do not thrive in a maritime climate[188]. There are many named forms, selected for their ornamental value[182, 200]. The leaves remain on the plant for about 3 years, falling in the spring[82]. Flowers are produced on the current year's growth[229]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.384 Pyrus communis

Wild Pear, Common pear 4 tlin 9 cyuc 2 kcak 3 tcan 1 dwat 13 m hkuc hmimbtut cyutli hgattcun hwicli hrasilutnyikfr

hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus communis is a deciduous Tree growing to 13 m (42ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 5]. The fruit of wild pears often remains very hard unless bletted[186]. It is more suitable for use in pies etc. The fruit is up to 5cm long[200].

tcanta Dye Shelterbelt WoodA yellow-tan dye is obtained from the leaves[106, 115]. Trees are sometimes used as part of a shelterbelt planting[227]. Wood - heavy, tough, durable, fine grained, hard. It weighs 51lb per cubic foot[227]. Used by cabinet and instrument makers[11, 61, 100, 149]. When covered with black varnish it is an excellent ebony substitute[74].

dwatta Astringent Febrifuge SedativeThe fruit is astringent, febrifuge and sedative[240].

nrakta Europe. Naturalized in Britain[17]. ksact Hedges, woodland margins etc in Britain[17].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at  $1^{\circ} c$  and should be sown as early in the year as possible[200]. Temperatures over 15 -  $20^{\circ} c$  induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[1, 200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types, if they are moderately fertile[200], avoiding only the most acid soils[186]. Dislikes very exposed positions[186]. Established plants are drought tolerant[200]. A very hardy plant, tolerating temperatures down to below -15°c[200]. Plants often sucker and can form dense thickets[186]. A parent of the cultivated pear, possibly by crossing with P. nivalis and P. cordata[11]. There are many hundreds of varieties of cultivated pears and they are widely cultivated in the temperate zone for their edible fruits. By selection of varieties fresh fruits can be obtained from late July to April or May of the following year. Special Features: Edible, Not North American native, Naturalizing, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 5.2.385 Juniperus osteosperma

Desert Juniper, Utah juniper 4 tlin 8 cyuc 2 kcak 3 tcan 2 dwat 12 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus osteosperma is an evergreen Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can ploerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 82, 95]. A thin flesh, it is sweet but strongly flavoured of resin and has a mealy texture[82, 85, 229]. Used as a flavouring in stews[216, 257]. The fruit can be eaten fresh or it can be dried and ground into a powder then baked into cakes[61, 82, 183]. The cones are about 6 - 18mm in diameter, they take 2 years to mature[200].

tcanta Beads Fuel Hair Incense Thatching Tinder Wax WoodA wax on the fruit is obtained by simmering the fruit in hot water and skimming off the wax as it rises to the surface. The wax can be used to make aromatic candles[85]. The bark is employed as a tinder and is also made into a slow match[216, 257]. The crushed bark was twisted into a rope, tied at intervals with yucca (Yucca species), and wrapped into a coil. The free end was set on fire and kept smouldering by blowing on it at intervals. Fire could be carried in this fashion

#### 5.2.530 Stellaria media

Chickweed. Common chickweed

4 tlin 11 cvuc 2 kcak 2 tcan 3 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Stellaria media is a ANNUAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower all year, and the seeds ripen all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain saponins[7, 65]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Report of paralysis attributed to excessive intake. Should not be used during pregnancy or during breastfeeding [301].

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked as a potherb[2, 7, 9, 12, 52, 54, 183]. They can be available all year round if the winter is not too severe[85]. Very nutritious, they can be added to salads whilst the cooked leaves can scarcely be distinguished from spring spinach[4, K]. The leaves contain saponins so some caution is advised, see the note on toxicity at the top of the page. A nutritional analysis is available[218]. Seed - ground into a powder and used in making bread or to thicken soups[172, 183]. It would be very fiddly to harvest any quantity of this seed since it is produced in small quantities throughout most of the year and is very small[K]. The seed contains 17.8% protein and 5.9% fat[218].

tcanta A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antirheumatic Astringent Carminative Demulcent Depurative Diuretic Emmenagogue Expectorant Galactogogue Kidney Laxative Ophthalmic Poultice Refrigerant TB VulneraryChickweed has a very long history of herbal use, being particularly beneficial in the external treatment of any kind of itching skin condition[238]. It has been known to soothe severe itchiness even where all other remedies have failed[254]. In excess doses chickweed can cause diarrhoea and vomiting[254]. It should not be used medicinally by pregnant women[254]. The whole plant is astringent, carminative, demulcent, diuretic, expectorant, laxative, refrigerant, vulnerary[4, 7, 9, 21, 54, 165, 222]. Taken internally it is useful in the treatment of chest complaints and in small quantities it also aids digestion[254]. It can be applied as a poultice and will relieve any kind of roseola and is effective wherever there are fragile superficial veins[7]. An infusion of the fresh or dried herb can be added to the bath water and its emollient property will help to reduce inflammation - in rheumatic joints for example - and encourage tissue repair[254]. Chickweed is best harvested between May and July, it can be used fresh or be dried and stored for later use[4, 238]. A decoction of the whole plant is taken internally as a post-partum depurative, emmenagogue, galactogogue and circulatory tonic[218]. It is also believed to relieve constipation and be beneficial in the treatment of kidney complaints[244]. The decoction is also used externally to treat rheumatic pains, wounds and ulcers[4, 218, 222]. The expressed juice of the plant has been used as an eyewash[244].

nrakta A cosmopolitan plant, found in most regions of the world, including Britain. ksacta Growing almost anywhere, it is a common garden weed[7, 17].

propta Seed - this species should not need any encouragement, you are much more likely to be trying to get rid of it than trying to introduce it (eating it is one way of doing that!)[K].

nwatta A very easily grown plant, it prefers a moist soil and a position in full sun or partial shade [52, 238]. It can be

very lush and vigorous when grown in a fertile soil[1], but in infertile soils it will flower and set seed whilst still very small. A very common garden weed, chickweed grows, flowers and sets seed all year round. The flowers open around 9 o'clock in the morning and remain open for about 12 hours[4]. They do not open in dull weather[4]. The leaves fold up of a night time, enfolding and protecting the tender buds of new shoots[4]. A food plant for the caterpillars of many butterfly species. Special Features: Edible. Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. Extended bloom season in Zones 9A and above. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A self-seeding annual [1-2]. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

# 5.2.531 Pinus monticola

Western White Pine

4 tlin 8 cvuc 2 kcak 0 tcan 2 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasilut hpa7tli flatprik hpa7tmwatli dvat hionli

drutta Pinus monticola is an evergreen Tree growing to 60 m (196ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Inner bark SeedEdible Uses: Condiment GumSeed - raw or cooked[105, 177]. The oil-rich seed has a resinous flavour. Rather small, the seed is only 5mm long[200]. The seed is up to 9mm long[82, 229]. An edible gummy exudation from the stem is used as a chewing gum[257]. Inner bark - raw or cooked[177, 257]. The inner bark can be dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[257]. The roasted young cones can be eaten[257]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Gum Herbicide WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile 641. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc. for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - straight and close-grained, soft, light, not strong, very durable, resistant to shrinking and warping. An important timber tree, it is used in making doors, shelves, flooring, construction etc[46, 61, 82, 171, 229]. The wood has dark knots, making it attractive for panelling[226].

dwatta Antirheumatic Antiseptic Diuretic Pectoral Poultice Salve TBThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4, 257]. It is also very beneficial to the respiratory system and so is useful in treating diseases of

out direct into their permanent positions. We have found that to most people, though they are attractive to insects[186]. it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in ordinary garden soil in sun or shade[1, 111]. Hardy to about -25°c[187]. An extremely invasive plant, capable of sending up new shoots at a considerable distance from the main clump[1]. Considered a pest in many areas, if grown in the garden it should be planted within a barrier to contain its roots. Plants seem to be immune to the predations of rabbits[233]. Dioecious, male and female plants must be grown if seed is required.

# 5.2.433 Cornus sanguinea

Dogwood, Bloodtwig dogwood 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cornus sanguinea is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista Contrary to some reports, the fruit is not poisonous, but the leaves can cause skin irritations to sensitive people[65].

kcakta Edible Parts: Fruit Oil OilEdible Uses: Oil Oil-Fruit - raw or cooked[105]. A bitter flavour, it can also have an emetic effect on the body[1, 7, 11]. It is not worthwhile[115]. The fruit is about 8mm in diameter[200]. An oil is obtained from the seed[2], it is edible when refined[75].

tcanta Basketry Charcoal Dve Fuel Hedge Hedge Oil Oil WoodThe seed contains 45% of a non-drying oil[74], it is used in soap making and lighting[7, 13, 100, 115, 177]. A non-drying oil is also obtained from the pericarp, it is used for lighting[74]. The pericarp contains 19 - 35% oil[74]. A greenish-blue dye is obtained from the fruit[13, 74]. The young stems are very flexible and are used in basketry[7, 13, 74, 100]. Wood - tough, hard. Used for small items such as tool handles, turnery etc[11, 61, 115]. A good quality charcoal is obtained from the wood[115], the wood also makes an excellent fuel[115].

dwatta Astringent Emetic FebrifugeThe bark is astringent and febrifuge[7]. It is used to treat fevers[254]. The leaves are sometimes used externally as an astringent[7]. The fruit is emetic[7].

nrakta Europe, including Britain, from Scandanavia to Spain, east to Sicily and Greece, Rare in S.W. Asia., ksacta Mixed woods, scrub and hedgerows, especially on calcareous soils[7, 13, 186].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Plants are relatively shade tolerant, though they are not happy when growing in dense shade[186]. They grow badly when exposed to strong cold winds[186]. Plants are hardy to about -25°c[184]. The flowers have a rather unpleasant smell

Plants have a suckering habit and can quickly form dense thickets[186]. They can be coppied regularly and will throw up long straight stems after being cut back[186]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.434 Helianthus petiolaris

Prairie Sunflower

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 3 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Helianthus petiolaris is a ANNUAL growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked. An oily texture[161, 177]. The seed can be ground into a powder and kneaded into seed butter[257].

dwatta SalveThe powdered leaves, either on their own or in an ointment, have been used as a dressing for sores and swellings[257]

nrakta Central to western N. America - Manitoba and Minnesota south to Arizona. ksacta Sandy soils[43]. Dry prairies[235].

propta Seed - sow in mid spring in situ. An earlier start can be made by sowing 2 - 3 seeds per pot in a greenhouse in early spring. Use a fairly rich compost. Thin to the strongest seedling, give them an occasional liquid feed to make sure they do not become nutrient deficient and plant them out in late spring or early summer.

nwatta Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. Grows well on dry soils[200]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. This species hybridizes in the wild with H. annuus[274]. Members of this genus are rarely if ever troubled by browsing deer or rab-

# 5.2.435 Malus brevipes

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus brevipes is a deciduous Tree growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves. but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177].

nrakta N. America, ksacta Not known

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.436 Malus toringo

Toringo crab

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus toringo is a deciduous Tree growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for atracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. It is best after a frost, the cold helping to produce more sugars in the fruit[2, 105]. Up to 2cm in diameter[200]. nrakta E. Asia - Japan. ksacta Mountains[58].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following vear. Cuttings of mature wood. November in a frame[11].

mwatta An easily grown plant, it succeeds in most ferstile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[200]. This species is closely related to M. floribunda[11]. It hybridizes freely with other members of the genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.437 Eleutherococcus spinosus

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Eleutherococcus spinosus is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH:

mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Leaves Edible Uses: TeaLeaves and young budlings - cooked [46, 61, 105, 116, 177]. The dried leaves are a tea substitute [105, 177]. Although we have no record of the seed being edible, it is said to contain 5.6 - 30.6% protein, 5.6 - 36.6% fat and 2.1 - 3.5% ash[218].

tcanta Hedge HedgePlants can be used as a hedge[200]. dwatta Antirheumatic TonicThe cortex of the root is tonic and analgesic. It is used to treat general debility, rheumatic pains and many other complaints[178, 218]. A wine made from the root is considered to be a general tonic for restoring vigour and restoring sexual potency[218].

nrakta E. Ásia - China, C. Japan. ksacta Not known propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[2001]. Division

nwatta Prefers a light warm open loamy humus-rich soil and a position sheltered from north and east winds[11, 200]. Prefers a well-drained soil and full sun[200]. Tolerates urban pollution and poor soils[200]. Plants are hardy to at least -15°c if they are sheltered from cold winds[200]. Considered to be a part of E. sieboldianus by some botanists, but this species has smaller leaves[200]. It is closely related to and often confused with E. divaricatus[200]. There is a spineless form of this species, known as Eleutherococcus spinosus inermis (Makino) H. Ohashi[275].

# 5.2.438 Crataegus uniflora

of suckers in the dormant season[200].

Dwarf hawthorn

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus uniflora is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[161, 177]. The fruit is about 10mm in diameter and is borne in small clusters[200]. The fruit is usually borne singly, or in groups of up to 3 fruits[235]. It can be up to 16mm in diameter and has a firm flesh[235]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - New York to Florida, west to Texas and Oklahoma. ksacta Sandy or rocky banks or woods[43].

Rubber can be made from latex contained in the leaves and the stems[57, 92, 112].

dwatta WartsThe latex is used as a cure for warts[168]. nrakta Eastern N. America - New Jersey to Florida and Texas ksacta Swamps, mostly near the coast[235].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Prefers a well-drained light rich or peaty soil and a sunny position[1, 134, 200]. A very ornamental plant[1], it is closely related to A. rubra[200]. This species has less flowers than most other members of the genus[235]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207].

#### 5.2.528 Lilium maculatum

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium maculatum is a BULB growing to 0.6 m (2ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers mosts soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Flowers RootEdible Uses: Bulb -cooked[46, 61]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum). Flower buds - cooked[105].

nrakta E. Asia - Japan. ksacta Rocks along seashores[58]

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the  $\mathrm{sun}[200]$ . This name possibly covers a group of hybrids involving L. dauricum x L. concolor[200]. Widely cultivated for ornament, there are many named varieties[58, 200]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

## 5.2.529 Lilium japonicum

Bamboo Lilv

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium japonicum is a BULB growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[2, 4, 105]. It contains about 18% starch[174]. A slightly bitter taste[174]. It can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

dwatta Antiasthmatic Antitussive Expectorant Nutritive Sedative TonicThe bulb is antiasthmatic, antitussive, expectorant, sedative and tonic (nutritive)[174, 176]. It is used in the treatment of coughs, haemoptysis, insomnia and fidgetiness in the later stage of febrile disease[176].

nrakta E. Asia - Japan. ksacta Thickets on hills and low mountains[58] in rich loose woodland soil, often amongst dwarf bamboo, 300 - 900 metres[143].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Grows well in open woodland[1]. Likes plenty of moisture and some shade[42, 47]. Just to totally confuse matters, one report says that this species prefers a poor gravelly loam with plenty of leafmold and some charcoal, in a sunny position[143]. Requires protection from winter rains[143]. The sub-species L. japonicum platyfolium is more vigorous than the type with broader leaves. Stem rooting, the bulbs should be planted 15 - 20cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas. in warmer areas they can be planted out as late as late autumn[200]. A very ornamental plant[1], it is cultivated for its bulb in Japan[2] and is also a sacred flower in Japanese Shinto rites[174]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

caution[21, 238], see the notes above on toxicity.

nrakta Europe, ksacta Damp shady places[50].

propta Seed - sow spring in a cold frame and only just cover the seed because it requires light for germination[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant out into their permanent positions in the summer if sufficient growth has been made. If the plants are too small to plant out, grow them on in the greenhouse or frame for their first winter and plant them out early in the following summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Succeeds in ordinary garden soil[1], preferring a moist site[7, 17]. Succeeds in full sun or in partial shade[233]. This species is considered to be no more than a sub-species of V. officinalis by many botanists[200], it has the same uses as that species[4]. Often grown in the herb garden and also sometimes grown commercially as a medicinal herb[1, 200]. Cats are very fond of this plant, particularly the powdered root[1, 4, 20]. The root also attracts rats[14]. A good companion for most plants.

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus elaeagnifolia kotschyana is a deciduous Tree. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The flesh is rather tough and gritty, but has a reasonable flavour when it is fully ripe[K]. The fruit is up to 2cm long[200].

nrakta W. Asia. ksacta Rocky limestone slopes and forests, 1000 - 1850 metres in Turkey[93].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200]. This sub-species differs from P. eleagrifolia in having thornless branches[200]. Closely related to P. georgica[93].

#### 5.2.526 Berberis everstiana

4 tlin 8 cvuc 2 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hjonli

drutta Berberis everstiana is a SHRUB growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and

82° destroy the active principle in the root[240]. Use with basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[272]. The fleshy oblong fruit is about 15mm long.

tcanta DyeA yellow dye is obtained from the root and bark.

dwatta Antibacterial Cancer Dysentery Ophthalmic StomachicBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activ-

nrakta E. Asia - northern India, Nepal and Tibet. ksacta Open rocky places at elevations of 3000 - 4000 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it 5.2.525 Pyrus elaeagnifolia kotschvana can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Pot up in the spring[113]. Cuttings of mature wood of the current season's growth, preferably with a heel. October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Closely related to B. tsangpoensis[11]. Plants can be pruned back quite severely, they resprout well from the base[200].

# 5.2.527 Asclepias lanceolata

Purple Silkweed, Fewflower milkweed 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis

hpa7tmwatli fyifxre7t hjonli drutta Asclepias lanceolata is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds

ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274].

kcakta Edible Parts: Flowers Leaves SeedpodEdible Uses: Gum SweetenerThe following uses have been recorded for the closely related A. rubra. They probably also apply to this closely related species[K]. Flower buds - cooked as potherbs or added to soups[207]. Young shoots and leaves cooked as potherbs or added to soups[207]. Young seed pods, 3 - 4 cm long, cooked[207]. Flower clusters can be boiled down to make a sugary syrup[207]. A chewing gum can be made from the latex contained in the stem and leaves, but it is possibly toxic[207].

tcanta Fibre Gum Latex StuffingThe following uses have been recorded for many other members of this genus, it is fairly safe to assume they can also be applied to this species[K]. A fibre is obtained from the bark[92, 99]. It is used in twine, coarse cloth, paper etc[92, 99]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[168, 169]. It is a Kapok substitute, used in Life Jackets or as a stuffing material [169]. It is very water repellent. The floss has also been used to mop up oil spills at sea.

518

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit. they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species is often confused with C. tomentosa. L.[235]. It hybridizes freely with other members of the genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 5.2.439 Rubus affinis

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rubus affinis is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177], Large[150],

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]

nrakta Europe to Asia. Rare in Britain[50] according to one report but it is not in [17]. ksacta Moist heath and grassland[50].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[11, 200]. Hardy to at least -15°c. This species is a blackberry with biennial stems[200]. New shoots are produced from the roots each year, these flower and fruit in their second year and then die 200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.440 Ligustrum obtusifolium

Border privet

4 tlin 7 cvuc 2 kcak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ligustrum obtusifolium is an evergreen Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, at least one member of this genus is recorded as being mildly toxic and it is quite possible that other members of the genus also contain toxins[65].

kcakta Edible Parts: Edible Uses: Coffee TeaThe roasted seed is a coffee substitute[61, 177]. Leaves are a tea substitute[177]

tcanta WaxA commercial insect wax is produced on the branches as a result of eggs being laid by insects[11]. Another report says that the wax is produced by the plant due to the stimulation of the feeding insects[61]. Yet another report says that the wax is produced by the insects[178]. It is used for candles and as a polish for earthenware pots, book edges etc[178]. The sub-species L. obtusifolium regelianum and its cultivar 'Dart's Perfection' make a good carpeting ground cover about 1.2 metres tall. They should be spaced about 2.5 metres apart each way[208].

nrakta E. Asia - China, Japan. ksacta Thin woods and thickets in lowland and hills all over Japan[58]. Hills, gullies and woods at elevations of 100 - 600 metres in China[266].

propta The seed does not require any pre-treatment and can be sown in the spring in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 10cm with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood, 20 - 30cm in a sheltered outdoor bed in November/December. High percentage[78].

nwatta Landscape Uses: Foundation, Hedge, Screen, Superior hedge. A very tolerant and easily grown plant, it succeeds in any soil that is not impoverished or water-logged[11. 1821. Grows well in heavy clay soils. A very ornamental plant[1]. Polymorphic[58]. Prefers hotter summers than are normally experienced in Britain[11]. Closely related to L. ovalifolium[200]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Invasive, Attractive flowers or blooms.

# 5.2.441 Quercus undulata

Wayyleaf Oak

483

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli ilutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Quercus undulata is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[61, 105, 161, 257]. Up to 2cm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[257].

tcanta Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Tannin is obtained from the bark[46, 61]. Wood. Used mainly as a fuel[46, 61].

dwatta Analgesic Astringent DysenteryA decoction of the root bark has been used to treat internal pains[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-western N. America - Colorado to Texas, south to Mexico. ksacta Sandstone soils and dry rocky slopes[228].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1,11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees of ten grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The seed ripens in its first year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

## 5.2.442 Aronia arbutifolia

Red Chokeberry

4 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aronia arbutifolia is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. It can also be dried and used for making pemican[161, 183]. Fruit quality is rather variable, some forms are rather pleasant when fully ripe, especially if they have experienced some frost[2]. The fruit is about 7mm in diametr[200], it can hang on the plant for several months[235].

nrakta Eastern N. America - Massachusetts to Minnesota and south to Texas and Florida. ksacta Low woods, thickets, swamps, damp pine barrens etc/431.

propta Seed - best sown as soon as it is ripe in pots outdoors or in a cold frame[113]. Pre-soak stored seed overnight and then cold stratify for 3 months at  $2^{\circ}$ c[113]. The seed germinates in 1 - 3 months at  $15^{\circ}$ c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring. Cuttings of half-ripe wood, July/August in a frame[113]. Division of suckers in the dormant season[200].

Very easy, they can be planted straight out into their permanent positions. Layering[200].

nwatta Landscape Uses:Border, Erosion control, Foundation, Pest tolerant, Massing, Seashore, Specimen, Woodland garden. Prefers a moist peaty soil in full sun or partial shade[134]. Succeeds in most soils[1] but dislikes shallow chalk[200]. Tolerates atmospheric pollution[227]. Plants are hardy to about -25°c[184]. This genus is closely related to Sorbus species[200]. A suckering plant, it forms thickets in the wild[182]. Some named forms have been developed for their ornamental value[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Wetlands plant, Attracts butterflies. The plant is heat tolerant in zones 8 through 4. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 5.2.443 Aralia chinensis

Chinese Angelica Tree, Pumila Spirea, Chinese Astilbe 4 tlin 8 cyuc 2 koak 0 tcan 2 dwat 3.5 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aralia chinensis is a deciduous Shrub growing to 3.5 m (11ft 6in) at a medium rate. It is frost tender. It is in flower from August to September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The bark is considered to be slightly poisonous[218].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[46, 61, 105, 177]. Used as a vegetable[206]. Blanched and used in salads[116]. Although no records of edibility have been seen for the seed, it is said to contain 5.8 - 17.5% protein, 4.2 - 46.3% fat and 3.7 - 5.7% ash[218].

dwatta Anodyne Carminative Diuretic SialagogueThe stem and root are anodyne and carminative[147, 218]. It is used as a warming painkilling herb in the treatment of rheumatoid arthritis[238]. The root is also considered to be useful in the treatment of diabetes and dysmenorrhoea[218]. Some caution is advised since the bark is considered to be slightly poisonous[218]. The stembark is diuretic and sialagogue[218].

nrakta E. Asia - China ksacta Forests on rich well moistened soil[74].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Landscape Uses:Border, Container, Massing, Rock garden, Woodland garden. Prefers a good deep loam and a semi-shady position[1, 11, 200]. Requires a sheltered position[1]. Plants are hardier when grown in poorer

ache and menstrual disorders[222]. Externally, a wash of the leaves was applied to itching, rashes, swellings, boils, sores, etc[222]. The wash was also applied to eczema and as an underarm deodorant[257]. A poultice of the leaves can be applied to spider bites, blisters and burst boils[257]. A snuff of the crushed leaves has been used to treat headaches, the sinuses and nosebleeds[257].

nrakta Western N. America - Michigan to Washington, south to Texas and Mexico. ksacta Prairies, dry open soils and thin woodland[43].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: CoppiceLandscape Uses:Border, Container, Ground cover, Massing, Seashore, Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Does well in a sandy soil[188]. Established plants are very drought tolerant[190]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. A very polymorphic species[43]. Slugs love the young shoots of this plant and have been known to destroy even well-established plants[K]. A very ornamental plant, spreading by stolons to form loose patches[187], it can be invasive[190]. There are many named forms selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Fragrant foliage, Invasive Suitable for dried flowers

# 5.2.523 Polygonum alpinum

Alpine Knotweed, Alaska wild rhubarb 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Polygonum alpinum is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Seed StemEdible Uses: DrinkLeaves - raw or cooked[2, 145]. They have an action drawn and can be used as a sorrel substitute[74]. The chopped leaves and stems have been added to a thick pudding of flour and sugar then eaten[257]. Leaf stems - raw or cooked. An acid flavour, they can be cut into sections and used like rhubarb (Rheum spp)[257]. The juice from the plant has been sweetened and used as a refreshing drink[257]. Seed - raw or cooked. It is rather small and fiddly to utilize.

dwatta Astringent PectoralThe whole plant is astringent[74]. The raw roots and stem bases have been chewed as a treatment for coughs and colds[257].

nrakta Europe to E. Asia. ksacta Damp meadows, wood margins and mixed grass steppes[74]. Open humus-rich slopes, 2200 - 2700 metres in Kashmir[145].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Grows well near water[1]. Repays generous treatment[1]. Plants seem to be immune to the predations of rabbits[233]. Plants can be invasive but they are easily controlled by spading around the clump[200].

#### 5.2.524 Valeriana sambucifolia

4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Valeriana sambucifolia is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista It is said that prolonged medicinal use of this plant can lead to addiction. A course of treatment should not exceed 3 months.

kcakta Edible Parts: SeedEdible Uses: Condiment TeaYoung leaves - cooked[105]. Seed[172]. No further details are given but the seeds of other members of this genus are parched and then eaten. An essential oil from the leaves and root is used as a flavouring in ice cream, baked goods, condiments etc[183]. The leaves can also be used as a condiment[61]. The plant is used in moderation as a herbal tea[183].

tcanta Compost Essential Liquid feed RepellentThe plant yields about 1% of an essential oil from the roots[7, 238]. It is used in perfumery to provide a 'mossy' aroma[57, 61, 238], though the scent is considered to be disagreeable by many people[207]. The dried roots are also placed in linen cupboards and clothes drawers in order to scent the clothes[4]. The dried root attracts rats and cats, it can be used as a bait to lure them away from other areas[100]. An ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The plant can also be used to make a very good liquid plant feed[14, 18, 201]. It attracts earthworms[14, 18]. The leaves are very rich in phosphorus[201].

dwatta Antispasmodic Carminative Diuretic Eczema Hypnotic Nervine Sedative StimulantValerian is a wellknown and frequently used medicinal herb that has a long and proven history of efficacy. It is noted especially for its effect as a tranquilliser and nervine, particularly for those people suffering from nervous overstrain[4, 222]. Valerian has been shown to encourage sleep, improve sleep quality and reduce blood pressure[254]. It is also used internally in the treatment of painful menstruation, cramps, hypertension, irritable bowel syndrome etc[238, 254]. It should not be prescribed for patients with liver problems[238]. Externally, it is used to treat eczema, ulcers and minor injuries[238]. The root is antispasmodic, carminative, diuretic, hypnotic, powerfully nervine, sedative and stimulant[4, 7, 9, 14, 21, 46, 147, 165, 192, 218]. The active ingredients are called valepotriates, research has confirmed that these have a calming effect on agitated people, but are also a stimulant in cases of fatique[222]. The roots of 2 year old plants are harvested in the autumn once the leaves have died down and are used fresh or dried[4, 9, 238]. The fresh root is about 3 times as effective as roots dried at 40° (the report does not specify if this is centigrade or fahrenheit), whilst temperatures above Best used when they are still red-coloured, they are peeled before being eaten[183]. Petals - cooked. They are the source of 'attar of roses' and 'rose water', and are used as a flavouring for drinks, sweets, baked goods, ice cream etc[183]. The petals are also used to make jam[74]. Fruit raw or cooked. The fruit is about 25mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The leaves are used as a seasoning. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta EssentialAn essential oil obtained from the flowers is much used for perfumery and as a flavouring[1, 46, 57, 171]. 1000g yields 0.5g of oil[61].

dwatta Aperient Astringent Cancer Cardiac TonicThe petals are applied externally as an astringent[240]. They are also made into a preserve and used as a tonic that helps to put on weight[240]. The buds (the report does not say if it is leaf or flower buds) are aperient, astringent, cardiac and tonic[240]. They are used for removing bile and cold humours[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta W. Asia. ksacta Not known in a truly wild situation, this species is probably a hybrid involving R, centifolia[11, 74].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel. July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. The plant resists frost[74]. A very ornamental plant[1], the flowers are very fragrant[245]. This species is commonly cultivated for its essential oil[57]. It is a parent of many varieties of perpetualflowering garden roses[1]. Grows well with alliums, parsley. mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.521 Lilium kelleyanum

Kelley's Lily 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium kellevanum is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, butterflies. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[46. 61]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

nrakta South-western N. America - California. ksacta Wet banks and boggy places, 1200 - 3100 metres in California[71]. Hillside seeps, wet thickets, along streams in coniferous forests at elevations of 2200 - 2900 metres[270].

propta Seed - delayed hypogeal germination[130]. Autumnal hypogeal germination[200]. Best sown as soon as it is ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Stoloniferous[200], the bulbs should be planted 10 - 12cm deep in a light, gritty, well-drained soil with added leafmold in sun or light shade[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### 5.2.522 Artemisia ludoviciana

White Sage, Louisiana Sage, Prairie Sage, Western Mugwort 4 tlin 9 cyuc 2 kcak 2 tcan 2 dwat 1 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwis hna7tmwatli xre7t hionli

drutta Artemisia ludoviciana is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista There is a report that the plant can cause allergies in some people[222].

kcakta Edible Parts: SeedEdible Uses: Condiment TeaLeaves and flowering heads are used as a flavouring or garnish for sauces, gravies etc[183]. A herb tea is made from the leaves and flowering heads[183]. Seed[105, 161, 177, 183]. No further details are given but the seed is very small and fiddly to use.

tcanta Deodorant RepellentThe plant makes a useful ground cover plant once it is established[190]. The leaves can be placed in the shoes as a foot deodorant[257]. An infusion of the leaves has been used as an underarm deodorant[257]. The soft leaves can be used as a toilet paper[257]. The plant can be burnt to repel mosquitoes[257].

dwatta Astringent Deodorant Eczema Poultice SkinThe leaves are astringent[222]. They were commonly used by the N. American Indians to induce sweating, curb pain and diarrhoea[222]. A weak tea was used in the treatment of stomach soils[200]. The young growth in spring, even on mature smell somewhat like decaying fish. This attracts midges plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species is closely allied to A. elata[11]. A very ornamental plant[1, 11]. Special Features: Attractive foliage, Suitable for

# 5.2.444 Crataegus jackii

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli hqattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus jackii is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177, 235]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 12mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Ouebec to Ontario, ksacta Calcareous ridges and banks of streams[43].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year [K]. The flowers have a foetid

which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

# 5.2.445 Calystegia sepium

Hedge Bindweed, Hedge false bindweed, Appalachia false bindweed, Bingham's false bindweed

4 tlin 8 cyuc 2 kcak 1 tcan 1 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Calystegia sepium is a PERENNIAL CLIMBER growing to 3 m (9ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This species is said to be purgative[173], some caution is advised.

kcakta Edible Parts: Leaves RootEdible Uses: Stalks and root - cooked[2, 46, 128, 153]. Washed and steamed[179]. A pleasant sweet taste[178]. Rich in starch and sugars, it is very nutritious [179]. It should not be eaten regularly, however, due to its possible purgative effect[179]. Young shoots - cooked[46, 61, 105]. Some caution is advised since they are possibly purgative[179].

tcanta StringThe stems are very flexible and can be used as an emergency string for tying[6]. It is fairly strong but not very long-lasting[K].

dwatta Cholagogue Demulcent Diuretic Febrifuge Poultice PurgativeThe root is demulcent, diuretic, febrifuge, poultice and strongly purgative [9, 21, 178, 222]. Use of the root is believed to increase the flow of bile[222].

nrakta Most of Europe, excluding the north but including Britain, W. Asia, N. Africa and N. America. ksacta Hedges, fences, edges of woods, waste ground etc[9].

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary garden soil in a sunny position, but plants are apt to become invasive[1, 200]. Hedge bindweed is a troublesome garden weed, especially when growing on moist soils[1, 4]. The plant is a vigorous climber with annual shoots 3 metres or more long. These twine around other plants and can kill them by smothering them[4]. Once established, it is very difficult to eradicate the plant because it has very deep roots and is capable of re-growing from any part of the root left in the ground. The flowers open in sunny weather and remain closed during dull weather[4]. Nearly all taxa in Calystegia intergrade geographically into neighboring taxa with the exception of the widespread coastal species, C. soldanella (Linnaeus) R. Brown. It is impossible to draw clearly defined specific limits, and intermediate forms are always found where two taxa approximate geographically[266].

#### 5.2.446 Angelica atropurpurea

Purplestem Angelica

4 tlin 8 cvuc 2 kcak 0 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Angelica atropurpurea is a PERENNIAL growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay)

soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furocoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238].

kcakta Edible Parts: Leaves Root StemEdible Uses: Young shoots and leaf stalks - raw or cooked[55, 105, 177]. When boiled in two lots of water they form a vegetable that strongly resembles celery. They can be peeled and eaten in salads or blanched and cooked like asparagus[183]. The stems can also be candied and used as a sweetmeat[2]. Root, leafstalks and stems - candied[177, 183].

dwatta Carminative Diaphoretic Emmenagogue Sedative Stomachic TonicA tea made from the leaves is carminative and stomachic[222]. It is also used in the treatment of colds, rheumatism etc[222]. The seed and roots can also be used and have a stronger effect[222]. The plant has similar properties to angelica, A. archangelica, though it is inferior since it is less aromatic[4]. The root is carminative, diaphoretic, emmenagogue, sedative, stomachic and tonic[257]. An infusion has been used in the treatment of fevers, colds, flatulent colic and other stomach disorders, obstructed menses and as a general tonic for women[257]. Externally it has been used as a gargle for sore throats and mouths and as a poultice for broken bones, swellings etc[257]. It has also been used, both internally and externally, as a treatment for rheumatism[257].

nrakta Eastern N. America - Newfoundland to Ontario and Minnesota, south to Delaware, Illinois and Iowa. ksacta Rich thickets, bottomlands and swamps[43].

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sow in situ as soon as it is ripe.

nwatta Requires a deep moist fertile soil in dappled shade or full sun[200]. Plants are reliably perennial if they are prevented from setting seed[200].

## 5.2.447 Aronia prunifolia

Purple Chokeberry

4 tlin 8 cvuc 2 kcak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aronia prunifolia is a deciduous Shrub growing to 3 m (9ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - dried and used for making pemmican. The fruit is about 8mm in diameter[200].

nrakta Eastern N. America. ksacta Low woodlands[200].

propta Seed - best sown as soon as it is ripe in pots outdoors or in a cold frame[113]. Pre-soak stored seed overnight and then cold stratify for 3 months at  $2^{\circ}c[113]$ . The seed germinates in 1- 3 months at  $15^{\circ}c[134]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring. Since this species is believed to be a hybrid it will probably not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[113]. Division of suckers in the dormant season[200]. Very easy, they can be planted straight out into their permanent positions. Layering[200].

nwatta Prefers a moist peaty soil in full sun or partial shade[200]. Succeeds in most soils but dislikes shallow chalk[200]. Plants are hardy to about -25°c[200]. This genus is closely related to Sorbus species[200]. Plants in this genus are notably resistant to honey fungus[200]. This

species is probably a naturally occurring hybrid, A. arbutifolia x A. melanocarpa[200].

## 5.2.448 Cornus guinguenervis

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cornus quinquenervis is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: A specimen of this species seen growing at Kew in September 1994 was carrying a few red fruits about 30mm long and 12mm wide these were not fully ripe and were slightly astringent but they showed some potential[K]. There must be some doubt about the validity of the name of the Kew plant since the botanical description of the plant says that the fruits are black, globose and 6mm in diameter[266].

nrakta E. Asia - China. ksacta Hillsides, mountain forests and thickets by streams from sea level to 2500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80. 1131. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots. July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage [78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. Plants in this genus are notably resistant to honey fungus[200].

#### 5.2.449 Aralia schmidtii

Sakhalin Spikenard

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc

pcimhmim cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aralia schmidtii is a PERENNIAL growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil

kcakta Edible Parts: Leaves Root StemEdible Uses: The following uses are for the closely related A. cordata. It is guite possible that they also apply to this species[K]. Shoots-cooked or raw[2, 46, 61, 105, 177]. They can be up to 1.5 metres long and have a mild and agreeable flavour[116]. They are usually blanched and are crisp and tender with a unique lemon-like flavour[183]. They can be sliced and added to salads, soups etc[206]. The shoots contain about 1.1% protein, 0.42% fat, 0.8% soluble carbohydrate, 0.55% ash[179]. Root-cooked[22, 105, 177]. Used like scorzonera[2].

nrakta E. Asia - N. Japan. ksacta Thickets and thin woods, esp. by streams and ravines[58, 275].

woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A robust plant, densely clump-forming[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A very ornamental plant[1], there are many named forms[187]. Hybridizes freely with other members of this genus[200]. This species usually breeds quite true from seed[233].

## 5.2.518 Juniperus horizontalis

Creeping Juniper, Horizontal Juniper 4 tlin 9 cyuc 2 kcak 3 tcan 1 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli nyanhjen hjonli

drutta Juniperus horizontalis is an evergreen Shrub growing to 1 m (3ft 3in) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Edible Uses: Coffee TeaThe fruits are roasted and used in the preparation of a coffee-like beverage[183]. A tea is made from the young branch tips[183, 257].

tcanta Baby care IncenseLandscape Uses: Cascades, Erosion control, Ground cover, Massing, Rock garden, Seashore. A good ground cover plant for a sunny position[208], eventually making a dense cover though it requires weeding for the first year or so[197]. The bark has been crushed and used as a soft hygienic pad in cradles[257]. It has also been used to make mats[257]. The young twigs and leaves have been burnt as an incense[257].

dwatta Diaphoretic Febrifuge KidneyAn infusion of the branches, or fleshy cones, has been used in the treatment of coughs, colds and fevers[257]. The cones or branches can also be used as a steam bath[257]. An infusion of the seeds has been used in the treatment of kidney problems[257].

nrakta Northern N. America - Newfoundland to British Columbia, south to Washington and Maine. ksacta Dry rocky soil, sterile pastures and fields[204].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78] 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October, Takes 12 months[78].

nwatta Succeeds in a sunny position in most soils so long as they are well drained, preferring a neutral or slightly alaline soil[11] and succeeding on chalk[200]. Succeeds in dry soils[200]. An aggregate species[204]. There are many named varieties selected for their ornamental value[200]. Bar Harbour' is very salt-resistant[200]. Dioecious, male

and female plants must be grown if seed is required. Special Features: North American native, Fragrant foliage, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

# 5.2.519 Polygonatum verticillatum

Whorled Solomon's Seal

4 tlin 8 cvuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum verticillatum is a PERENNIAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-ertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some members of this genus have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Tender leaves and young shoots - cooked as a vegetable[51, 272]. They can be used as an asparagus substitute. Root - cooked[105]. Rich in starch.

nrakta Europe, including Britain, from Scandanavia south and east to Spain, W. Asia, Himalayas. ksacta Margins of woods, clearings and shady rocky places, usually on acid soils[17].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

## 5.2.520 Rosa x damascena

Damask Rose

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rosa x damascena is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: CondimentYoung shoots - raw or cooked[105, 177].

fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Most of Europe, including Britain, to N. Africa, western and northern Asia. ksacta Woodland, copses and open pastures in base rich soils[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade [230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Succeeds in most soils, but it prefers a moist loam and lots of leaf mould[42]. Requires a deep rich soil[1]. Grows well in full sun or partial shade[42], doing well in a woodland garden[230]. It also succeeds in a sunny dry border or on a scree[230]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials [230]. Plants seem to be immune to the predations of rabbits[233]. The flowers have a fairly pleasant odour from a distance, but an unpleasant fur-like smell near to which is more pronounced at nightfall and as the flowers begin to fade[245]. Cultivated plants are very susceptible to the predation of slugs and snails[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1]

#### 5.2.516 Lilium distichum

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Lilium distichum is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Bulb - cooked[177]. The bulb can be up to 4cm in diameter[266].

Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum). Young leaves and buds[105, 177]. No more details are given.

nrakta E. Asia - Korea, Manchuria. ksacta Moist and shady broad-leaved woodlands[74, 143]. Forested slopes, forest margins, hillsides along streams; 200 - 1800 metres in Heilongjiang, [lilin and Liaoning provinces[266].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant. putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200] Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soul with its roots in the shade and its head in the sun[200]. Grows well in open woodland, preferring a shady position[143]. Stem rooting, plant bulbs 10 - 12cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. Closely allied to L. tsingtauense[200]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### 5.2.517 Hosta sieboldiana

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hosta sieboldiana is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105, 177].

tcanta A useful ground cover plant, succeeding in dense shade, though rather slow spreading[197]. Plants should be spaced about 60cm apart each way[208].

nrakta E. Asia - Japan. ksacta Rich fertile soils in mountain valleys and forest margins[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at  $20^{\circ} c [134].$  When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25 cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8 cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a deep moderately fertile moisture-retentive well-drained loam and a semi-shady position[1, 11, 200]. Requires a sheltered position[200]. Plants are hardier when grown in poorer soils[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species is closely related to A. race-mosa[200]. The rootstock is similar to A. cordata[200]. It is considered to be no more than a subspecies of A. cordata by some botanists[275].

## 5.2.450 Prunus x cistena

Purple-Leaf Sand Cherry 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus x cistena is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. The fruit contains a single large seed. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge HedgeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Plants can be used for hedging[11]

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta A hybrid of garden origin, P. 'Pissardii' x P. pumila or P. bessevi, ksacta Not known in the wild.

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. This species is a hybrid and will not breed true from seed. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Succeeds in most soils in a sunny position[184]. Dormant plants are hardy to about -30°c[184]. A slow and weak grower[200]. There are several named forms, selected for their ornamental value[200]. The cultivar 'Schmidtteis' is taller growing, to 5 metres, and more vigorous[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.451 Silphium laciniatum

Compass Plant, Robinson's compassplant 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Silphium laciniatum is a PERENNIAL growing to 2 m (6ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista There is a report that the plant might be toxic[222].

kcakta Edible Parts: Edible Uses: GumA resin exudes naturally from the plant, and can also be obtained by incision[4]. It is an inexpensive substitute for mastic and is used as a chewing gum to sweeten the breath[4, 61, 105, 257]. It forms on the upper part of the flowering stem[183].

dwatta Diuretic Emetic Expectorant Tonic VermifugeThe resin obtained from the plant is diuretic[4, 61, 222]. It imparts a strong aromatic odour to urine[4]. A tea made from the roots is vermifuge and a tonic for general debility[4, 61, 222]. It is used as an expectorant in coughs and other pulmonary aliments[4]. A decoction of the smaller roots has been used as an emetic[257]. A tea made from the leaves is emetic, it has also been used in the treatment of coughs, lung aliments and asthma[222].

nrakta Central N. America - Ohio to Minnesota, south to Alabama and Texas. ksacta Prairies and glades[222]. Calcareous or sandy soils and prairies in Texas[274].

propta Seed - best sown as soon as it is ripe in a green-house[200]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[188]. This is very difficult due to the deep and extensive root system.

nwatta Industrial Crop: Hydrocarbon Management: Standard Wild CropSucceeds in any ordinary garden soil[1]. Prefers a deep moisture retentive moderately fertile soil that is not too nitrogen rich, in sun or dappled shade[200]. Prefers a shady position[200]. A very ornamental plant[1]. Leaves of young plants tip vertically and align themselves north to south to minimise exposure to the midday sun[200]. Plants have a deep and extensive root system which makes transplanting difficult[200]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat davs" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

#### 5.2.452 Rosa woodsii

Western Wild Rose, Woods' rose, Tehachapi rose 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rosa woodsii is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit StemEdible Uses: TeaFruit - raw or cooked[101, 155, 257]. They are used in making jams, jellies etc. The taste and texture are best after a frost[116]. The fruit can also be dried and used to make a pleasant tasting fruity-flavoured tea[183]. The fruit is up to 15mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Young shoots - raw[172]. Harvested whilst still tender in the spring, they are best peeled[257]. Petals - raw. Remove the bitter white base[172]. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The bark, young shoots, leaves and fruit have all been used to make tea-like beverages[257].

dwatta Analgesic Astringent Cancer Diuretic Foot care Poultice Salve Stings Women's complaintsThe seeds have been used as a poultice to produce a drawing effect for treating muscular pains[257]. An infusion of the leaves has been used as a spring tonic[257]. A poultice of the chewed leaves has been used to allow the pain of bee stings[257]. The leaves have been placed in the shoes as a protection from athletes foot[257]. The roots are blood tonic and diuretic[257]. A decoction of the roots has been used by adults and children in the treatment of diarrhoea and intestinal influenza[257]. A decoction of the root or inner bark has been used in the treatment of colds[257]. An infusion of the fruits has been used in the treatment of coughs[257]. Various parts of the plant have been used to make poultices to apply to burns, sores, cuts, swellings and wounds[257]. A decoction of the branches, combined with chokecherry (Prunus virginiana) and red willow (Salix bonplandiana), has been used in the treatment of various women's complaints, diarrhoea and vomiting[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Central and Western N. America -Minnesota to Missouri, Northwest Territory, New Mexico and Colorado. ksacta Moist soils of draws, hillsides, along streams and in open valleys. It often forms thickets in open positions[212].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant

out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most well-drained soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Closely related to and hybridizes in the wild with R. blanda[11]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.453 Oplopanax horridus

Devil's Club

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Oplopanax horridus is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil. The plant can tolerate maritime exposure.

pcista The plant is densely armed with spikes and these spikes are irritant[200].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - peeled and then cooked[46, 61, 105, 106]. Only the very young shoots are used[172]. The roots can be chewed after peeling[105, 106, 161].

tcanta Parasiticide ParasiticideThe berries can be mashed into a pulp and then rubbed onto the scalp to get rid of head lice[257].

dwatta Analgesic Antidandruff Antiphlogistic Antirheumatic Hypoglycaemic Parasiticide Parasiticide TonicDevil's club was widely employed medicinally by several native North American Indian tribes who used it especially for its pain-relieving properties[257]. It is little, if at all, used in modern herbalism, though it probably merits further investigation. The root bark and stems are analgesic, antirheumatic, antiphlogistic, appetizer, blood purifier, cathartic, emmenagogue, galactogogue, hypoglycaemic, ophthalmic, pectoral and tonic[172, 157]. An infusion is used in the treatment of coughs and colds, bronchitis, tuberculosis, stomach problems etc[257]. A decoction is drunk in the treatment of rheumatism and is also applied externally as a wash on the affected joints[257]. A poultice of the bark has been used to relieve pain in various parts of the body[257]. A poultice of the bark has been applied to a nursing mother's breasts in order to stop an excessive flow of milk[257]. A decoction has been used as an eye wash in the treatment of cataracts and as a herbal steam bath for treating general body pains[257]. The burnt stems, mixed with oil, are applied as a salve on swellings[257]. An extract of the root bark lowers blood sugar levels and an infusion of the bark has been used in the treatment of diabetes[213]. The infusion also has a tonic effect on the blood and liver[213]. The inner bark is emetic in large doses and purgative (especially if taken with hot water)[257]. It is used in the treatment of coughs and colds, stomach and bowel cramps[257]. A poultice of the inner bark is used in the treatment of wounds, sores etc[257]. The berries have been rubbed on the scalp to combat lice and dandruff, and to make the hair shiny[256].

nrakta Western N. America. ksacta Moist woods, especially by streams[11, 60] and usually in rich soils[99].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caution is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised.

kcakta Edible Parts: Leaves RootEdible Uses: Young fronds - they must be cooked[172. Some caution is advised, see the notes above on toxicity. Root - cooked[118, 161, 177]. Harvested in the spring and baked[213].

tcanta Hair PackingAn infusion of the fronds is used as a hair rinse and to treat dandruff[172, 213]. The leaves can be used as a packing material for fruit etc[172]. Plants can be grown as a ground cover when spaced about 60cm apart each way[208].

dwatta Antidandruff VermifugeThe root contains 'filcin', a substance that paralyses tapeworms and other internal parasites and has been used as a worm expellent[4, 172, 238]. It is one of the most effective treatments known for tapeworms- its use should be immediately followed by a nonoily purgative such as magnesium sulphate in order to expel the worms from the body[238]. An oily purge, such as caster oil, increases the absorption of the fern root and can be dangerous[238]. The root is harvested in the autumn and can be dried for later use, it should not be stored for longer than 12 months[238]. This remedy should be used with caution and only under the supervision of a qualified practitioner[238]. The root is toxic and the dosage is critical[238]. See also the notes above on toxicity. The root is also used in the treatment of dandruff[4, 172].

nrakta Europe, including Britain, Iceland and N. Russia south and east to Spain and temperate Asia. ksacta Woods, hedgebanks, wet heaths, shady rock ledges and crevices[17].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at 20°c. Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant[233], it prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position[175, 200]. Prefers a moist soil[188], but is drought tolerant when well established[200]. Plants are evergreen in mild winters[188]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 5.2.514 Iris pallida

Dalmation Iris, Sweet iris, Fragrant Iris, Zebra Iris 4 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Iris pallida is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: Edible Uses: CondimentThe root can be dried, ground into a powder and used as a food flavouring[46, 171]. The root may take several years of drying to develop its full fragrance[168]. 'Orris oil' is an essential oil derived from the dried root, it is used as a flavouring in soft drinks, sweets, chewing gum etc[183].

tcanta Cosmetic Dye EssentialThe root is a source of Orris powder which has the scent of violets[238]. It is obtained by grinding up the dried root[4, 7, 46]. It is much used as a fixative in perfumery and pot-pourri, as an ingredient of toothpastes, breath fresheners etc and as a food flavouring. The root can take several years of drying to fully develop its fragrance, when fresh it has an acrid flavour and almost no smell[4, 168]. An essential oil is obtained from the fresh root, this has the same uses as the root[57, 61]. The juice of the root is sometimes used as a cosmetic and also for the removal of freckles from the skin[4]. A black dye is obtained from the root[168]. A blue dye is obtained from the flowers[168]. Plants can be grown for ground cover, the dense mat of roots excluding all weeds[208].

dwatta CatharticCathartic[4]. The juice of the fresh root is a strong purge of great efficiency in the treatment of dropsy[4].

nrakta Europe - S. Tyrol from Yugoslavia to the Adriatic. ksacta Rocky places[45] in limestone hillsides and the sides of gorges[187].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done after flowering, though it can be done at almost any time. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

mwatta Landscape Uses:Border, Massing, Rock garden, Specimen. Requires a sunny position and a well-drained soil containing lime[42]. Easily cultivated in a sunny position in ordinary garden soil[187]. Prefers a pH between 6 and 7.5 or higher[200]. Established plants are drought tolerant[190]. Cultivated, especially in Italy, for the essential oil in its root[4]. The flowers are sweetly scented, reminding some people of orange blossom, others of vanilla and others of civet[245]. A very vigorous species[42]. The rhizome should be planted partly above the soil[1]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Fragrant foliage, All or parts of this plant are poisonous.

## 5.2.515 Orchis mascula

Early Purple Orchis

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Orchis mascula is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot -cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antiflatulent Astringent Demulcent Expectorant NutritiveSalep (see above for more details) is very nutritive, astringent, expectorant and demulcent[4, 240]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to

60% starch[74]. The dry weight content of starch is between 43 and 72%[173]. This starch can be extracted from the roots and is used in making dumplings which are eaten with sova flour and sugar as a delicacy[183]. The root has a somewhat constipating effect upon the body so is best eaten with foods that have a laxative quality[256]. Young shoots, harvested when still unfurling, can be eaten raw or cooked[2, 13, 55, 62, 94, 102, 183, 257]. They can be used like asparagus or like spinach[9, 257]. Somewhat flavourless, though they are considered to be a delicacy in Japan[4]. The fronds should be used when less than 20cm long, longer ones have a terrible taste[9, 213]. The shoots are somewhat bitter so they are often blanched for a few minutes in boiling water, then left to soak in cold water for two hours before being cooked[4, 9]. Although this might well improve the flavour, it will greatly reduce the nutritional value[K]. The shoots should be steeped in lye first[55]. Occasional use should cause no problems, but regular consumption is not advisable because the shoots might be carcinogenic[9, 65]. The plant yields an edible saccharine substance[55]. (from the cooking root??).

tcanta Adhesive Basketry Biomass Compost Dve Hair Lining Mulch Packing Repellent Soap Soap making Stuffing Thatching TinderA glue can be made from the rootstock[74]. A brown dye is obtained from the fronds[6, 67, 141]. It is green according to another report[141]. The fibrous remnants from edible roots make a good tinder[99]. The rhizome lathers readily in water and can be used as a soap[74]. A decoction of the root has been used as a hair wash[257]. The roots have been rubbed into the scalp in order to promote hair growth[257]. The roots have been pounded to remove the bark, then split into flat bands and used as the black strands of cheap baskets[257]. The ashes of the plant are rich in potassium and could be used as a fertilizer[4]. They are also used in the manufacture of glass (when mixed with sand) and in making soap (when mixed with vegetable oil)[4, 74]. The roots contain up to 20% potash in early summer, but this reduces to about 5% in the autumn[4]. The whole plant is a very valuable addition to the compost heap, it is rich in potash and makes an excellent compost for tree seeds[67, 94]. Cut twice a year if you want the plants to continue growing, three cuts annually will weaken and eventually kill off the plants. The dried ferns produce a very durable thatch[4]. The leaves are used as a packing material for fruit, keeping it fresh and cool without imparting any colour or flavour[4, 66, 99]. They are also used as a lining for baskets, fruit drying racks etc and as a bedding[66, 99]. The leaves repel insects and can help to prevent rot in the fruits etc[99]. Dried bracken fronds are very useful in the garden as a mulch for somewhat tender plants. This will keep the soil warmer, protect from wind damage and also keep off some of the rain[4, K].

dwatta Anthelmintic Antiemetic Antiseptic Diuretic Poultice Refrigerant TonicThe young shoots are diuretic, refrigerant and vermifuge[4, 46, 94, 218]. They have been eaten as a treatment for cancer[257]. The leaves have been used in a steam bath as a treatment for arthritis[257]. A decoction of the plant as been used in the treatment of tuberculosis[257]. A poultice of the pounded fronds and leaves has been used to treat sores of any type and also to bind broken bones in place[257]. The root is antiemetic, antiseptic, appetizer and tonic[257]. A tincture of the root in wine is used in the treatment of rheumatism[218]. A tea made from the roots is used in the treatment of stomach cramps, chest pains, internal bleeding, diarrhoea, colds and also to expel worms[4, 46, 94, 222, 257]. The poulticed root is applied to sores, burns and caked breasts[222, 257].

nrakta Most areas of the globe, including Britain, but absent from the Arctic and temperate S. America. ksacta Heath, woodland and grassland. A common and highly invasive weed of acid soils[9], it is rarely found on limestone or wet neats[17].

propta Spores can be surface sown in the same way as other ferns but this plant really does not need any help in spreading itself about. Division is also possible but usually totally unnecessary.

nwatta Landscape Uses:Border, Foundation, Rock garden, Woodland garden. Prefers a light, acid, deep sandy soil[1]. Dislikes shade according to some reports[13, 17] whilst another says that it tolerates full sun but prefers light shade[200]. Prefers a pH in the range 4 to 6[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. This is an extremely invasive plant and is a noxious weed. It is one of the most widespread plants in the

world, being found in all parts of the globe other than the extreme north and south[4]. Plants can be cut down twice a year to provide compost material, this will not kill the plants. If the plants are cut down three times a year this will gradually weaken and eventually kill them. Special Features: Attractive foliage, Not North American native, Invasive, All or parts of this plant are poisonous, There are no flowers or blooms.

#### 5.2.512 Lilium medeoloides

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium medeoloides is a BULB growing to 0.8 m (2ft. fin). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[74, 105]. The bulb is about 25mm in diameter[266]. Used in soups or as a porridge[143]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum)

nrakta E. Asia - China, Japan, Korea. ksacta Damp woods and meadows, occasionally to the sub-alpine zone, in N. and C. Japan[58]. Forests, subalpine grasslands, limestone and serpentine areas in Zhejiang province, China[266].

propta Seed - delayed hypogeal germination according to one report[163], whilst two others suggest that it might be immediate hypogeal germination[130, 200]. If it is delayed then it is best sown as soon as it is ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. If it is immediate then a late winter to early spring sowing should germinate in 2 -4 weeks[163] Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Stem rooting, the bulbs should be planted 7 - 12cm deep in practically pure leaf mould with plenty of grit added[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. Closely related to L. distichum and L. tsingtauense[143]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

# 5.2.513 Dryopteris dilatata

Shield Fern

4 tlin 8 cyuc 2 kcak 0 tcan 4 dwat 1.2 m hkuc hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Dryopteris dilatata is a FERN growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen from July to September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers in the dormant season. Root cuttings in a greenhouse in the winter[188]

nwatta Requires a cool moist soil[11, 200]. Prefers a position in light shade[182]. Prefers dense shade and is probably best if grown in moist woodland[1, 11]. Tolerates maritime exposure[200]. (Rather a strange report for a plant that needs to be grown in dense shade[K]). A very hardy plant, tolerating temperatures down to at least -15°c, but the young shoots in spring can be damaged by late frosts[11, 200]. It is therefore best not grown in a frost pocket[182]. This species was until recently considered to have its range in N. America and Japan, but the Japanese form has now been separated off into its own species as O. japonicus[200]. A very ornamental plant, but it is densely armed with spikes[60]. It transplants easily and also tolerates pruning[200]. The leaves and stems are excessively spiny[182].

# 5.2.454 Amelanchier parviflora

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier parviflora is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked. The fruit is rich in iron and copper[226].

tcanta Wood - fine grained, hard, very heavy, reddish. Used for small articles[74].

nrakta W. Asia - Turkey. ksacta Not known

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Lavering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if re-

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Fairly lime tolerant[200]. Plants are hardy to about -20°c[184]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A group of young plants about 5 years old growing at Kew under this name were about 2 metres tall with almost no side-branches in 1995 and flowering at the end of April. They look as though their final height will be substantially more than that given above[K]. This species is closely related to A. ovalis[11]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizina[1].

# 5.2.455 Berberis thunbergii

Japanese Barberry

4 tlin 8 cyuc 2 kcak 2 tcan 2 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Berberis thunbergii is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked[105, 177]. Dry with a very poor flavour[K]. The fruits are about 8mm long[200]. Leaves - cooked.

tcanta Dye Hedge HedgePlants can be grown as a medium-size hedge[29]. They are very tolerant of trimming and have prickles which make them an effective barrier to larger creatures[K]. The cultivar 'Atropurpurea Nana' can be used for ground cover[208]. It makes a dense covering when planted 30cm apart each way[208]. A yellow dye is obtained from the root and branches[178]. An Ornamental plant.

dwatta Anthelmintic Antibacterial Antiseptic Cancer Dysentery FebrifugeThe root bark is anthelmintic, antiseptic and febrifuge[178]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - C. and S. Japan ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Fairly easy[11]. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78], Fairly easy[11]

nwatta Landscape Uses:Border, Erosion control, Foundation, Pest tolerant, Hedge, Massing, Rock garden, Standard, Superior hedge, Specimen, Woodland garden. Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Prefers a lime-free soil according to one report[182]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Plants are hardy to about -25°c[184]. A commonly grown ornamental plant, there are many named varieties[182]. Plants can be pruned back quite severely, they resprout well from the base[200]. Unlike most other members of this genus, this plant does not usually hybridize with other species[67]. An alternate host of 'black-stem rust' of wheat so it has been extensively grubbed up from its habitats. This species is notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Invasive, Inconspicuous flowers or blooms.

#### 5.2.456 Rosa gallica

French Rose

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Rosa gallica is a deciduous Shrub growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness, It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to October. The species is

hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: FlowersEdible Uses: Condiment-Petals - raw or cooked. They can be added as a decorative garnish to salads[238], and can also be crystallised or preserved in syrup. They are also dried and used as a flavouring in tea, beverages, cakes etc[177, 183]. The dried petals and flower buds are an important ingredient in the Northern African spice mixture 'ras-el-hanout'[238]. Rose water, made by cold-infusing the petals, is used as a flavouring in various confections, especially 'Turkish Delight'[238]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Essential Pot-pourriAn essential oil obtained from the flowers is used in perfumery[100], as an additive to bath water and in skin care preparations[238]. Rose water, made by a cold infusion of the petals, is also added to bath water and skin care preparations[238]. The dried petals and buds are used in pot-pourri[238].

dwatta Antibacterial Aromatherapy Astringent Cancer TonicThe petals are antibacterial, astringent and tonic[4, 61]. They are taken internally in the treatment of colds, bronchial infections, gastritis, diarrhoea, depression and letharyy[238]. Externally, they are used to treat eye infections, sore throats, minor injuries and skin problems[238]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The essential oil from the flowers is used in aromatherapy to counter depression, anxiety and negative feelings[238].

nrakta S. and C. Europe. ksacta Hedges and woods, usually on calcareous soils[100].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel. July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. A very ornamental plant[1], the flowers have a spicy fragrance[245]. It is cultivated for its essential oil in Eastern Europe[100]. There are some named varieties[200]. 'Officialis' is the Apothecary's rose, it has been cultivated for its medicinal virtues[200]. Plants produce suckers[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.457 Helianthus strumosus

Paleleaf Woodland Sunflower

4 tlin 8 cvuc 2 kcak 0 tcan 1 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Helianthus strumosus is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root[177]. No more details but it is probably used raw or cooked like the Jerusalem artichoke.

dwatta Anthelmintic PectoralA decoction of the roots has been used to get rid of worms in both adults and children [257]. An infusion of the roots has been used in the treatment of lung problems [257].

nrakta N. America - Quebec to N. Dakota, south to Arkansas and Oklahoma, ksacta Dry woods and banks[235].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. Prefers a moist soil[200]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants have a running root system and can be invasive[1].

#### 5.2.458 Helianthus laetiflorus

Showy Sunflower, Cheerful sunflower 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Helianthus laetiflorus is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is polinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Tubers - raw or cooked[55, 105, K]. Used like Jerusalem artichokes, to which they are not much inferior in taste though yields are lower[95, 183].

nrakta Central N. America - Pennsylvania to Minnesota. ksacta Open woods and thickets, often on drier soils[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in spring. Harvest the shoots when

another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species is closely related to C. sanguinea[200].

## 5.2.510 Orchis militaris

Military Orchis

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli lwisslip hpa7tmwatli xre7t hjonli

drutta Orchis militaris is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot -cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starchlike substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Siberia and W. Asia. ksacta Grassy hills, banks, borders of fields and woodland edges on chalky soils[17]. Extremely rare in Britain, growing in only one or two sites[135].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a

symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally [230].

nwatta Easily grown on a good loamy soil[42]. Requires a deep rich soil[1]. Prefers a chalky soil[42]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Cultivated plants often survive for many years, though they rarely multiply[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1]. Plants seem to be immune to the predations of rabbits[233].

# 5.2.511 Pteridium aquilinum

Bracken, Western brackenfern, Decomposition brackenfern, Hairy brackenfern

4 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 1.2 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Pteridium aquilinum is a FERN growing to 1.2 m (4ft) by 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The seeds ripen from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista There are a number of reports regarding the possible health risks of this plant. The huge quantity of spores released by large areas of bracken are suggested to be implicated in stomach cancers. A recent study suggests that this is not such a problem in Britain as was once believed, the spores are not produced in such high quantities nor do they travel so far due to our normally humid atmosphere. The leaves and roots contain substances that deprive the body of vitamin B1 if they are eaten raw, though they are possibly alright cooked[102]. The leaves are also said to be carcinogenic[65, 76].

kcakta Edible Parts: Leaves RootEdible Uses: SweetenerRoot - cooked. It can be dried and ground into a powder[2, 13, 46, 55, 66, 94, 95, 102, 257]. The root is very fibrous so traditionally it was baked after being dried, the outer skin was peeled off and the roots pounded into a powder with sticks so that the inner fibres could be removed[173, 256]. The dried root will store for years[173]. The root contains

layering it just below the soil surface, or by removing all the 5.2.508 Cirsium palustre flowers before they open.

nwatta Succeeds in ordinary garden soil[143]. Prefers an open free-draining humus-rich loamy soil in a sunny position, it rapidly degenerates if grown in shade[143, 200]. Prefers an acid soil but tolerates lime[47, 200]. The dormant bulb is very hardy and has withstood soil temperatures down to -20°c, though the embryonic flower shoot will be damaged at temperatures around -15°c[214]. Stem rooting with a stoloniferous stem base, plant the bulbs 10 - 12cm deep[42, 143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. A very ornamental plant[1]. L. spectabilis, which is said to be a synonym of this species by many botanists, differs from this plant and therefore exists in its own right[74]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### 5.2.507 Lilium hansonii

4 tlin 8 cvuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium hansonii is a BULB growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Bulb cooked[105, 177]. The bulb can be up to 7cm in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum). Young plant - cooked[105, 177].

nrakta E. Asia - N. Japan, Korea. ksacta Thickets and open forests in very humus-rich soils[143].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Best grown in partial shade, the flowers are bleached in strong sunlight[143]. Lime tolerant[200]. Plants are hardy, easy to grow and long-lived, succeeding in most soils and positions[143]. Stem rooting, the bulbs should be planted 20 - 25cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[143]. A very ornamental plant[1]. The flowers have a slight but sweet perfume, this decreasing with the increase of pigment in the blooms[245]. Plants seldom produce fertile seed, even when they are hand pollinated [143]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

Marsh Thistle

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cirsium palustre is a BIENNIAL growing to 1.5 m (5ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves Oil StemEdible Uses: Oil-Leaves and young shoots - raw or cooked[52, 100, 183]. Stems - raw or cooked like asparagus or rhubarb[4, 5, 12, 52, 105, 115]. The flower stalks are peeled and eaten raw or

tcanta Oil TinderThe seed fluff is used as a tinder[106]. The seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

nrakta Europe, including Britain, from Scandanavia south and west to N. Africa and W. Asia ksacta Damp soils in meadows and woodland[5, 17].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°c[164].

nwatta An easily grown plant, it succeeds in a sunny position in any ordinary garden soil so long as it is moist[200]. Tolerant of light shade, succeeding in woodlands[17], A good bee and butterfly plant[17].

## 5.2.509 Crataegus maximowiczii

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli hqattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crataegus maximowiczii is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. It is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia - Siberia to N. Japan, ksacta Riverain deciduous forest strips, crests, meadows of flooded valleys, forest edges and dry mountain slopes[74].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take

they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A naturally occurring hybrid, H. pauciflorus (or H. rigidus in another report) x H. tuberosus[200]. Plants have a running root system and can be very invasive[1]. This species is often grown as an ornamental plant, there are several named varieties[1]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

#### 5.2.459 Sarcobatus vermiculatus

4 tlin 8 cvuc 2 kcak 0 tcan 1 dwat 2.7 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli nyanhien hionli

drutta Sarcobatus vermiculatus is a deciduous Shrub growing to 2.7 m (8ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Leaves SeedEdible Uses: Young shoots - cooked[105, 161]. Used as greens[257]. The young twigs are cut into short pieces and boiled until tender[183]. The seeds are occasionally consumed[61, 105, 161, 183]. They are used as a food at times when other foods are in short supply[257]. The seeds are about 2mm in diameter[270].

tcanta Fuel WoodThe wood is used for fuel, for want of better materials in the areas where it grows wild[235]. The wood is strong[257]. It has been used in general construction[257].

dwatta Astringent Odontalgic StingsThe crushed leaves have been used to treat insect bites[257]. An infusion of the burnt plant has been used in the treatment of diarrhoea and bleeding from the rectum[257]. The wood or the roots can be heated until they are burnt or blackened and then used on aching and decayed teeth[257].

nrakta South-western N. America - Nebraska and Wyoming to Nevada and New Mexico, ksacta Alkaline or saline soils in semiarid or arid plains, alkali flats, slopes, desert-shrub communities, sagebrush, saltflats, roadsides, fencerows, dry washes at elevations of 600 - 2400 me-

propta Seed - we have no information for this species but suggest sowing the seed in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Cuttings of half-ripe wood are worth trying in July/August.

nwatta An easily grown plant[200], succeeding in a sunny position in most well-drained soils[11, 200]. Tolerates alkaline and saline soils[11]. Plants can be dioecious or monoecious. Male and female plants must be grown if seed is required.

## 5.2.460 Berberis gagnepainii

4 tlin 8 cvuc 2 kcak 0 tcan 2 dwat 2.4 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis gagnepainii is an evergreen Shrub growing to 2.4 m (7ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruits are about 10mm long[200].

tcanta Dye Hedge HedgeThe plant makes an impenetrable hedge that can be trimmed or left to its own devices[29, 182, 200]. A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China in Sichuan. ksacta Thickets and woodlands, 2000 - 4000 metres[109].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. A number of cultivars have been selected for their ornamental value[200]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

#### 5.2.461 Prunus pedunculata

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prunus pedunculata is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[177]. The fruit is about 10mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - northern China, Mongolia and Siberia. ksacta Stony mountain slopes and watersheds with steppe vegetation[74]. Sunny pebbly slopes and steppes in Nei Mongol, Ningxia and Shaanxi Provinces of China[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Industrial Crop: Oil Management: Standard Wild CropThrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.462 Rosa rubiginosa

Sweet Briar, Sweetbriar rose 4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Rosa rubiginosa is a deciduous Shrub growing to 2.5 m (8th) by 2.5 m (8th). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is polinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It brefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: TeaFruit - cooked[2, 62]. It is used in making jelies etc[105, 183]. The taste is best after a frost[172]. The fruit is up to 25mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. A pleasant tasting fruity-flavoured tea is made from the fruit, it is rich in vitamin C[21]. Petals - raw or cooked. Remove the bitter white base[172]. Used in confectionery[177, 183]. Young shoots - raw[172]. Used as they come through the ground in spring. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Hedge HedgeThe plant makes a good low hedge[1, 11]. The prickles on the stem make it a useful security hedge[245].

dwatta Aperient Astringent Cancer Skin Stomachic Vitamin CThe flowers and hips are aperient, astringent and stomachic[21, 46]. An infusion of dried rose petals can be used to treat headaches and dizziness, with honey added the infusion is used as a heart and nerve tonic and a blood purifier[21]. A decoction of the petals is used to treat mouth sores[21]. The seed is rich in vitamin E and an oil extracted from the seed is used externally in the treatment of burns, scars and wrinkles[238]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A. C and E. flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Caucasus and Himalayas. ksacta Open copses and old hedgerows[4]. Usually found on calcareous soils, it is one of the first shrubs to colonize chalk grassland[11, 17].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate [80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel. July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Lavering, Takes 12

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[14, 200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Grows well on chalk. A very ornamental plant[1]. The leaves are apple-scented[188]. The flowers are slightly scented[245]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.463 Ribes inebrians

Whisky Currant

4tlin  $\ref{8}$ cyuc 2 kcak 0 t<br/>can 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat<br/>priklwis hpa7tmwatli xre7t hjonli

drutta Ribes inebrians is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked[105, 161, 257]. The fruit can also be dried for later use or made into preserves[105, 257]. One report cluster[245]. These flowers possess a delicious sweet fruity perfume[245]. Plants often self-layer[11]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

## 5.2.505 Yucca glauca

Soapweed, Soapweed yucca, Gurney's yucca, American Vetch, Yucca, Narrowleaf Yucca, Soapweed 4 tlin 10 cyuc 2 koak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Yucca glauca is an evergreen Shrub growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit Leaves Seedpod StemEdible Uses: Fruit - raw or cooked[2, 46, 61, 161, 257]. Dry, with a bitter skin[85]. The fruit can be baked and either eaten immediately or formed into cakes and dried for later use[257]. The raw fruit can be dried for winter use[1, 257]. The immature fruits are peeled, boiled and served with seasonings[183]. The soaked, cooked fruit can be made into a syrup and used like hot chocolate[257]. The fruit is up to 8cm long and 12mm wide[2]. Flowers and flower buds - raw or cooked[61, 85]. Delicious raw, they can also be dried, crushed and used as a flavouring[164]. A delicious addition to the salad bowl, or used as a potherb[183]. Flowering stem - raw or cooked[62, 85, 161, 257]. It can be cooked and used like asparagus[164]. The white inner portion of the stem is eaten[183]. Seedpods - cooked. They can be boiled or roasted and used as a vegetable[257]. The plant crowns have been roasted and eaten in times of food shortage[257].

tcanta Basketry Broom Brush Fibre Hair Needles Soap String WeavingBoth the leaves, and a fibre obtained from the leaves, can be used for making cloth, ropes and mats[21, 57, 61, 82, 85, 169, 257]. The leaves can be split and used to make baskets[257]. The leaves can be split and used and brooms[46, 85, 92]. The leaves can be split and used as a temporary tying material[257]. The sharp points of the leaves have been used as needles[257]. The roots are rich in saponins and can be used as a soap substitute[82, 85, 95]. The soap obtained from the root makes a good hair shampoo[95], it is said to be effective against dandruff and also to act as a tonic to stop the hair falling out[213, 257]. The shampoo also rids the body of lice and other parasites[257].

dwatta Antidandruff Contraceptive Oxytoxic Poultice SkinA soap made from the crushed roots is said to be an effective treatment for dandruff and skin irritations[213, 222]. A cold infusion of the root has been used to expedite the delivery of a child or the placenta[257]. The root is poulticed and applied to inflammations, wounds, bleeding cuts, sprains etc[222, 257]. The rotten root can be crushed and boiled to make suds. Drinking these suds is said to induce the menopause in women, thereby rendering then infertile[257].

nrakta Central N. America - Iowa to Texas and N. Dakota. ksacta Dry plains and sandy hills[43].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept at a temperature of  $20\,^\circ\text{c}.$  Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their

first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established[78]. Division of suckers in late spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Landscape Uses: Border, Erosion control, Massing, Rock garden, Seashore, Specimen. Thrives in most soils but prefers a sandy loam and full exposure to the south[11]. Dislikes chalky or peaty soils[111]. Can succeed in light shade[K]. Plants are hardier when grown on poor sandy soils[200]. Prefers a hot dry position and a poor soil[166]. Established plants are very drought tolerant[200]. Hardy to at least -30°c according to one report[164], whilst another one says that it is hardy to about -15°c[200]. A very ornamental plant[1], it rarely flowers unless in a dry sandy soil[42]. The scent of the flowers is most pronounced at night[245]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush[1]. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in later years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, North Ameri-

# 5.2.506 Lilium dauricum

4 tlin 8 cvuc 2 kcak 0 tcan 0 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium dauricum is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers RootEdible Uses: Bulb-cooked[46, 61, 74, 105]. The bulb is about 2m in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum). Flowers[74]. No further details are given.

nrakta N.E. Asia - China, Japan, Korea, Mongolia and Siberia. ksacta Damp meadows and forest edges in mixed herbaceous vegetation in sandy soils[47]. Open forests, bushy slopes, hillsides and moist meadows, 400 - 1500 metres[266].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out [200]. The formation of bulbils on the stem can be induced by either removing the stem at flowering time and

tcanta Adhesive Basketry Biomass Compost Dve Hair Lining Packing Repellent Soap Soap making Stuffing TinderA glue can be made from the rootstock[74]. A brown dye is obtained from the fronds[6, 67, 141]. It is green according to another report[141]. The fibrous remnants from edible roots make a good tinder[99]. The rhizome lathers readily in water and can be used as a soap[74]. A decoction of the root has been used as a hair wash[257]. The roots have been rubbed into the scalp in order to promote hair growth[257]. The roots have been pounded to remove the bark, then split into flat bands and used as the black strands of cheap baskets[257]. The ashes of the plant are rich in potassium and could be used as a fertilizer[4]. They are also used in the manufacture of glass (when mixed with sand) and in making soap (when mixed with vegetable oil)[4, 74]. The roots contain up to 20% potash in early summer, but this reduces to about 5% in the autumn[4]. The whole plant is a very valuable addition to the compost heap, it is rich in potash and makes an excellent compost for tree seeds[67, 94]. Cut twice a year if you want the plants to continue growing, three cuts annually will weaken and eventually kill off the plants. The dried ferns produce a very durable thatch[4]. The leaves are used as a packing material for fruit, keeping it fresh and cool without imparting any colour or flavour[4, 66, 99]. They are also used as a lining for baskets, fruit drying racks etc and as a bedding[66, 99]. The leaves repel insects and can help to prevent rot in the fruits etc[99]. Dried bracken fronds are very useful in the garden as a mulch for somewhat tender plants. This will keep the soil warmer, protect from wind damage and also keep off some of the rain[4, K].

dwatta Anthelmintic Antiemetic Antirheumatic Diuretic Febrifuge PoulticeThe young shoots are diuretic, refrigerant and vermifuge[4, 46, 94, 218]. They have been eaten as a treatment for cancer[257]. The leaves have been used in a steam bath as a treatment for arthritis[257]. A decoction of the plant as been used in the treatment of tuberculosis[257]. A poultice of the pounded fronds and leaves has been used to treat sores of any type and also to bind broken bones in place[257]. The root is antiemetic, antiseptic, appetizer and tonic[257]. A tincture of the root in wine is used in the treatment of rheumatism[218]. A tea made from the roots is used in the treatment of stomach cramps, chest pains, internal bleeding, diarrhoea, colds and also to expel worms[4, 46, 94, 222, 257]. The poulticed root is applied to sores, burns and caked breasts[222, 257].

nrakta Australia - New South Wales, Queensland and Victoria. New Zealand. ksacta Forests, heaths and paddocks[193].

propta Spores can be surface sown in the same way as other ferns but this plant really does not need any help in spreading itself about. Division is also possible but totally unnecessary in most circumstances.

nwatta Prefers a light, acid, deep sandy soil[1]. Dislikes shade according to some reports[13, 17] whilst another says that it tolerates full sun but prefers light shade[200]. Prefers a pH in the range 4 to 6[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. This is an extremely invasive plant and is a noxious weed. Plants can be cut down twice a year to provide compost material, this will not kill the plants. If the plants are cut down three times a year this will gradually weaken and eventually kill them.

#### 5.2.504 Rosa multiflora

Japanese Rose, Multiflora rose 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rosa multiflora is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation

to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit Seed StemEdible Uses: Fruit - raw or made into preserves, pies etc[105, 177, 183]. The fruit is about 7mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. The fruit is rich in carotene (81.4mg per 100g) and vitamin C[218]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Young leaves and shoots - raw or cooked[105, 177, 183]. Used as they emerge from the ground in spring. The young leaves contain more than 200mg per 100g of vitamin C[218]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The seed contains about 8% oil[218].

tcanta Essential Hedge Hedge Rootstock Soil stabilization TanninThe plant is fairly wind tolerant and can be grown as a shelter hedge though it can be damaged by salt laden winds[75]. The plant has a dense sturdy habit and makes an excellent hedge[245]. The root contains 23-25 per cent of tannin[266]. An essential oil obtained from the fresh flowers is used in the cosmetic industry[266]. The plant also has an extensive root system and is used for soil stabilization[11, 200]. This species can also be used as a rootstock for other species of rose, especially for ramblers and when grown on poor soils[11, 200].

dwatta Anodyne Antidote Astringent Cancer Carminative Diuretic Hypoglycaemic Laxative Poultice Vitamin CThe leaves are poulticed and applied to sores[218]. The fruit is anodyne, diuretic, hypoglycaemic and laxative[218]. It is also antidotal to fish poisoning[218]. It is used to treat constipation and articular pain[279] and as an application to foul ulcers, wounds, sprains and injuries[240]. The seed is laxative and diuretic[218]. The root is rich in tannins. It is astringent and carminative[218]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bioactive compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - China, Japan, Korea. ksacta On slopes, in scrub, or by rivers at elevations around 1300 metres in China[266].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as vet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel. July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Lavering, Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Succeeds on poor soils[200]. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. A very ornamental plant[1], more than 100 blooms can be produced in a single says that although the fruit was eaten by the Hopi Indians, it could make you ill[216]. Another report says that the fruit was highly relished[257]. The fruit is about 5mm in diameter[200]. Leaves - cooked[105, 161].

dwatta PoulticeA poultice of the plant has been applied to sores[257]

nrakta Western N. America - California to Idaho, Nebraska and New Mexico. ksacta Dry slopes to 3700 metres in California[71].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 2001.

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°c[200]. This species is closely related to R. cereum[11, 200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.464 Polygonatum commutatum

King Solomon's Seal, Smooth Solomon's seal 4 tlin 8 cyuc 2 koak 0 tcan 1 dwat 2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Polygonatum commutatum is a PERENNIAL growing to 2 m (6ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The fruit and seed are thought to be poisonous[65].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked. They can be used as an asparagus substitute. Root - cooked[22, 161]. A parsnip-like flavour[212]. Rich in starch, it can be dried and ground into a powder then used as a thickener in soups etc or can be added to flour when making cakes, bread or whatever[46, 61]. The root should be boiled and sun-dried nine times, it is then delicious[179] (if there is anything left.![K])

tcanta IncenseThe root has been burnt in the house for its pleasant fragrance[257].

dwatta AnalgesicA decoction of the root has been used as a herbal steam inhalant as a treatment for headaches[257].

nrakta Eastern N. America - Rhode Island to Ontario and Manitoba, south to Georgia, New Mexico and Arizona. ksacta Moist woodland and copses, often by streams[43, 235]. Plants are rarely found in dry soils[235].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Grows well in woodlands and copses[1, 42]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots are very attractive to slugs[K]. Hybridizes with other members of this genus[200]. According to one report this species is no more than a synonym for P biflorum[200].

# 5.2.465 Aciphylla squarrosa

Speargrass

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 2.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Aciphylla squarrosa is an evergreen Perennial growing to 2.5 m (8th) by 1.5 m (5th). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Gum GumRoot - cooked. Aromatic[173]. A very good taste[177, 183]. The resin is used as a chewing gum[173]. Shoots and young stems[173]. No further details.

tcanta Gum Gum<br/>The plant yields a semi-transparent resinous gum that is edible and also used in per<br/>fumery[128].

nrakta New Zealand. ksacta Found from sea-level to montane areas in North and South Islands to latitude 41° 30′ south[441]

propta Seed - best sown in a greenhouse as soon as it is ripe[200]. Stored seed should be sown in a greenhouse in late winter or early spring. Germination can be very slow. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter before planting them out in late spring or early summer, after the last expected frosts.

nwatta Requires a perfectly drained gritty soil in full sun[200]. Easily grown in a moist but well-drained soil in full sun[187]. Hardy to about -10°c according to one report[200] whilst another says it is hardy to about -15°c[187]. Dioecious but female plants have occasional male flowers[200]. Male and female plants must normally be grown if seed is required. The flowers are sweetly scented[187].

#### 5.2.466 Prinsepia uniflora

Rui Ren

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prinsepia uniflora is a deciduous Shrub growing to 1.8 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 105, 177]. Juicy[183]. The cherry-like fruit is about 15mm in diameter and contains one large seed[200].

nrakta E. Asia - N.W. China. ksacta Loess plateaux, areas intermediate between woodland and steppe. Sunny slopes, ravines in valleys, base of hills at elevations of 800 - 2200 metres [266].

propta Seed - best if given 2 months cold stratification[113]. Sow the seed in autumn if possible, otherwise in late winter or early spring in a cold frame in light shade. Germination may be inhibited by light[113]. Prick out the

seedlings when they are large enough to handle into individual pots. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113].

nwatta Succeeds in any moderately fertile well-drained soil in full sun or light shade[200]. The plants produce flowers and fruits better when they are growing in full sun[200]. Hardy to about -20°c[184]. This species is closely allied to P. sinensis[11, 109]. Flowers are produced very early in the spring and they are then easily damaged by frosts[11]. The flowers are produced on the previous seasons wood[200]. They are produced on old wood according to another report[182]. Plants only fruit in Britain after long hot summers[200].

#### 5.2.467 Polygonatum multiflorum

Solomon's Seal, Eurasian Solomon's seal 4 tlin 8 cyuc 2 koak 0 tcan 3 dwat m hkuc pcimhmim cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum multiflorum is a PERENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

pcista Large quantities of the fruits are poisonous[10, 19, 65]. It has laxative properties and can increase the laxative effects of aloe, rhamnus, senna and yellow dock. May lead to gastrointestinal irritation with prolonged use. Overdose leads to nausea, diarrhoea, qastric complaints [301].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked. Boiled and used as an asparagus substitute, they make an excellent vegetable[2, 4, 115] and are widely used in Turkey[244]. Root - cooked[177, 179]. Rich in starch[115]. The root should be macerated for some time in water in order to remove bitter substances[4]. Normally only used in times of famine, the root was powdered and then made into a bread by the North American Indians[244].

tcanta CosmeticPlants can be grown for ground cover when spaced about 30cm apart each way[208]. A distilled water made from the whole plant is used as a cosmetic to improve the complexion[244].

dwatta Astringent Demulcent Dysentery Emetic Poultice TonicSolomon's seal has been used for thousands of years in herbal medicine. It is used mainly in the form of a poultice and is believed to prevent excessive bruising and to stimulate tissue repair[254]. The root is astringent, demulcent, emetic and tonic[4, 21, 61, 240]. An infusion is healing and restorative, it is good in the treatment of stomach inflammations, chronic dysentery etc[4]. It is used with other herbs in the treatment of pulmonary problems, including tuberculosis, and women's complaints[4, 254]. The powdered roots make an excellent poultice for bruises, piles, inflammation etc[4]. The root is harvested in the autumn and dried for later use[4]. The plant should not be used internally except under professional supervision[254]. A distilled water made from the whole plant has been used as a skin tonic and is an ingredient of expensive cosmetics[244]. The dried powdered roots and flowers have been used as a snuff to promote sneezing and thus clear the bronchial passages[244].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, and temperate Asia to Japan. ks-acta Woodland. usually on limestone[187].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last

expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Succeeds in dry shade if the soil is rich in humus[190]. Grows well in heavy clay soils. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Another report sugests that they tolerate drought so long as the soil is rich in humus[190]. A very ornamental plant[1], growing well on the woodland edge[24]. There are some named forms[188]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

#### 5.2.468 Ptelea trifoliata mollis

Hop Tree

4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ptelea trifoliata mollis is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This species can cause photosensitization of the skin[274].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[2]. Eaten by young children[161, 257]. The fruit is also used as a hop substitute when making beer and it is added to yeast to make it rise more quickly when making bread[159, 183]. The fruit is produced abundantly in Britain[61], though very little of it is fertile[11]. The fruit is about 25mm long[200].

tcanta WoodWood - hard, heavy, close grained[82, 149]. It weighs 43lb per cubic foot[235].

dwatta Anthelmintic Antibacterial Antiperiodic Malaria Stomachic TonicThe root-bark is anthelmintic, antibacterial, antiperiodic, stomachic and tonic[4, 21, 46, 82, 238]. It has been mixed with other medicines in order to give added potency[213, 222]. It has a soothing influence on the mucous membranes and promotes the appetite, being tolerated when other tonics cannot be retained[4]. It is also taken in the treatment of intermittent fevers such as malaria, heartburn, roundworms, pinworms and poor digestion[238]. Externally it is applied to wounds[238]. The roots are harvested in the autumn, the bark peeled off and dried for later use[238]. The roots are a tonic, used in the treatment of asthmatic breathing, fevers, poor appetite etc[222]. The leaves are said to be useful in the treatment of wounds and also in the destruction of intestinal worms[213, 222].

nrakta Eastern N. America - North Carolina and Georgia to Indiana. ksacta Moist places, rocky slopes, edges of woods[21], alluvial thickets and gravels[43].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires 3 months cold stratification at 5°c and should be sown as early as possible in the year[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Very little of the seed produced in Britain is viable[11]. Cuttings of half-ripe wood, July/August in a frame[113]. Layering.

nwatta Succeeds in any fertile well-drained moisture retentive soil in full sun or light part day shade[11, 200]. The young growth in spring can be damaged by late frosts. A very ornamental plant[50]. This sub-species is the form that is eaten by children[161]. Plants in this genus are notably resistant to honey fungus[200].

winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.501 Peraphyllum ramosissimum

Squaw Apple, Wild crab apple 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.8 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Peraphyllum ramosissimum is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[11]. Sour when unripe, the fruits are slightly bitter as they ripen and when fully ripe are sweetish but with a bitter after-taste[85, 183]. Those fruits that have fully ripened and dried on the plant are the sweetest and most desirable[85, 183]. Ripe fruits can also be used in making jellies or prepared like spiced crab apples[85, 183]. Fruits are rarely borne in Britain[11, 200].

nrakta Western N. America. ksacta Dry hillsides[11].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise as soon as stored seed is received. Stored seed is likely to require a period of cold stratification. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter, planting out in late spring. Layering in spring. Takes 12 months[78].

nwatta Requires a good well-drained neutral or limefree loam and the maximum possible sunshine in a sheltered position[11, 200]. Does well in hot dry summers[200]. Closely related to the Amelanchier species[11].

#### 5.2.502 Ulmus macrocarpa

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulmus macrocarpa is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Leaves raw or cooked. The fruits are eaten in sauces. An emergency food, they are only used when all else fails[177].

tcanta Parasiticide Parasiticide WoodUsed externally on body parasites[178]. No more details.

dwatta Anthelmintic Antidote Astringent Digestive Parasiticide Parasiticide SkinThe seed is anthelmintic, antidote, digestive, febrifuge, parasiticide, skin[178, 218]. The bark contains tannins. It is astringent and has antimicrobial activities[279]. It is used in the treatment of chronic diarrhoea and internal parasites[279]. nrakta E. Asia - China, Japan. ksacta Sunny dry rocky mountain slopes in W. China[109]. Mixed forests, slopes, valleys at elevations of 700 - 800 metres[266].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. This species is resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200].

# 5.2.503 Pteridium aquilinum esculentum

D--- -1---

4tlin 8 cyuc 2 kcak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Pteridium aquilinum esculentum is a FERN growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4. The seeds ripen from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista There are a number of reports regarding the possible health risks of this plant. The huge quantity of spores released by large areas of bracken are suggested to be implicated in stomach cancers. A recent study suggests that this is not such a problem in Britain as was once believed, the spores are not produced in such high quantities nor do they travel so far due to our normally humid atmosphere. The leaves and roots contain substances that deprive the body of vitamin B1 if they are eaten raw, though they are possibly alright cooked[102]. The leaves are also said to be carcinogenic[65, 76].

kcakta Edible Parts: Leaves RootEdible Uses: SweetenerRoot - rich in a white starch that can be eaten raw or cooked[193]. It can also be dried and ground into a powder[2, 13, 46, 55, 66, 94, 95, 102]. The root is very fibrous[173]. When dried, it will store for years[173]. The root contains 60% starch[74]. The dry weight content of starch is between 43 and 72%[173]. This starch can be extracted from the roots and is used in making dumplings which are eaten with soya flour and sugar as a delicacy[183]. Young shoots - raw or cooked[2, 13, 55, 62, 94, 102, 183]. They can be used like asparagus or like spinach[9]. Somewhat flavourless, though they are considered to be a delicacy in Japan[4]. The fronds should be used when less than 20cm long, longer ones have a terrible taste[9, 213]. The shoots are somewhat bitter so they are often blanched for a few minutes in boiling water, then left to soak in cold water for two hours before being cooked[4, 9]. Although this might well improve the flavour, it will greatly reduce the nutritional value[K]. The shoots should be steeped in lye first[55]. Occasional use should cause no problems, but regular consumption is not advisable because the shoots might be carcinogenic[9, 65]. The plant yields an edible saccharine substance[55]. (from the cooking root??).

sedatives (e.g. alcohol) or before driving (or alertness required) [301].

kcakta Edible Parts: SeedEdible Uses: Condiment TeaSeed[172]. No further details are given but the seeds of other members of this genus are parched and then eaten. An essential oil from the leaves and root is used as a flavouring in ice cream, baked goods, condiments etc[183]. It is especially important in apple flavours[238]. The leaves can also be used as a condiment[61]. The plant is used in moderation as a herbal tea[183].

tcanta Compost Essential Liquid feed RepellentThe plant yields about 1% of an essential oil from the roots[7, 238]. It is used in perfumery to provide a 'mossy' aroma[57, 61, 238], though the scent is considered to be disagreeable by many people[207]. The dried roots are also placed in linen cupboards and clothes drawers in order to scent the clothes[4]. The dried root attracts rats and cats, it can be used as a bait to lure them away from other areas[100]. An ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The plant can also be used to make a very good liquid plant feed[14, 18, 201]. It attracts earthworms[14, 18]. The leaves are very rich in phosphorus[201]. Dynamic accumulator.

dwatta Anticonvulsant Antispasmodic Carminative Diuretic Eczema Hypnotic Nervine Sedative StimulantValerian is a well-known and frequently used medicinal herb that has a long and proven history of efficacy. It is noted especially for its effect as a tranquilliser and nervine, particularly for those people suffering from nervous overstrain[4, 222]. Valerian has been shown to encourage sleep, improve sleep quality and reduce blood pressure[254]. It is also used internally in the treatment of painful menstruation, cramps, hypertension, irritable bowel syndrome etc[238, 254]. It should not be prescribed for patients with liver problems[238]. Externally, it is used to treat eczema, ulcers and minor injuries[238]. The root is antispasmodic, carminative, diuretic, hypnotic, powerfully nervine, sedative and stimulant[4, 7, 9, 14, 21, 46, 147, 165, 192, 218]. The active ingredients are called valepotriates, research has confirmed that these have a calming effect on agitated people, but are also a stimulant in cases of fatigue[222]. The roots of 2 year old plants are harvested in the autumn once the leaves have died down and are used fresh or dried[4, 9, 238]. The fresh root is about 3 times as effective as roots dried at 40° (the report does not specify if this is centigrade or fahrenheit), whilst temperatures above 82° destroy the active principle in the root[240]. Use with caution[21, 238], see the notes above on toxicity.

nrakta Europe, including Britain but excluding the extreme north and south, temperate Asia to Japan. ksacta Grassland, scrub, woods etc, on dry or damp soils[9, 17]. Avoids acid soils.

propta Seed - sow spring in a cold frame and only just cover the seed because it requires light for germination[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant out into their permanent positions in the summer if sufficient growth has been made. If the plants are too small to plant out, grow them on in the greenhouse or frame for their first winter and plant them out early in the following summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta A very easily grown plant, it succeeds in ordinary garden soil[1], preferring a rich heavy loam in a moist site[4, 7, 17]. Thrives in full sun or in partial shade[233], doing well in light woodland. A polymorphic species, the more extreme variations are given specific status by some botanists[17]. Valerian is often grown in the herb garden and also sometimes grown commercially as a medicinal herb[1. 200]. When grown for its medicinal root, the plant should not be allowed to flower[4]. The flowers and the dried roots have a strong smell somewhat resembling stale perspiration[245]. Cats are very fond of this plant, particularly the powdered root[1, 4, 20]. Once a cat has discovered a plant they will often destroy it by constantly rolling over it[4]. The dried root also attracts rats and can be used as a bait in traps[4, 14]. A good companion for most plants. In garden design, as well as the above-ground architecture of a plant, root structure

considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 5.2.499 Pycnanthemum pilosum

Mountain Mint, Whorled mountainmint 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pycnanthemum pilosum is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardness. It is hardy to UK zone 5. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaFlower buds and leaves - raw or cooked[K]. A nice addition to salads or used as a condiment. The fresh or dried leaves are brewed into a delicious mint-like tea[183].

nrakta Eastern N. America - Ontario and Michigan south to Tennessee, Arkansas and Oklahoma. ksacta Dry to moist woods, thickets and clearings[43].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If there are sufficient seeds they can be sown in an outdoor seedbed in April. Division in spring.

nwatta Succeeds in most soils[1] but prefers a rich loamy soil in full sun or partial shade with plenty of moisture in the growing season[200]. A good butterfly plant[K].

## 5.2.500 Pycnanthemum virginianum

Virginia Mountain Mint

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pycnanthemum virginianum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaFlower buds and leaves - raw or cooked. A mint-like flavour, they make a nice addition to salads or can be used as a condiment[61, 161, 183, 238]. The fresh or dried leaves are brewed into a refreshing mint-like tea[183].

dwatta Alterative Analgesic Carminative Diaphoretic FebrifugeA tea made from the leaves is alterative, diaphoretic and carminative[222, 257]. A poultice of the leaves is used in the treatment of headaches[222]. The tea is also used in the treatment of menstrual disorders, indigestion, colic, coughs, colds, chills and fevers[222, 238, 257]. The flowering stems are cut as flowering begins and they can be used fresh or dried[238]. There is a suggestion that this plant can cause abortions, so it is best not used by pregnant women[257].

nrakta Eastern N. America - Virginia to New England, north to North Dakota. ksacta Gravelly shores, meadows, dry to wet thickets  ${\sf etc}[43]$ .

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If there are sufficient seeds they can be sown in an outdoor seedbed in April. Division in spring.

nwatta Succeeds in most soils[1] but prefers a rich loamy soil in full sun or partial shade with plenty of moisture in the growing season[200]. Plants are hardy to at least 15°c[238]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold

#### 5.2.469 Lilium martagon

Turk's Cap Lily, Martagon lily 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hjonli

drutta Lilium martagon is a BULB growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[2, 14, 61]. It is often dried for later use[46]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

dwatta Cardiac Diuretic Emmenagogue Emollient ExpectorantThe bulb is diuretic, emmenagogue, emollient and expectorant[240]. They are used to relieve heart diseases, pain in the cardiac region and angina pectoris[240].

nrakta Europe to W. Asia. Naturalized in Britain. ksacta Deciduous woods, scrub and mountain pasture, especially on limestone[13].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as it is ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Landscape Uses:Border, Container, Massing, Seashore, Specimen, Woodland garden. Succeeds in ordinary well-drained garden soil[1, 42]. Prefers a good leafy soil in sun or semi-shade[90]. Prefers its roots to be in the shade[28]. Prefers a calcareous soil according to some reports[1, 4, 13, 90], whilst one says that it is probably best in an acid or neutral soil[47]. A very ornamental[1] and polymorphic plant[143]. It takes 7 - 8 years to flower from seed[143]. The flowers have an unpleasant odour[143]. The flowers are sweetly fragrant, especially at night in order to attract the night hawk-moth for pollination[245]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. Special Features: Naturalizing. Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

# 5.2.470 Calligonum aphyllum

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calligonum aphyllum is an evergreen Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Fruit LeavesEdible Uses: GumYoung shoots -cooked[105]. An edible gum or mucilage is obtained from the leaves[105]. The pounded root furnishes an edible mucilaginous substance resembling gum tragacanth (see Ferula species)[2, 177]. One report says that the plant has an edible fruit[105]. This possibly refers to the seed.

nrakta Europe to Asia - Caspian Sea. ksacta Sandy soils in dry arid regions[1, 50].

propta Seed - we have no information on this species. The seed is probably best sown in late winter in a greenhouse. Prick out the seedlings when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in early summer of the following year.

nwatta Requires a dryish sunny position and a sandy loam[1]. Plants are tolerant of extreme cold but they are impatient of shade or excessive moisture[1].

# 5.2.471 Angelica gigas

Giant Angelica, Purple Parsnip, Korean Angelica 4 tlin 8 cyuc 2 koak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Angelica gigas is a PERENNIAL growing to 1.8 m (6ft) at a medium rate. It is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furocommarins, which increase skin sensitivity to sunlight and may cause dermatitis[238].

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177, 183].

dwatta Blood tonic Women's complaints The root is used in Korea to treat anaemia, hemiplegia and women's diseases [279]. It ontains a number of active compounds and has been shown to increase duodenum motility and have an anti-platelet aggregation action [279].

nrakta E. Asia - China, Japan. ksacta Grassy places and open woods in the mountains[187]. In grasses, forests or by stream at elevations around 1000 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sow in situ as soon as it is ripe.

nwatta Landscape Uses:Specimen, Woodland garden. Requires a deep moist fertile soil in dappled shade or full sun[200]. Hardy to about-20°c[187]. Plants flower in 2 years from seed[187] and are reliably perennial if prevented from setting seed[200]. Special Features: Attractive foliage, Naturalizing.

# 5.2.472 Ribes cereum

Wax Currant

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 1.8 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes cereum is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Fruit - raw or cooked[62, 101, 161, 183]. Not very nice, large quantities can cause nausea[85]. Reports on the quality of the fruit range from insipid and rubbery to highly esteemed as an article of diet[257]. The fruit can also be used to make

pemmican, jellies, jams, sauces and pies[183]. Fruits can also be dried for later use[85]. Young leaves[183]. No more details are given. Flowers - raw[183]. A sweet flavour[85].

dwatta Astringent Emetic OphthalmicAn infusion of the inner bark has been used as a wash for sore eyes[257]. The fruit has been eaten in quantity as an emetic[257]. It has also been used to treat diarrhoea[257].

nrakta Western N. America. ksacta Canyons, dry ravines, hillsides, prairies and open woodland[62].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between -2 to 0°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11, 200]. Reguires a sunny position[11]. Hardy to about -20°c[200]. A very ornamental and free-flowering plant[1]. Often cultivated for its edible fruit in N. America[62]. It is diseaseresistant and is being used in modern blackcurrant breeding programmes[119]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Related to R. viscosissimum[182].

#### 5.2.473 Helianthus doronicoides

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Helianthus doronicoides is a PERENNIAL growing to 1.8 m (6ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers

kcakta Edible Parts: RootEdible Uses: Tubers cooked[2, 46, 61]. A similar taste to Jerusalem artichokes but less productive because the tubers are very thin[K].

nrakta Central N. America - Ohio to Missouri and Arkansas. ksacta Dry woods, thickets and clearings[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. Plants have a running root system and can be invasive in suitable conditions[233]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Possibly a naturally occurring hybrid, H. giganteus x H. mollis[200].

# 5.2.474 Sanguisorba officinalis

4 tlin 8 cyuc 2 kcak 2 tcan 3 dwat 1 m hkuc

hmimhtut cyutli kyuctcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Sanguisorba officinalis is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista Best avoided during pregnancy in view of the lack of information about toxicity. Suggested that the herb may interact with the group of allopathic medications known as fluoroguinolones [301].

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[13, 61, 105]. They should be harvested in the spring before the plant comes into flower[9]. A cucumber flavour[7, 46], they can be added to salads or used as a potherb[183]. The fresh or dried leaves are used as a tea substitute[183].

tcanta TanninThe roots contain tannin[7].

dwatta Anodyne Antidiarrhoeal Astringent Contraceptive Diuretic Dysentery Eczema Febrifuge Haemostatic Tonic VulneraryGreat burnet is employed mainly for its astringent action, being used to slow or arrest blood flow. It is taken both internally and externally internally and is a safe and effective treatment. Modern research in China has shown that the whole herb heals burns more effectively than the extracted tannins (the astringent component of the plant)[254]. Patients suffering from eczema showed marked improvement when treated with an ointment made from the root and petroleum jelly[254]. The leaves are astringent, refrigerant. styptic and tonic[7, 218, 222]. They are used in the treatment of fevers and bleeding[218, 222]. The plant is prevented from flowering and then the leaves are harvested in July and dried for later use[4, 238]. The root is anodyne, astringent, diuretic, febrifuge, haemostatic, tonic and vulnerary[4, 7, 9, 21, 147, 165, 176, 178, 218]. It is used in the treatment of peptic ulcers, haematuria, menorrhagia, bloody stool, dysentery, diarrhoea, haemorrhoids and burns[176]. The root is harvested in the autumn as the leaves die down and dried for later use[4, 238]. All parts of the plant are astringent, but the root is most active[4]. Great burnet is an excellent internal treatment for all sorts of abnormal discharges including diarrhoea, dysentery and leucorrhoea[4]. It is used externally in the treatment of burns, scalds, sores and skin diseases[238]. This species was ranked 19th in a Chinese survey of 250 potential anti-fertility plants[218].

nrakta Europe, including Britain, from celand south and east to Spain, temperate Asia to Iran, China, Japan ksacta Meadows and wet grassy places by streams[187]. Moist shady sites in grassland, on siliceous soils[7, 13, 17]

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out as soon as they have reached a reasonable size. The seed can also be sown in situ in early spring[4]. Division in the spring or in autumn[4].

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Plants grow tolerably well in very poor soils and likes a dry chalky soil[4]. This species is hardy to about -25°c[187]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

tral nervous system[218]. The plant is said to restore the 5.2.497 Physalis subglabrata appetite, memory, vigour etc[218].

nrakta E. Asia - China, Japan, Korea, Manchuria. ksacta Forests on rich well moistened slopes, 900 - 2000 metres in N. Hupeh. Thickets and thin woods in lowland and hills in Japan[58].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April, High percentage[78], Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a good deep loam and a position in semishade. Requires a sheltered position. Plants are hardier when grown on poorer soils. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This plant is very closely related to A. elata and is included in that species by many botanists[58].

#### 5.2.496 Berberis concinna

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis concinna is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruits raw[272]. The fleshy oblong berries are up to 18mm long[11].

tcanta DyeA yellow dye is obtained from the roots and stems.

dwatta Antibacterial Cancer Dysentery Ophthalmic StomachicBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activ-

nrakta E. Asia - Himalayas in Sikkim, Nepal and Tibet. ksacta Forms thickets in open spaces at elevations of 3000 -3600 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. A very ornamental plant[11]. Plants can be pruned back quite severely and resprout well from the base[200].

Longleaf groundcherry

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Physalis subglabrata is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from May to October, in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where many of the members have poisonous leaves and stems, though the full ripe fruits are usually edible[19, 65].

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[85]. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten.

nrakta Eastern N. America - New York to Georgia. ksacta Shores, meadows, fields, roadsides and waste places[43]. Moist to medium dry soil of cultivated land and waste ground[212].

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away well. Diurnal temperature fluctuations assist germination[170]. Division in spring[111]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in early summer[111]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors at least in the milder parts of this country. If it proves to be tender, it should be possible to treat it as an annual, sowing the seed in early spring in a warm greenhouse and planting out after the last expected frosts[K]. There is some confusion over the name of this species, it might be best treated as a sub-species of P. virginiana, when it will be P. virginiana subglabrata. (MacKenzie. and Bush.)Waterfall. The plant has a deep rootstock[235]. The following notes are based on the general needs of the genus. Succeeds in any well-drained soil in full sun or light shade[200].

#### 5.2.498 Valeriana officinalis

Valerian, Garden valerian

4 tlin 8 cyuc 2 kcak 3 tcan 3 dwat 1.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Valeriana officinalis is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista It is said that prolonged medicinal use of this plant can lead to addiction[9]. A course of treatment should not exceed 3 months. Adverse effects can include: headaches (rare), giddiness, nausea, excitability and agitation, heart palpitations (rare), insomnia (rare). Do not take with other seed[143, 260]. In a warm climate the plant grows continually and will grow happilly in pots in a conservatory[260]. The bulbs can be crammed into the pot with crocks below to give good drainage and a good loose compost above[260]. The form 'Price's var.' is an alpine form of the species, it breeds true from seed and it is hardy if grown in a sheltered spot in the rock garden[143]. The flowers diffuse a delicious sweet perfume[245]. Stem rooting, the bulbs should be planted 20cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[143]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### 5.2.493 Lonicera involucrata

Twinberry, Twinberry honeysuckle 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lonicera involucrata is a deciduous Shrub growing to 1.2 m (4ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or dried[2, 46, 65, 155]. A pleasant taste[161]. Not tasty enough to be widely sought[212]. The only form we have tried has an incredibly bitter taste[K]. The fruit is about 8mm in diameter[200].

tcanta Disinfectant Dye HairA purple dye is obtained from the fruit[99, 257]. It is grey when tin is used as a mordant[168]. The berries are rubbed onto the scalp as a hair tonic. It is said to prevent greyness[99]. (don't mix the berries with tin though!!(KI)

dwatta Antidandruff Antipruritic Disinfectant Emetic Galactogogue Laxative Ophthalmic Pectoral PoulticeTwinberry was employed medicinally by a number of native North American Indian tribes who used it to treat a range of complaints[257]. It is little, if at all, used in modern herbalism. The bark is disinfectant, galactogogue, ophthalmic and pectoral[257]. A decoction is used in the treatment of coughs and as an eyewash[257]. A decoction of the bark has been applied to a woman's breasts to encourage milk flow[257]. The bark has also been used as a dressing on burns[257]. The leaves are antipruritic and ophthalmic[257]. A poultice of the chewed leaves is applied to venereal sores, itchy skin and boils[218, 257]. A decoction of the leaves is used as an eve wash[257]. The fruits are antidandruff, emetic, laxative and pectoral[218, 257]. An infusion is used to treat chest and stomach complaints and to cleanse the body[257]. The mashed fruit has been rubbed into the scalp as a treatment for dandruff

nrakta Western N. America - Alaska to Mexico. ksacta Calcareous woods, banks of streams and swamps[43] and in open coniferous forests[155], usually on limestone[184].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Lavering in autumn[200].

nwatta An easily grown and very tolerant plant, succeeding in any fertile soil, and preferring a good moist soil in a unny position[11, 200]. It produces less fruit when grown in the shade[200]. Plants have proved to be quite wind resistant when growing on an exposed site in Cornwall[K]. Plants are hardy to about -25°c[184]. Closely allied to L. ledebouri[11]. There are some named forms, developed for the ornamental

garden[182]. 'Humilis' is a smaller form and 'Serotina' is later flowering[182].

#### 5.2.494 Lilium davidii

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium davidii is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb -cooked[105, 143]. One of the larger lily bulbs, it is up to 45mm in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

nrakta E. Asia - Čhina in Gansu, Guizhou, Henan, W Hubei, S Shaanxi, Shanxi, Sichuan and Yunnan. ksacta Moist places in forests, forest margins and grassy slopes at elevations of 800 - 3200 metres[266].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]. The formation of bulbils on the stem can be induced by either removing the stem at flowering time and layering it just below the soil surface, or by removing all the flowers before they open.

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. An easily grown plant, it tolerates some lime in the soil[143, 163, 200]. Stem rooting, the bulbs should be planted 15-20cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[143]. This species is occasionally cultivated for its edible bulb in China[143]. The plant is widely cultivated for its root according to another report[266]. Closely allied to L. willmottiae[143]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### 5.2.495 Aralia mandschurica

Manchurian Angelica Tree 4 tlin 8 cyuc 2 koak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Aralia mandschurica is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoots cooked. They can also be blanched and used in salads.

dwatta Anodyne Carminative TonicAnodyne, carminative. The root, and especially the bark, stimulates the cen-

#### 5.2.475 Elymus glauca

Blue Wild Ry

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elymus glauca is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed -cooked[105, 161]. It can be ground into a flour and used to make bread. Very fiddly to use, the seed is small and difficult to extractf.Kl.

nrakta N. America - Ontario and Michigan to British Columbia, south to Colorado and California. ksacta Moist or dry open thickets and shores[43].

propta Seed - sow mid spring in situ and only just cover the seed[162]. Germination should take place within 2 weeks. If the supply of seed is limited, it can also be sown in mid spring in a cold frame. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in summer[K] Division in spring or summer[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, it succeeds in most soils, preferring a sandy soil and a sunny position[1, 162].

# 5.2.476 Cicerbita alpina

Blue Sow Thistle

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Cicerbita alpina is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young shoots and stems - raw[4, 105]. The skin is first removed, but the shoots are still rather bitter and unpalatable[4, K]. Older stems can also be peeled and eaten raw[105, 177, 183] but have a bitter taste[2].

dwatta Antiphlogistic DiureticThe leaves and milky sap were at one time often used in herbal medicine, though are seldom employed nowadays[4]. They are diuretic and are also applied externally to inflammations[4].

nrakta Mountainous regions of C. Europe, including Britain, from Norway to the Pyrenees. ksacta A very rare native of Scotland, growing on alpine rock in moist places[17].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not let the compost dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in spring[188]. We have found it best to pot up the clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Prefers a moist well-drained humus rich neutral to acid light sandy soil and some shade[1, 187, 200]. Plants are hardy to at least -20°c[187].

#### 5.2.477 Hosta montana

4tlin 8 cyuc 2 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hosta montana is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves - cooked[116]. White part of the leaf stem - cooked[105].

nrakta E. Asia - Japan. ksacta Woodlands and forest margins[251] in the hills and mountains of northern and central Japan[58].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1-3 months at  $10^{\circ}c.$  Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3-5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A polymorphic species, it hybridizes freely with other members of this genus[200].

#### 5.2.478 Berberis verruculosa

4tlin 8 cyuc 2 kcak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis verruculosa is an evergreen Shrub growing to 1.8 m (6ft) by 1.8 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Poor quality[K]. The fruits are about 10mm long[200].

tcanta DyePlants can be grown as a medium-size hedge[29]. They are quite tolerant of trimming though are best left untrimmed. They make an effective dense barrier[K]. Plants can be grown as a tall ground cover when

planted about 1 metre apart each way[208]. A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - W. China. ksacta Woods, thickets and rocky places, 1300 - 4100 metres[109].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants are hardy to about -20°[184]. Hybridizes freely with other members of this genus[1]. A very ornamental[1] but slow-growing plant[200]. The flowers are sweetly scented[245]. Can be pruned back quite severely, it resprouts well from the base[200].

#### 5.2.479 Allium aflatunense

Persian Onion, Ornamental Onion 4 tlin 8 cyuc 2 koak 0 tcan 2 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Allium aflatunense is a BULB growing to 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. The bulb varies greatly in size, from 2 - 6cm[200]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe growing plant is said to repel insects and moles[20]

dwatta AntibioticThe plant possesses outstanding germicidal properties, all cultures being destroyed under its influence[240]. Although no other specific mention has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta W. Asia - Soviet mid Asia, ksacta Not known

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the di-

visions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Landscape Uses:Container, Foundation, Massing, Rock garden, Seashore, Specimen. Prefers a sunny position in a light well-drained soil[1]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. This species does not have the characteristic garlic smell of most members of the genus[200]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Fragrant foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers.

#### 5.2.480 Orchis morio

Green-Winged Orchid, Green-winged orchid 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Orchis morio is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from April to August, in flower from May to June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Édible Parts: RootEdible Uses: DrinkRoot cooked[2, 4, 46]. This species is a major source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Demulcent Nutritive Salep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Siberia, Caucasus and Siberia. ksacta Wet meadows, especially on chalk[13, 17, 230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - cooked[2, 115, 177]. Used as a potherb or as a flavouring[61, 183]. The aromatic roots can be used as a flavouring[183]. They are said to taste hotter than pepper[4]. A particularly popular drink is made from the fermented roots[7].

dwatta Antispasmodic Aromatic Bitter Carminative Diaphoretic Digestive Diuretic Emmenagogue Expectorant Febrifuge Homeopathy Odontalgic Skin Stimulant StomachicMasterwort is little used in modern herbalism, but it may well be a herb that bears further investigation[254]. It was held in high regard in the Middle Ages where it was especially valued for its ability to resolve all flatulence in the body and stimulate the flow of urine and menstruation[254]. It was also used in treating rheumatic conditions, shortness of breath, kidney and bladder stones, water retention and wounds[254]. The root is antispasmodic, aromatic, bitter. strongly carminative, diaphoretic, digestive, diuretic, emmenagogue, expectorant, febrifuge, stimulant and stomachic[4, 7, 9, 21, 254]. It is of use in the treatment of asthma, dyspepsia and menstrual complaints[4], an infusion helps to relieve migraine[7]. The root is gathered in the spring or autumn and dried for later use[7, 9]. An essential oil from the plant has a euphoric and odontalgic effect[7]. Used externally, it relieves skin irritation[7]. When used externally, the plant or the extracted essential oil can cause an allergic reaction to sunlight[254]. A homeopathic remedy is made from the roots[9]. No details of its applications are given[K].

nrakta S. Europe. Naturalized in Britain. ksacta Woodland, damp fields, river banks and mountain meadows[17, 50]

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta An easily grown plant, it succeeds in any moisture-retentive soil in a sunny position[200]. Dislikes shade. This report contradicts the report that this plant grows wild in woodlands. Masterwort was at one time cultivated as a pot herb and for medicinal purposes, though it has now fallen into virtual disuse[4, 200]. Suitable for group plantings in the wild garden[200].

#### 5.2.491 Beta vulgaris maritima

Sea Beet

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hionli

drutta Beta vulgaris maritima is a AN-NUAL/PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves raw or cooked[5, 12, 16, 21]. A delicious spinach substitute in the spring, the leaves become less pleasant as the season progresses, developing a distinct bitterness in hot weather[K]. Some people dislike the raw leaves since they can leave an unpleasant taste in the mouth[K].

dwatta Antitumor EmmenagogueAlthough little used in modern herbalism, beet has a long history of folk use, especially in the treatment of tumours[269]. A decoction prepared from the seed has been used as a remedy for tumours of the intestines. The seed, boiled in water, is said to curs genital tumours[269]. The juice or other parts of the plant is said to help in the treatment of tumours, leukaemia and other forms of cancer such as cancer of the breast, oesophagus, glands, head, intestines, leg, lip, lung, prostate, rectum, spleen, stomach, and uterus[269]. Some figure that betacyanin and anthocyanin are important in the exchange of substances of cancer cells; others note two main components of the amines, choline and its oxidation product betaine, whose absence produces tumours in mice[269]. The juice has been applied to ulcers[269]. A decoction is used

as a purgative by those who suffer from haemorrhoids in South Africa[269]. Leaves and roots used as an emmena-gogue[269]. Plant effective in the treatment of feline ascariasis[269]. In the old days, beet juice was recommended as a remedy for anaemia and yellow jaundice, and, put into the nostrils to purge the head, clear ringing ears, and alleviate toothache[269]. Beet juice in vinegar was said to rid the scalp of dandruff as scurf, and was recommended to prevent falling hair[269]. Juice of the white beet was said to clear obstructions of the liver and spleen[269]. Culpepper (1653) recommended it for treating headache and vertigo as well as all affections of the brain[269].

nrakta Coastal areas of Europe, including Britain, south and east to N. Africa and Asia to the East Indies. ksacta Banks and shingle by the coast[5].

propta Seed - sow March to May in situ.

nwatta Beets grow well in a variety of soils, growing best in a deep, friable well-drained soil abundant with organic matter, but doing poorly on clay. They prefer an open position and a light well-drained soil[52]. The optimum pH is 6.0 - 6.8, but neutral and alkaline soils are tolerated in some areas. Some salinity may be tolerated after the seedling stage. Beets are notable for their tolerance to manganese toxicity. Beet is reported to tolerate an annual precipitation of 23 to 315cm, an average annual temperature range of 5.0 to 26.6°C and a pH of 4.2 to 8.2[269]. This is the wild beetroot of coastal areas. The cultivated beetroot, sugar beet, seakale beet and Swiss chard have all been developed from this species by means of selective breeding[1, 5]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.492 Lilium formosanum

Formosa lily

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium formosanum is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb -cooked[105, 177]. The bulb can be up to 4cm in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

nrakta E. Asia - Formosa and Taiwan. ksacta Seashores and open grassland in sandy or volcanic soils[245, 260] from sea level to 3500 metres[143, 266].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. This species can flower within a year from seed, especially if sown in the early autumn[143]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. This species only tolerates temperatures down to about - 3°c[260]. It is not fully hardy outside the mildest parts of Britain and is best grown as an annual or biennial in a cool greenhouse where it can flower in the first year from

taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Requires a light humus-rich acid soil and plenty of moisture in late spring[47]. Should succeed in a cool well-drained peat, leaf-mould and sand mix with shelter from the midday sun[42]. Best grown in a greenhouse border in Britain[1]. This species could be one of the parents of L. lancifolium[90]. Stem rooting, the bulbs should be planted 15cm deep[42, 200]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. This form is said to be much easier to grow than the species[42], though this is not necessarily true[47] The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### 5.2.488 Malus x micromalus

Kaido Crab Apple

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus x micromalus is a deciduous Shrub growing to 4 m (13ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. About 15mm in diameter[200].

tcanta RootstockUsed as a rootstock for the cultivated apple, M. sylvestris domestica, it is said to be the best dwarfing rootstock from seed[183].

nrakta A hybrid of garden origin, M. baccata x M. spectabilis[200]. ksacta Not known in the wild.

propta Seed - this is a hybrid species and will not breed true. The seed is best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.489 Morus mongolica

Mongolian Mulberry

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifnvanhien hionli

drutta Morus mongolica is a deciduous Tree growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[3, 105]. Sweet but insipid[1, 11]. Palatable[109, 177]. The fruit is up to 25mm in diameter[200].

tcanta Fibre MiscellanyThe fibers of the bark are raw material for textile and paper making[266].

dwatta MiscellanyThe bark is used medicinally[266]. No more details are given.

nrakta E. Asia - China, Japan, Korea. ksacta On cliffs and in ravines to 2000 metres in W. China[109]. Mountain slopes, high mountains and forests at elevations of 500 - 3500 metres[266].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sumy position[1, 11]. Closely allied to M. alba[1], and considered to be no more than part of that species by some botanists[200]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200]. This species is dioecious[266]. Both male and female plants will need to be grown if fruit is remiired.

#### 5.2.490 Peucedanum ostruthium

Mactarwort

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Peucedanum ostruthium is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the sap of this plant is said to cause photo-sensitivity and/or dermatitis in some people[65, 218]. It is also said to contain the alleged 'psychotroph' myristicine[218].

still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Prefers a sunny position and a good loamy soil[42]. Requires a deep rich soil[1]. Grows well in a sunny dry border or on a scree[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants seem to be immune to the predations of rabbits[233]. The flowers have a powerful scent that is not particularly pleasant[245]. Those forms with lighter coloured flowers have a more pleasant scent[245]. Cultivated plants are very susceptible to the predation of slugs and snails [230]. Plants can occasionally appear in lawns where they will increase freely if allowed to set seed[230]. The lawn should not be mown early in the year before or immediately after flowering[200]. If you want to try establishing plants in a lawn then plant out the bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1].

# 5.2.481 Lilium speciosum

Oriental Lily

4 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Lilium speciosum is a BULB growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[2, 105, 163, 266]. The bulb is about 5cm in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

dwatta The bulb is used medicinally[266]. No further information is given.

nrakta E. Asia - S. China and S. Japan. ksacta Shaded and moist places in forests, grassy slopes at elevations of 600 - 900 metres[266].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Landscape Uses:Border, Container, Seashore, Specimen. Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Dislikes lime[42]. Prefers a light sandy loam with plenty

of leafmold[47]. Best grown in open woodland or amongst dwarf evergreens[1]. Prefers a sunny position[42, 143]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°c[214]. Stem rooting, the bulbs should be planted 25 - 30cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. A very ornamental plant[1] it is easily grown[163] but requires a long growing season if it is to do well[200]. The flowers diffuse a powerful sweet honey perfume[245]. Cultivated for its edible bulb in Japan[2]. The sub-species L. speciosum rubrum. Mast. ex Bak. is said to be inedible whilst L. speciosum album. Mast. ex Bak. is said to be acceptable for eating[163]. The variety 'Magnificum' is said to be the best form for growing outdoors in Britain[245]. Plants take 4 years to flower from seed[143]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour [200]. Special Features: Not North American native, Attracts butterflies, Suitable for cut flowers. Fragrant flowers. Attractive flowers or blooms.

## 5.2.482 Dictamnus albus

Burning Bush, Gasplant, White Dittany, 4 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 1 m hkuc

htut cyuʻli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis

drutta Dictamuus albus is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Poisonous[19].

kcakta Edible Parts: Edible Uses: TeaA lemon-scented tea is made from the dried leaves[21, 46, 61]. Refreshing and aromatic[183].

tcanta EssentialThe plant contains an essential oil[211]. Yields from the fresh flowering plant are around 3% on a dry weight basis[240]. This oil is used as a cosmetic[4].

dwatta Abortifacient Anthelmintic Antibacterial Anticonvulsant Antirheumatic Antispasmodic Aromatic Digestive Diuretic Eczema Emmenagogue Expectorant Febrifuge Galactogogue Homeopathy Stimulant TonicThe burning bush has been used in Chinese herbal medicine for at least 1,500 years[238]. The root bark is a bitter, strong-smelling herb that lowers fevers and controls bacterial and fungal infections[238]. The plant has an effect similar to rue (Ruta graveolens) in that it strongly stimulates the muscles of the uterus, inducing menstruation and sometimes causing abortion[254]. By contrast, its effect upon the gastro-intestinal tract is antispasmodic and it acts as a mild tonic on the stomach[254]. Both the flowering stems and the root-bark are used medicinally[7]. They are abortifacient, anthelmintic. antispasmodic, aromatic, digestive, diuretic, emmenagogue, expectorant, febrifuge, galactogogue, stimulant and tonic[7, 9, 19, 21, 46, 178, 211]. The plant is used both internally and externally in the treatment of skin diseases (especially scabies and eczema), German measles, arthritic pain and jaundice[238]. It is little used in Western herbalism nowadays, though it has been recommended for use in nervous complaints, intermittent fevers, scrofulous and scorbutic diseases[4]. Use with caution, in large doses it is poisonous[9]. 21]. The root bark is harvested in the autumn and dried for later use[238]. An infusion of the leaves is used as a tea substitute and is a good digestive[7]. A homeopathic remedy is made from the fresh leaves[9]. It is used in the treatment of female complaints and constipation[9].

nrakta S. and C. Europe. ksacta Woodland margins and rocky scree, mainly on calcareous soils[19].

propta Seed best sown in a cold frame as soon as it is ripe[175]. Cold stratify stored seed for 6 weeks and sow in the spring in a cold frame[175]. The seed usually germinates in 1 - 6 months at 15°c[175]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late

spring or early summer, after the last expected frosts. Division in spring[1]. Take care since the plant resents root disturbance[1]. The plant can also be divided in autumn[200]. We have found it best to tease out divisions from the side of the clump to avoid the need to dig up the main clump. Try to get divisions that already have formed roots. Pot them up in a greenhouse and grow them on for a year to make sure they are well established before planting them out. Root cuttings in November/December.

nwatta Landscape Uses:Border, Foundation, Massing, Rock garden, Specimen, Woodland garden. An easily grown plant, succeeding in ordinary garden soil[1]. It prefers a dry sunny position with some lime[1, 108] and is not suitable for heavy or damp soils[111]. Established plants are drought tolerant[190]. A very ornamental plant[1], it should be planted into its permanent position as soon as possible because it dislikes root disturbance[1, 175]. The whole plant contains a very aromatic essential oil, giving out a scent somewhat like lemon peel[4]. When the plant is bruised, this smell becomes more like fine balsam[4]. This essential oil is emitted from the plant in hot weather and, on a still day, can be ignited and will burn for a second or two without harming the plant, thus giving the plant its common name[1, 4, 13, 187]. Slugs are strongly attracted to this plant and can destroy it by eating all the young growth in spring[K]. There are at least 2 named varieties, 'Pink' produces a tea with a less lemony flavour but with an added taste of almonds and vanilla, 'White' has a lemony fragrance and taste[183]. The flowers are very attractive to bees[108]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native. All or parts of this plant are poisonous. Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

#### 5.2.483 Dactylorhiza maculata

Spotted Orchid

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Dactylorhiza maculata is a BULB growing to  $0.6\,\mathrm{m}$  (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: RootEdible Uses: Root - cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta W. Europe in Britain and France, north through Germany ad Belgium to Scandanavia. ksacta Moist acid peaty substrata throughout the British Isles[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200].

It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Succeeds in most soils, but it prefers a moist loam and lots of leaf mould[42]. Requires a deep rich soil[1]. Grows well in full sun or partial shade[42], doing well in a woodland garden[230]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials [230]. Cultivated plants are very susceptible to the predation of slugs and snails[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1].

#### 5.2.484 Lilium amabile

4tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium amabile is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - cooked[105, 183]. The bulb is 25 - 30mm in diametr[266]. It can be used as a vegetable in similar ways to potatoes. Flower buds - cooked[105, 177, 183]. Young shoots - cooked[105, 177, 183]. Eating the young shoots will prevent the bulb from growing any more in that year with a consequent loss of vigour or even the death of the plant, so is not to be recommended[K].

nrakta E. Asia - Korea ksacta Limestone formations[143].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200].

Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out [200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200] Plants are probably lime tolerant[143, 163, 200]. Succeeds in ordinary garden soil. Does well in limy soils and also succeeds in acid soils. Prefers a sunny position. A very ornamental[1] and easily grown plant[163]. The flowers are malodorous according to one report[143], whilst another says that they have a powerful oriental perfume[245]. Stem rooting, it is best planted 15cm deep in semi-shade[143, 200]. The plant should be protected against slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. Bulbs are best planted out into their permanent positions in early to mid-autumn in cool temperate zones and up to late autumn in warmer areas, this allows them to become established before new top growth commences in spring[200].

# 5.2.485 Lilium japonicum platyfolium

Bamboo Lilv

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium japonicum platyfolium is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[2, 4, 105]. It contains about 18% starch[174]. A slightly bitter taste[174]. It can be used as a vegetable in similar ways to potatoes(Solanum tuberosum).

dwatta Antiasthmatic Antitussive Expectorant Nutritive Sedative TonicThe bulb is antiasthmatic, antitussive, expectorant, sedative and tonic (nutritive)[174, 176]. It is used in the treatment of coughs, haemoptysis, insomnia and fidgetiness in the later stage of febrile disease[176].

nrakta E. Asia - Japan. ksacta Thickets on hills and low mountains[58] in rich loose woodland soil, often amongst dwarf bamboo, 300 - 900 metres[143].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy old with its roots in the shade and its head in the sun[200]. Grows well in open woodland[1]. Likes plenty of moisture and some shade[42, 47]. Just to totally confuse matters, one report says that this species prefers a poor gravelly loam with plenty of leafmold and some charcoal, in a sunny position[143]. Requires protection from winter rains[143]. This sub-species is more vigorous than the type and has broader leaves. Stem rooting, the bulbs should be planted 15 - 20cm

deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. A very ornamental plant[1], it is cultivated for its bulb in Japan[2] and is also a sacred flower in Japanese Shinto rites[174]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose viqour[200].

#### 5.2.486 Avena barbata

Slender Oat

4 tlin 8 cyuc 2 kcak 2 tcan 0 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Avena barbata is a ÅNNUAL at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[57]. Rather small[257]. The seed ripens in the latter half of summer and, when harvested and dried, can store for several years. It has a floury texture and a mild, somewhat creamy flavour. It can be used as a staple food crop in either savoury or sweet dishes. The seed can be cooked whole, though it is more commonly ground into a flour and used as a cereal in all the ways that oats are used, especially as a porridge but also to make biscuits, sourdough bread etc. The seed can also be sprouted and eaten raw or cooked in salads, stews etc. The roasted seed is a coffee substitute.

tcanta Fibre Mulch Paper ThatchingThe straw has a wide range of uses such as for bio-mass, fibre, mulch, paper-making and thatching[171]. Some caution is advised in its use as a mulch since oat straw can infest strawberries with stem and bulb eelworm.

nrakta Europe to Asia. ksacta Dry wasteland, cultivated ground and meadows, especially on heavier soils[74, 200].

propta Seed - sow in situ in early spring or in the autumn. Only just cover the seed. Germination should take place within 2 weeks.

nwatta Succeeds in any moderately fertile soil in full sun[200]. A triploid species, it is rarely cultivated for its edible seed[57]. Oats are in general easily grown plants but especially when grown on a small scale, the seed is often completely eaten out by birds. Some sort of netting seems to be the best answer on a garden scale.

# 5.2.487 Lilium leichtlinii maximowiczii

4tlin8cyuc2kcak0tcan0dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium leichtlinii maximowiczii is a BULB growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[85, 105]. The bulb can be up to 4cm in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potates (Solanum tuberosum).

nrakta E. Asia - China, Japan, S. Korea. ksacta Humusrich soils in river valleys and amongst grass on hills[47]. Sandy places along valleys, mountain grasslands, limestone or serpentine areas, from near sea level to 1300 metres[266].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be

is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure

pcista Carrots sometimes cause allergic reactions in some people[46]. Skin contact with the sap is said to cause photo-sensitivity and/or dermatitis in some people[218]. Daucus has been reported to contain acetone, asarone, choline, ethanol, formic acid, HCN, isobutyric acid, limonene, malic acid, maltose, oxalic acid, palmitic acid, pyrrolidine, and quinic acid. Reviewing research on myristicin, which occurs in nutmeg, mace, black pepper, carrot seed, celery seed, and parsley, Buchanan (J. Food Safety 1: 275, 1979) noted that the psychoactive and hallucinogenic properties of mace, nutmeg, and purified myristicin have been studied. It has been hypothesized that myristicin and elemicin can be readily modified in the body to amphetamines. Handling carrot foliage, especially wet foliage, can cause irritation and vesication. Sensitized photosensitive persons may get an exact reproduction of the leaf on the skin by placing the leaf on the skin for awhile, followed by exposure to sunshine[269]

kcakta Edible Parts: Flowers RootEdible Uses: Coffee CondimentRoot - cooked[55]. Thin and stringv[K]. The flower clusters can be french-fried to produce a carrot-flavoured gourmet's delight[183]. The aromatic seed is used as a flavouring in stews etc[55, 183]. The dried roasted roots are ground into a powder and are used for making coffee[183].

tcanta Cosmetic EssentialAn essential oil obtained from the seed has an orris-like scent[238]. It is used in perfumery and as a food flavouring[46, 238]. The oil has also been used cosmetically in anti-wrinkle creams[238].

dwatta Anthelmintic Carminative Contraceptive Deobstruent Diuretic Emmenagogue Galactogogue Ophthalmic Stimulant UrinaryThe wild carrot is an aromatic herb that acts as a diuretic, soothes the digestive tract and stimulates the uterus[238]. A wonderfully cleansing medicine, it supports the liver, stimulates the flow of urine and the removal of waste by the kidneys[254]. The whole plant is anthelmintic, carminative, deobstruent, diuretic, galactogogue, ophthalmic, stimulant[4, 7, 9, 13, 21, 165]. An infusion is used in the treatment of various complaints including digestive disorders, kidney and bladder diseases and in the treatment of dropsy[4, 238]. An infusion of the leaves has been used to counter cystitis and kidney stone formation, and to diminish stones that have already formed[254]. Carrot leaves contain significant amounts of porphyrins, which stimulate the pituitary gland and lead to the release of increased levels of sex hormones[254]. The plant is harvested in July and dried for later use. A warm water infusion of the flowers has been used in the treatment of diabetes [213]. The grated raw root, especially of the cultivated forms, is used as a remedy for threadworms[213, 222, 254]. The root is also used to encourage delayed menstruation[213]. The root of the wild plant can induce uterine contractions and so should not be used by pregnant women[213]. A tea made from the roots is diuretic and has been used in the treatment of urinary stones[222]. The seeds are diuretic[213, 218], carminative, emmenagogue and anthelmintic[4, 218]. An infusion is used in the treatment of oedema, flatulent indigestion and menstrual problems[238]. The seed is a traditional 'morning after' contraceptive and there is some evidence to uphold this belief. It requires further investigation[222]. Carrot seeds can be abortifacient and so should not be used by pregnant women[254].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, China and eastern India. ksacta Cultivated and waste land, amongst grass, especially by the sea and on chalk[4, 17].

propta Seed - sow August/September or April in situ. The seed germinates better if it is given a period of cold strat-

nwatta Landscape Uses:Border, Seashore. Prefers a sunny position and a well-drained neutral to alkaline soil[24. 238]. A good plant for the summer meadow[24], it is a food plant for caterpillars of the Swallow-tail Butterfly[200]. This species is the parent of the cultivated carrot[200]. It can act

as an alternative host for pests and diseases of the cultivated carrots. The plant has become a pest weed in N. America, where it is spreading rapidly and crowding out native vegetation[274]. The whole plant, when bruised, gives off an aniseed-like scent[245]. Special Features: Edible, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 5.2.640 Chamaemelum nobile

Chamomile, Roman chamomile

4 tlin 9 cyuc 2 kcak 4 tcan 5 dwat 0.2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Chamaemelum nobile is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Patients with severe allergic responses to ragweed (ragwort) should be warned about the possible crosssensitivity to chamomile and other members of the Asteraceae/Compositae family (e.g. echinacea, feverfew, milk thistle).

kcakta Edible Parts: Flowers ShootsEdible Uses: Condiment TeaYoung sprigs are used as a seasoning and a flavouring in herb beers[15, 183]. The fresh or dried flowers are used to make herb teas[21, 37, 183]. This has a strong aromatic odour and a bitter flavour, especially the singleflowered form[4]. The whole herb is used for making herbal

tcanta Companion Compost Dye Essential Fungicide Hair Liquid feed Repellent StrewingAn infusion of the flowers is used as a hair shampoo, especially for fair hair[14. 20, 1681. It is also used as a liquid feed and general plant tonic[14], effective against a number of plant diseases[18, 20, 201]. It has fungicidal properties and its use is said to prevent damping off in seedlings[238]. The flowers are an ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The whole plant was formerly used as a strewing herb[4, 168]. The whole plant is insect repellent both when growing and when dried[14, 20]. An essential oil from the whole plant is used as a flavouring and in perfumery[46]. Yellow to gold dyes are obtained from the flowers[168]. The plant makes a very good ground cover[197] and can also be used as an edging plant[200]. It does tend to become bare in patches[208]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch

dwatta Anodyne Antianxiety Antiinflammatory Antispasmodic Aromatherapy Nervine Stomachic Tonic Vasodilator-Camomile is a common herb with a long history of safe and effective medicinal use - it is widely used as a household herbal remedy. It is particularly useful as a remedy for various problems of the digestive system, as a sedative and a nervine, it is especially suited for young children[4, 20, 21]. A tea is made from the flowers and this should be prepared in a closed vessel to prevent loss of the essential oils[4]. The flowers are anodyne, anti-inflammatory, antispasmodic, nervine, stomachic, tonic, vasodilator[4, 14, 21, 37, 165, 201]. The single-flowered form is the most potent medicinally, though it can in large doses damage the lining of the stomach and bowels[4]. For this reason, the double-flowered form is usually preferred since this contains less of the alkaloid that causes the problem[4]. The flowers are gathered in the summer when they are fully open and are distilled for their oil or dried

the mucous membranes and respiratory complaints such as sic (mildly alkaline) soils. It can grow in semi-shade (light coughs, colds, influenza and TB[4, 257]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4]. An infusion of the bark has been used as a blood purifier and in the treatment of stomach disorders and tuberculosis[257] A decoction of the bark has been used as a wash on cuts and sores[257]. A decoction of the young shoots has been used as a soak in the treatment of rheumatism[257].

nrakta Western N. America, British Columbia to California. ksacta Mountain forests[82]. Found on a variety of soils, though the best specimens are growing in deep, welldrained, moisture-retentive soils[229].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses:Screen, Specimen. Thrives in a light well-drained sandy or gravelly loam in a sunny position[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. A fast growing tree, capable of sustaining growth of 75cm per year over a long period of time even when in an unfavourable site. This species establishes very well on severely altered sites such as after a forest fire[229]. Trees on a site 300m above sea level in N. Wales have grown exceptionally well[185]. Girth increases of up to 4cm a year have been recorded[185]. Trees take 30 - 40 years before they produce reliable crops of seeds[229]. Good crops are produced every 2 - 4 years in the wild, with little seed in the intervening years[229]. The cones are 12 - 27cm long and take 2 years to mature[82, 229], they open and shed their seed in late summer and early autumn whilst still attached to the tree[82, 226]. Very susceptible to 'white pine blister rust' this tree should not be planted near Ribes species (currants and gooseberries) because they can transmit the rust(1, 11, 120). Most of the older trees in this country have been killed by the rust. However, it seems that infection only occurs when the trees are young in this country and new plantings in areas isolated from species of Ribes are being made[185]. Plants are also subject to damage by aphis. Trees have a thin bark, which makes them susceptible to forest fires[226]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow beneath the tree[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attracts birds, Attractive foliage, North American native, Inconspicuous flowers or blooms.

# 5.2.532 Prinsepia sinensis

Cherry prinsepia

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prinsepia sinensis is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and bawoodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 105, 177]. Red and juicy[11]. A pleasant sour taste[74], they can be eaten out of hand or made into jellies[183]. The plum-shaped fruit is about 15mm long with one large seed[200].

nrakta E. Asia - Northern China to Manchuria. ksacta In the shade of mixed forests and in shrubberies, especially on pebbly or alluvial soils[74]. Mixed forests, forests of shady slopes, open places on slopes and beside streams in northern China[266].

propta Seed - best if given 2 months cold stratification[113]. Sow the seed in autumn if possible, otherwise in late winter or early spring in a cold frame in light shade. Germination may be inhibited by light[113]. Prick out the seedlings when they are large enough to handle into individual pots. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113].

nwatta Succeeds in any moderately fertile well-drained soil in full sun or light shade[182, 200]. The plants produce flowers and fruits better when they are growing in full sun[200]. Flowers are produced on the previous seasons wood[200]. They are produced on old wood according to another report[182]. This plant has a potential for commercial fruit production[74]. Unfortunately, it only fruits in Britain after long hot summers[200].

# 5.2.533 Lilium leichtlinii

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium leichtlinii is a BULB growing to 1.2 m (4ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from September to October. The species is hermanhrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[85. 105]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

nrakta E. Asia - Japan. ksacta Humus-rich soils in river valleys and amongst grass on hills[47].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Requires a light humus-rich acid soil and plenty of moisture in late spring[47]. Should succeed in a cool welldrained peat, leaf-mold and sand mix with shelter from the midday sun[42]. Plants are best grown in a greenhouse border in Britain[1]. This species could be one of the parents of L. lancifolium[90]. Stem rooting, the bulbs should be planted 15cm deep[42, 200]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. It is said that this species is very difficult to grow[143] whilst its variety L.. leichtlinii maximowiczii is much easier[42], but this is not necessarily the case[47]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

# 5.2.534 Cotoneaster microphyllus

4tlin 8 cyuc 2 kcak 3 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cotoneaster microphyllus is an evergreen Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is poliniated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[272]. It is sweet when fully ripe[158]. A watery flavour[272]. It is possibly edible[177]. The fruit is about 7mm in diameter[200]

tcanta Basketry Dye Incense Soil stabilization WoodA rose-tan dye is obtained from the fruit. The leaves are used for incense[272]. The plant has an extensive root system and a creeping habit above ground. It makes a good soil binder[272]. The sub-species C. microphyllus cochleatus can be used as a ground cover plant in a sunny position[188, 208]. It forms a dense carpet of growth[208]. The branches are used for making baskets[146, 158, 272]. Wood - hard, close and even grained[146, 158]. Used for fuel[272].

dwatta AstringentThe stolons are said to be astringent[240].

nrakta E. Asia - Himalayas. ksacta Trailing on rocks or spreading on grassy hillsides, 1200 - 5400 metres[158]. Rocky slopes, rocky mountain areas, thickets and river valleysat elevations of 2000 - 4200 metres[266].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at  $15^\circ c$  and then 3 months cold stratification at  $4^\circ c[164]$ . The seed usually germinates within 1-18 months at  $15^\circ c$  but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -25°c[184, 200]. A very ornamental plant[1], there are some named forms[202]. Most forms are quite slowgrowing[200, 202]. It hybridizes freely with other members of this genus[200] and often self-sows in British gardens[219]. A low-growing plant, the branches often root when they come into contact with the soil[219]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Plants are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### eaten out the bulb will not grow in that year and will lose 5.2.535 Pachysandra terminalis

Japanese Spurge, Japanese pachysandra, Pachysandra 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc pcimhmim cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tlmwatli hjonli

drutta Pachysandra terminalis is an evergreen Shrub growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Sweet and juicy[105]. The ovoid fruits are 5 - 6mm long[266]. The fruit is not usually produced in cultivation[200] - this could be because both male and female plants are required and most people only grow one plant.

tcanta A very useful ground cover plant for a shady position, spreading by means of underground runners[182, 190]. A vigorous grower, but it is not too invasive[200]. It grows well in the shade of shruhs[K].

nrakta E. Asia - China, Japan. ksacta Moist deciduous woods in valleys and low mountains to 2000 metres[187, 200]

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise sow it in late winter. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a shady part of the greenhouse or cold frame. Plant out in early summer of the following year. Cuttings of half-ripe wood, 4 - 7cm long taken at a node, June - August in a shady position in a frame[78]. Division in spring[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer[K].

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Rock garden, Woodland garden. A very tolerant plant, it thrives in any moist well-drained soil[11, 200]. Easily grown in a loose leafy soil succeeding in dry shade[187] and tolerating drought once it is established[190]. Grows well under trees[11]. Dislikes dry soils, full sun and strong winds[200]. Prefers a lime-free soil[182] according to one report whilst another says that it succeeds in acid and alkaline soils[200]. Hardy to about -25°c[187]. Plants are monoecious and rarely if ever produce fruit in cultivation[187, 200]. The flowers have a pleasant sweet fragrance[245]. At least one named form has been selected for its ornamental value[187]. Special Features: Attractive foliage, Not North American native, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms.

#### 5.2.536 Petasites hyperboreus

Arctic Sweet Coltsfoot

4tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.2 m hkuc pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Petasites hyperboreus is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: SaltYoung leaves - cooked. A felt-like texture[172]. Young stalks and flower heads - cooked[172]. The burnt leaves are

attractive to honey bees[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200].

# 5.2.636 Codonopsis ovata

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Codonopsis ovata is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. It can be dried and ground into a powder[105]. A famine food, used when all else fails[145].

dwatta PoulticeThe roots and leaves are used to make a poultice for the treatment of bruises, ulcers and wounds[211, 240]

nrakta E. Asia - Himalayas - Pakistan to Kashmir. ksacta Rocks and alpine slopes of the eastern Himalayas, usually amongst shrubs, 3000 - 4200 metres[51, 145].

propta Seed - surface sow in spring to early summer in an ericaceous compost in a greenhouse. Do not allow the compost to dry out. The seed usually germinates in 1 - 6 weeks at 20°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in a greenhouse for their first winter. Plant out in late spring or early summer and protect them from slugs until the plants are well established[K]. Division in spring, with care, since the plant resents root disturbance[200]. We have found it best to take small divisions that are teased out from the sides of the main clump so as to cause the least possible disturbance to the plants and to avoid having to dig up the clump. These small divisions need to be potted up and placed in light shade in a greenhouse until they are rooting well. They can be planted out into their permanent positions in the summer if they are large enough, otherwise in the following spring[K].

nwatta Prefers a well-drained fertile light soil in full sun or semi shade[1, 200]. Plants only succeed in full sun if the soil remains moist during the growing season[200]. Prefers a slightly acid soil[164]. Dormant plants are hardy to about -20°c, but this species is not easy to grow in cultivation[187]. The young growth in spring, even on mature plants, is frosttender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species is not as cold tolerant as most members of the genus, it is best given a good mulch in the winter[200]. The plant resents root disturbance and should be planted out into its permanent position as soon as possible[164]. It is best grown on a high bank in order to give a good view of the flowers[1]. The flowers, when inhaled near to, have the unpleasant odour of fur - likened by some to the smell of ferrets[245]. Plants are very susceptible to the rayages of slugs. The young shoots in spring are particularly at risk, though older growth is also eaten[K].

#### 5.2.637 Lamium purpureum

Red Dead Nettle, Purple deadnettle 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lamium purpureum is a ANNUAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves raw or cooked as a potherb[2, 4, 5, 8, 54, 62, 183]. The plant is a short-lived annual, but seeds can germinate at almost any time of the year and so the leaves are often available all year round.

dwatta Astringent Diaphoretic Diuretic Purgative StypticThe whole plant is astringent, diaphoretic, diuretic, purgative and styptic[4, 46]. A decoction of the plant is particularly useful for checking any kind of haemorrhage, whilst the fresh bruised leaves can be applied to external cuts and wounds[4].

nrakta Europe, including Britain, from Norway south and east to the Mediterranean and Israel. ksacta Roadsides, waste places and as a common weed of cultivated land[17].

propta Seed - plants usually self sow freely and should not require human intervention. When required, the seed can be sown in situ as soon as it is ripe.

nwatta An easily satisfied plant, it tolerates most soils and conditions. Grows well in heavy clay soils. Dislikes shade. A common garden weed, usually flowering at almost any time of the year and the seed is capable of germinating even in the winter if the weather is mild[17]. In rich soils the plant can grow quite lushly, in poor soils it will only grow a few centimetres tall before flowering and spreading its seed. The plant is easily controlled, however, and never really becomes a pest[K]. Plants seem to be immune to the predations of rabbits[233]. A good bee plant[4, 24]. Grows well with potatoes[14].

# 5.2.638 Chrysosplenium oppositifolium

Golden Saxifrage

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Chrysosplenium oppositifolium is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 5, 8, 17, 52, 61, 66]. Added to salads or soups[183]. The leaves are rather small, and there is a distinct bitterness in the flavour, especially in hot weather[K].

tcanta The plants creeping habit makes it a good ground cover for the bog garden[200].

nrakta Western and central Europe, including Britain, from Norway to Spain, east to Germany and N. Italy. ksacta Acid soils[200] on the banks of springs and wet shady mountainsides[5, 17, 52].

propta Seed - sow spring or autumn in a lightly shaded position in a cold frame. Stand the pot in 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in light shade in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils if they are moist. Requires a constantly wet but well-drained soil[200]. Prefers a shady position, succeeding in woodland[17, 200].

#### 5.2.639 Daucus carota

Wild Carrot, Queen anne's lace, Carrot, Wild Carrot, Queen Anne's Lace

4 tlin 8 cyuc 2 kcak 4 tcan 3 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Daucus carota is a BIENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It

enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200].

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Tolerates poorer soils[233]. Prefers a sunny position[200] but also succeeds in part shade[233]. Plants are hardy to about -25°c[187]. A very ornamental plant[1], there are some named varieties[233]. A polymorphic species[50], it hybridizes freely with other members of this genus[200]. Most species in this genus seem to be immune to the predations of rabbits[233].

#### 5.2.633 Clintonia umbellulata

Speckled Wood Lily, White clintonia 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Clintonia umbellulata is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked[61, 105, 177]. Harvested in spring before they fully unfurl, they have a cucumber flavour[62]. Older leaves can be cooked[62].

nrakta Eastern N. America - New York to New Jersey, south to Georgia and Tennessee. ksacta Rich cove hardwood forests at elevations of 200 - 1000 metres[43, 270].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the spring[200]. Stored seed should be sown in late winter or early spring in a cold frame[164]. It sometimes germinates within 1 - 3 months at 15°c, but may take a year. The seed should be completely separated from the fruit and should only just be covered by soil[164, 200]. If the seed has been sown thinly enough, then it is possible to leave the seedlings in the pot for their first growing season, dividing them after they become dormant. Make sure to give them liquid feeds at intervals through the spring and summer. Otherwise prick out the seedlings into individual pots when they are large enough to handle. Plant out in late spring or early summer at the beginning of their second or third years growth. Division in spring as new growth is just commencing[200].

nwatta Prefers a damp peaty sandy soil in a cool damp shady position[1, 42, 200]. Requires a moist neutral to acid soil[200]. Succeeds in acid clay soils[187]. Dormant plants are hardy to at least -25°c, but the new growth in spring can be damaged by late frosts[187]. Plants only produce their fruit in warm seasons in Britain[200]. They have shortly-creeping underground stems and form dense patches[187].

# 5.2.634 Lewisia columbiana

Columbian Bitterroot, Columbian lewisia, Wallowa lewisia 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lewisia columbiana is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable plr: mildly acid and neutral soils. It can grow in semi-shade (light wood-

land) or no shade. It prefers moist soil.

koakta Edible Parts: RootEdible Uses: Rootcooked[257]. Said to be extremely nutritious. It is easiest
to use when the plant is in flower because the outer layer of
the root (which is very bitter) slips off easily at this time of
the year. The root has a good taste though a decided bitter
flavour develops afterwards[105, 161].

nrakta Western N. America - South British Columbia to Oregon.. ksacta Exposed gravel banks and rocky slopes [60]. Rocky slopes and crevices at elevations of 500 - 2300 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame in a very freely draining soil[129]. Sow stored seed as soon as possible in a cold frame. One months cold stratification should improve germination, though this is still likely to be very slow. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first two winters. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March/April. Very difficult.

nwatta Requires a very well-drained gritty humus-rich deep soil in a sunny position[1, 200]. Prefers a neutral to acid soil and a position in semi-shade[188]. Best if given a north or north-east aspect in order to protect it from the midday sun[200]. Thrives on almost bare rock[1]. It might be worth-while trying this species in a crevice of a sunny drystone wall[219]. This species prefers a moister soil than most members of the genus[188]. This species is not reliably hardy in Britain. It can withstand consistently very cold weather but does not like alternating periods of mild and cold conditions, nor does it like winter wet[1]. The plant is very susceptible to rotting at the neck in a damp soil[200]. A very ornamental plant[1], it is very apt to hybridize with other members of the genus[1].

#### 5.2.635 Thymus guinguecostatus

4tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.1 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thymus quinquecostatus is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe plant is the source of an essential oil that is used as a food flavouring[177, 183]. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200].

tcanta Deodorant Disinfectant EssentialThe essential oil obtained from the leaves is also used in perfumery, as a mouth wash, medicinally etc[200].

dwatta Antiseptic Deodorant DisinfectantThe leaves, and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta E. Asia - Japan, Himalayas, Mongolia. ksacta Dry rocky slopes, less common in scrubby areas, 1700 - 3100 metres in Srinagar[145].

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Requires a light well-drained preferably calcareous soil in a sunny position[1, 200]. Succeeds in dry soils. Grows well between stepping stones on paths, tolerating light treading[183, 200]. Succeeds on walls. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. The flowers are rich in nectar and are very

used as a salt substitute[172, 177]. The stems and leaves, whilst still green, are rolled up into balls, dried and then placed on top of a very small fire on a rock and burned[207]. A very acceptable condiment for piñole[207].

tcanta Containers StuffingThe cotton-like seed heads have been used as a stuffing material in mattresses etc[257]. The leaves have been used to make temporary cone-shaped containers for picking fruit[257]. The leaves have occasionally been used to form makeshift funnels[257].

dwatta Antispasmodic Pectoral Poultice SalveAntispasmodic, poultice, salve[172]. An infusion of the dried, stored leaves has been used in the treatment of colds, head and chest congestion[257].

nrakta North-western N. America. ksacta Meadows, swampy places and moist woods[60].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta We have very little information on this species and do not know if it will succeed in Britain, though judging by its native range it should succeed outdoors in most parts of the country. According to one report this species is no more than a synonym of P. frigidus[60]. The following notes are based on the general needs of the genus. Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Prefers partial shade[31]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Dioecious, male and female plants must be grown if seed is required.

#### 5.2.537 Onoclea sensibilis

Sensitive Fern

4 tlin 8 cyuc 2 kcak 2 tcan 2 dwat 0.5 m hkuc

pcimhmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Onoclea sensibilis is a deciduous Fern growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The seeds ripen from June to October. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semishade (light woodland). It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: Leaves RootEdible Uses: The young uncurled leaves, often called 'fiddleheads', are used as a vegetable or eaten raw[[159, 177, 183]. Remove the brown scales and then steam the leaves in very little water[213]. The young shoots have been sold as delicacies in Asian markets[213]. Root - cooked[105, 161, 177, 183]. A famine food, it is only used in times of scarcity[213].

tcanta HairA decoction of the plant has been used as a hair wash to help prevent baldness[257]. This species has a freely-running rootstock and makes an effective ground cover plant[200, 233]. Although it is deciduous its decomposing ferns make an effective weed suppressing mulch[200]. Plants should be spaced about 1 metre apart each way[208].

dwatta Galactogogue Poultice Women's complaintsSensitive fern has not been much used medicinally. However, one native North American Indian tribe did employ it quite widely to treat various women's complaints[257]. An infusion of the root has been used to treat the pain following childbirth[257]. A decoction of the roots has been used to treat fertility in women, to give strength after childbirth, to start the menses, and to treat swellings, cramps and a sore abdomen[257]. An infusion of the whole plant, or just the root, has been applied externally to full breasts where the milk will not flow[257]. A poultice of the plant is used in treating deep cuts[257].

nrakta N. America - east of the Rockies to N.E. Asia. ksacta Open swamps, thickets, marshes, or low woods, in sunny or shaded locations, often forming thick stands from sea level to elevations of 1500 metres[270],

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep them in humid conditions until they are well established. Do not plant outside until the ferns are at least 2 years old. Division of underground rhizomes, October to March.

nwatta Landscape Uses: Container, Foundation, Specimen, Woodland garden. Prefers a moist light soil in partial shade[187]. Requires a damp humus-rich site in partial shade with preferably only 2 - 3 hours of sun daily[200]. Plants require an abundance of water at the roots all year round[1] and they grow well in a bog or woodland garden, or on the water's edge where they may grow out over the water[200]. Requires a pH in the range 5 - 6.5[200]. Plants can colonize most situations that are not too dry and are sheltered from harsh winds[200]. A very hardy plant, the rootstock can tolerate temperatures down to about -30°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental[1] and easily grown fern, spreading quite vigorously by means of a slender far-creeping rhizome when it is established[187]. It can become invasive in suitable conditions[200]. The fronds die quickly with the first autumn frosts[187], which is why the plant has gained its common name of the sensitive fern[200]. Special Features: Attractive foliage, North American native, Invasive, Naturalizing, Attracts butterflies. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.538 Arisaema amurense

Tian Nan Xinc

4tlin 8 cyuc  $\check{2}$ kcak 0 tcan 3 dwat 0.5 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Arisaema amurense is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

kcakta Edible Parts: Leaves RootEdible Uses: Well-soaked roots can be boiled, peeled and eaten[177]. The tuber is 6 - 7cm in diameter[266]. Some caution is advised, see the notes above on toxicity. Young leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

dwatta Anodyne Antispasmodic Cancer Epilepsy Expectorant VermifugeTian Nan Xing has been used in Chinese herbal medicine for thousands of years and is valued especially for its beneficial affect upon the chest[254]. When prescribed internally it is always used dried and in conjunction with fresh ginger root[254]. The root is an acrid irritant herb that is anodyne, antibacterial, antifungal, antiphlogistic, antirheumatic, anticancer, antispasmodic, antitumor, expectorant, sedative and stomachic [147, 176, 218, 238, 279]. The dried root is used internally in the treatment of coughs with profuse phlegm, tumours, cervical cancer, epilepsy, tetanus and complaints involving muscular spasms[176, 238]. The fresh root is applied externally as a poultice to ulcers and other skin complaints[254]. The root is harvested when the plant is dormant in the autumn or winter and is dried for later use[238]

nrakta E. Asia - N. China, Japan, Korea. ksacta Virgin forests, mountains and river banks[74]. Deciduous forest, mixed forest, under woods and by streams at elevations of 50 - 200 metres in China[266].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame [134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1-6 months at  $15\,^\circ\text{c}[134]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Prefers a cool peaty soil in the bog, woodland garden or a sheltered border in semi-shade[200]. Prefers a loamy or peaty soil[1] and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too exposed[1, 200]. This species is well suited to the front of a peat border[200]. Tubers should be planted about 15cm deep[233]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants require protection from slugs[200]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year.

#### 5.2.539 Orchis coriophora

**Bug Orchis** 

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Orchis coriophora is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot -cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antiflatulent Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta C. Europe to W. Asia. ksacta Dry or damp pastures and marshes in hills and mountains[42]. Usually found on acid soils[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Easily grown in full sun in a moist sandy loam[42]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Plants seem to be immune to the predations of rabbits[233]. Cultivated plants are very susceptible to the predation of slugs and snails[230]. The flowers have an abominable bug-like smell[42, 230]. The flowers of the commoner sub-species. O. coriophora fragrans, however, are sweetly scented[230].

#### 5.2.540 Cardamine bulbifera

Coral Root, Coralroot bittercress 4 tlin 8 cyuc 2 koak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Cardamine bulbifera is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to 0.5 m (1ft 8in). See above for USDA hardiness. It is is hardy to UK zone 4 and is not frost tender. It is in flower from April to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw or cooked[K]. A hot cress-like flavour. Bulbils - raw or cooked. They are rather small, about the size ofa lentil, but have a pleasant mild cress-like flavour[K]. Root - raw or cooked[K]. A hot flavour, it is pleasant but rather small[K].

nrakta Central Europe from Britain and France to Sweden, east to the Balkans, W. Asia and the Caucasus. ksacta Very local in woods, usually on calcareous soils, in Devon,

#### 5.2.630 Lilium concolor

Morning Star Lily

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium concolor is a BULB growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - cooked[2, 105]. The bulb is up to 35mm in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum). Young leaves - cooked[177]. Flowers[178]. No more details are given.

dwatta Carminative Expectorant Pectoral Poultice Sedative TonicThe bulb is carminative, expectorant, pectoral, sedative and tonic[147, 218]. It is taken internally in the treatment of bronchial complaints[238]. The flowers invigorate the blood[218]. They are poulticed onto sores and boils[218].

nrakta E. Asia - China ksacta Scrub in pockets of humus on carboniferous limestone and in heavy limey soil, 1500 - 2200 metres[90]. Moist places in forests, thickets, moist meadows, grassy slopes and sunny grassland[266].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[143, 200]. Prefers an acid sandy soil but also succeeds on heavy soils[47, 143]. Plants are lime tolerant[47, 143, 200]. Requires a sheltered position if grown outdoors, doing well on a rock garden, but it is best grown in a greenhouse[163] Stem rooting, the bulbs should be planted 7 - 10 cm deep[143, 200]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. A very ornamental plant[1], it is cultivated for its edible bulb in Japan[2]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### **5.2.631** Thymus pulegioides

Broad-Leaved Thyme, lemon thyme 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thymus pulegioides is an evergreen Shrub growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe leaves of some cultivars can be used as a condiment[183, 238]. They can be used as an ingredient of the herb mix 'bouquet garni', or added to soups, vegetables etc, going particularly well with mushrooms or courgettes[238]. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200].

tcanta Deodorant Disinfectant EssentialThe essential oil obtained from the leaves is also used in perfumery, as a mouth wash, medicinally etc[200].

dwatta Antiseptic Deodorant Disinfectant Expectorant. The leaves, and especially the essential oil contained in them, are antiseptic, deodorant, disinfectant and expectorant[200, 222, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Serbia and Bulgaria. ksacta Dry grassland, usually on calcareous soils[11].

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Requires a light well-drained preferably calcareous soil in a sunny position[1, 200]. Succeeds in dry soils. Grows well between stepping stones on paths, tolerating light treading[183, 200]. Succeeds on walls. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to at least -10°c[238]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200]. There are many named forms selected for their ornamental value[183]. The leaves are highly aromatic[200]. The flowers are rich in nectar and are very attractive to honey bees[200].

# 5.2.632 Aster amellus

Ialian Actor

4 tlin 8 cvuc 2 kcak 0 tcan 2 dwat 0.7 m hkuc

htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aster amellus is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from September to October, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young plants - cooked[177]. Only certain varieties (not specified in the report) are used[177]. A nutritional analysis is available[218].

dwatta Antiinflammatory Antitussive Depurative Haemostatic Malaria PectoralThe roots are anti-inflammatory, antitussive, depurative, haemostatic and pectoral[61, 147].They are used in the treatment of coughs, pulmonary affections and malaria[240]. The root juice is used internally in Nepal to treat indigestion and externally to treat boils[272].

nrakta Europe to E. Asia. ksacta Scrub and wood margins.[50] Marshy places and lake sides[178], mainly on limestone soils[200].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. The seed usually germinates in 2 weeks at 20°c[134]. When large

beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Skin contact with the sap is said to cause photosensitivity and/or dermatitis in some people[218].

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[46, 61, 105, 161, 257].

dwatta Antipruritic Blood purifier Febrifuge PoulticeThe plant is antipruritic, blood purifier and febrifuge[257]. A decoction has been used to treat colds, itches, fevers and snakebites[257]. A poultice of the chewed plant has been applied to snakebites[257].

nrakta Western N. America. ksacta Barrens, plains and dry hills[43]. Streambanks, roadsides and waste areas in Texas[274].

propta Seed - sow August/September or April in situ. The seed germinates better if it is cold stratified, therefore the autumn sowing is liable to be more successful.

nwatta We have very little information on this plant, but it can be grown outdoors at least in southern Britain and probably in the north as well. It is likely to need a well-drained soil in a sunny position[K].

#### 5.2.627 Potentilla recta

Rough-Fruited Cinquefoil, Erect cinquefoil 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Potentilla recta is a PERENNIAL growing to  $0.6\,$  m (2ft) by  $0.6\,$  m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[207]. The unripe fruit is almost as pleasant as the fully ripe fruit[207].

dwatta AstringentThe whole plant is astringent[257]. A poultice of the pounded leaves and stems has been applied to open sores and wounds[257].

nrakta C. and S. Europe to W. Asia. More or less naturalized in Britain. Casual in Eastern N. America. ksacta More or less naturalized in waste or grassy places in Britain[17].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an acid soil[200]. Plants produce more foliage but flower less freely when grown in a rich soil[200]. Hardy to about -25°c[200]. There is at least one named variety selected for its ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.628 Fritillaria atropurpurea

Purple Fritillary, Spotted fritillary 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xra7t hionli

drutta Fritillaria atropurpurea is a BULB growing to 0.6 m (2ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy)

and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[212]. Rich in starch[212]. Rather small, it is usually less than 15mm in diameter[235].

dwatta SalveThe plant has been pulverized into a salve and applied to scrofulous swellings[257].

nrakta Western N. America - California to Oregon, N. Dakota and New Mexico. ksacta Humus rich damp soils under trees and shrubs in valleys and open woods, also in mountains to near the timberline, at elevations of 1000 - 3200 metres[212, 270].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[11]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[11]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta A woodland plant, preferring light soils[1]. It is best grown in a well-drained sandy woodland soil[42, 90, 134]. Plants are best grown in a bulb frame and kept rather dry in summer[90]. Water should be withheld in summer or hot spells[164]. Closely related to F. pinetorum[270].

#### 5.2.629 Ribes distans

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ribes distans is a deciduous Shrub growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly al-kaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Fruit - raw or cooked[177]. An unpleasant taste[74]. The red fruit is up to 8mm in diameter[266].

nrakta E. Asia - China, Korea, Manchuria. ksacta Mixed forests, in the shade of undergrowth and in the shade of rocks[74]. Forests and thickets in valleys, mountain slopes at elevations of 900 - 2700 metres[266].

propta Seed - best sown as soon as it is ripe in the auturn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°c[200]. This species is closely related to R. alpinum[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Diocious, male and female plants must be grown if fruit and seed is required[200].

S.E. England, the Chilterns and Ayr[17]. A characteristic species of base-rich beech woodlands[17]. and also in shady situations beneath shrubs etc[200]. Requires a shady position[188]. Plants are hardy to at least -

propta Seed - best sown when ripe, otherwise sow it in the spring. If you have sufficient seed it can be sown in situ, otherwise it is best to sow it in pots in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and pant out in the summer. The bulbils can be collected in early summer and potted up. Keep them in a cold frame over the winter and plant out when in active growth in the spring.

nwatta Prefers a moist humus rich soil in shade or semishade[200]. The flowers are rarely visited by pollinating insects and seed is rarely set, propagation is carried out by means of bulbils formed on the axils of the upper leaf stems[17, Kl.

# 5.2.541 Osmunda cinnamomea

Cinnamon Fern

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Osmunda cinnamomea is a FERN growing to 0.6 m (2ft) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: The young unexpanded fronds are eaten as a nibble or cooked in soups[46, 61, 62, 116, 159, 183, 257]. The taste is said to resemble asparagus[200]. The young shoots are seen as a 'spring tonic' to cleanse the body with fresh green food after a long winter eating mainly stored foods[257]. The latent buds can be eaten in early spring, they rival chestnuts in size and flavour[95].

dwatta Analgesic Antirheumatic GalactogogueA decoction of the root has been rubbed into affected joints as a treatment for rheumatism[257]. The root has been chewed, a small portion swallowed and the remainder applied to a snakebite[257]. The following reports do not state which part of the plant is being used, though it is most likely that the root is being referred to. The plant is analgesic, antirheumatic and galactogogue[257]. A decoction is used internally in the treatment of headaches, joint pain, rheumatism, colds etc, and also to promote the flow of milk in a nursing mother[257].

nrakta Eastern N. America - Newfoundland to Florida, S. America, E. Asia. ksacta Sandy or alluvial soils[159] in swamps low woods and thickets in Eastern N. America[43]. Moist areas, acidic soils, frequently in vernal seeps from sea level to 2300 metres[270].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferms are at least 2 years old. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wirv roots[2001.

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Specimen, Woodland garden. Easily grown in a damp woodland or by the margins of pools and streams[187]. Likes a soil of swamp mud and loamy or fibrous peat, sand and loam[1]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil

and also in shady situations beneath shrubs etc[200]. Requires a shady position[188]. Plants are hardy to at least -20°c, they are evergreen in warm winter areas but deciduous elsewhere[200]. This species is sometimes cultivated for its edible fronds[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1]. The rhizome is large and slowly creeping[187]. Special Features: Attractive foliage, North American native, Naturalizing, Wetlands plant, There are no flowers or blooms.

# 5.2.542 Calypso bulbosa

Fairyslipper

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.1 m hkuc pcimhmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Calypso bulbosa is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from October to July, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[22, 46, 61, 105, 155]. Rather small[161]. The corms have a rich, butter-like quality[256]. They were usually boiled by the North American Indians before being eaten, though young maidens would eat them raw as they were believed to increase the size of the bust[256].

dwatta Antispasmodic EpilepsyThe bulbs have been chewed or the flowers sucked in the treatment of mild epilepsy[257].

nrakta N. Europe, N. America - Alaska to California, east to New York. ksacta Soils rich with decaying leaves and wood, in moist pine or spruce woods and by cool shady streams from sea level to the mid-montane zone[60, 155].

propta Seed - we have no information on this species but, like all members of the orchid family, the seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. Surface sow the seed, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division in autumn. Make sure that you keep plenty of soil with each plant. It is also said to be possible to transplant orchids after they have flowered but whilst they are still in leaf. Grow on for at least the first year before potting up and do not plant out until the plants are 2 - 4 years old. Division of the tubers as the flowers fade [230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Grows well in half shade in a light moist organicrich soil[1, 42, 200]. Requires a lime-free soil, doing best in full shade[42]. The plant comes into growth in the autumn and, although fairly hardy, is best grown in a frame or unheated greenhouse[230]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to

obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. Plants can be naturalized in the woodland or bog garden[200]. Apply a good organic mulch in the winter[1]. Plants do not always grow every year, the bulb can remain dormant in the soil for 2 years[42].

#### **5.2.543** Erythronium tuolumnense

Tuolumne Fawn Lily, Dog's Tooth Violet, Pagoda Lily 4 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Erythronium tuolumnense is a BULB growing to  $0.3 \, \mathrm{m}$  (1ft) by  $0.2 \, \mathrm{m}$  (0ft 8in) at a medium rate. It is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, the following notes have been seen for another member of this genus and so some caution is advised. Skin contact with the bulbs has been known to cause dermatitis in sensitive people[65].

kcakta Edible Parts: RootEdible Uses: Although no specific mention has been found for this species, most if not all members of the genus provide edible bulbs[K]. The ovoid bulb is 5 - 10cm long[270].

nrakta Western N. America - California. ksacta A very rare plant in the wild, growing in chaparral, yellow pine forests and woodlands in the foothills at elevations of 300 - 600 metres[276]

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame. Water lightly in summer, it should germinate in autumn or winter[164, 200]. Stored seed requires a period of cold stratification[164]. Sow as early in spring as possible in a cold frame. Sow the seed thinly so that it will not be necessary to prick them out for their first year of growth. Give an occasional liquid feed to the seedlings to make sure that they do not become nutrient deficient. When the plants are dormant, pot up the small bulbs putting 2 -3 bulbs in each pot. Grow them on in a shady position in the greenhouse for another 2 3 years and then plant them out into their permanent positions when they are dormant in late summer. Division of the bulbs in the summer as the leaves die down[1]. Larger bulbs can be replanted immediately into their permanent positions, but it is best to pot up smaller bulbs and grow them on in a shady position in a greenhouse for a year before planting them out when dormant in late summer

nwatta Landscape Uses:Alpine garden, Container, Rock garden, Woodland garden. Prefers slightly acid soil conditions but succeeds in chalky soils if these contain plenty of humus[164]. Requires semi-shade, preferably provided by trees or shrubs, and a well-drained soil[42, 164]. Succeeds in almost any light soil, preferring one that is rich in humus[1]. Plants are hardy to at least -15°c[200]. Plants are spreading well, but only flowering lightly in the dappled shade of a woodland garden at Kew[K]. Bulbs should be planted about 7cm deep[1]. They increase rapidly by offsets[188]. Special Features: Attractive foliage, North American native, Naturalizing.

# 5.2.544 Cardamine bulbosa

Bulbous Bittercress

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine bulbosa is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs)

and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - raw[105, 177]. Added to salads. The rootstock is grated and used as a condiment[207], it is a horse radish substitute[105, 177]. A hot pungent taste.

nrakta Eastern N. America - Vermont to Ontario and Minnesota, south to Florida and Texas. ksacta By springs, bottomland woods and meadows[43].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

#### 5.2.545 Carlina acaulis

Stemless Carline Thistle

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Carlina acaulis is a BIENNIAL/PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA
hardiness. It is hardy to UK zone 4. It is in flower in
June, and the seeds ripen from July to August. The species
is hermaphrodite (has both male and female organs) and
is pollinated by Bees, Lepidoptera (Moths and Butterflies).
The plant is self-fertile. Suitable for: light (sandy), medium
(loamy) and heavy (clay) soils, prefers well-drained soil and
can grow in nutritionally poor soil. Suitable pH: mildly acid,
neutral and basic (mildly alkaline) soils and can grow in very
alkaline soils. It cannot grow in the shade. It prefers dry or
moist soil

kcakta Edible Parts: Flowers Root StemEdible Uses: Flowering head - cooked. Used as a globe artichoke substitute[177, 183], though they are considerably smaller and even more fiddly[K]. The fleshy centre of the plant is edible[7, 105]. Does this refer to the peeled stem?[K]. Root[13]. No more details are given.

tcanta Weather forecastingThe dried flowers respond to the amount of humidity in the air and can be used as hygrometers[100]. Flowers on the growing plant close at the approach of rain[268].

dwatta Antispasmodic Carminative Diaphoretic Digestive Diuretic Eczema Emetic Febrifuge PurgativeStemless carline thistle is seldom used in modern herbalism. The plant was at one time in great demand as an aphrodisiac[7], it is occasionally used nowadays in the treatment of spasms of the digestive tract, gall bladder and liver disorders, dropsy, urine retention etc[9, 268]. The root has also been used in treating a range of skin complaints such as acne and eczema[268]. A decoction of the root can be used externally to cleanse wounds or as an antiseptic gargle[268]. Some caution should be employed since in large doses the root is purgative and emetic[268]. The root is antibiotic, antispasmodic, carminative, diaphoretic, digestive, mildly diuretic, emetic in large doses, febrifuge and purgative in large doses[7, 9, 21, 46]. The root is harvested in the autumn and dried for later use[7].

nrakta Europe. ksacta Poor soils in dry sandy pastures and on rocky slopes[7, 21, 100], especially on limestone[9].

propta Seed - surface sow in a cold frame in the spring. The seed usually germinates in 4 - 8 weeks at 15°c[138]. As soon as they are large enough to handle, prick the seedlings

and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Landscape Uses: Alpine garden, Container, Foundation, Massing, Rock garden, Woodland garden. An easily grown and very tolerant plant[K], it succeeds in ordinary garden soil, preferring a moist but not wet soil and a sunny position[1]. Intolerant of heavy clay[200]. Does well in semishade[111]. Prefers a rather poor slightly acid soil[111]. A very ornamental and cold-hardy plant, it tolerates temperatures down to about -25°c[1,187]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Plants are pollinated by humming birds in the wild[187] Most species in this genus are short-lived, dving out after 2 - 3 years, though they usually produce seed prolifically[200]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. Special Features: Attracts birds, North American native, Naturalizing, Wetlands plant, Attracts butterflies, Suitable for cut flowers. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 5.2.624 Hierochloe odorata

Holy Grass

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hierochloe odorata is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

pcista The plant contains coumarin, this is toxic if taken internally[169] and is sometimes considered to be carcinoqueic[222].

kcakta Edible Parts: SeedEdible Uses: Colouring CondimentSeed - cooked[105]. Small and fiddly to use. It almost certainly does not contain coumarin and should be safe to use. An essential oil from the leaves is used as a food flavouring in sweets and soft drinks. It has a strong vanilla-like flavour[183]. The leaves are added to vodka as a flavouring[238]. The plant is said to be used as a colouring agent[183] but no more details are given.

tcanta Basketry Hair Incense Repellent Soil stabilization Strewing Stuffing The dried leaves are used as an incense[46, 61, 99], they were formerly also used as a strewing herb[1, 46, 238] and have been used as a stuffing in pillows and mattresses[257]. They have also been used as an insect repellent in the clothes cupboard where they impart a nice smell to the clothes[99, 238]. The leaves are used to make aromatic baskets[46, 61, 99, 169, 171]. The wet leaves can be sewn together, dried until they are tight and then resin used over the stitches to make a waterproof container[257]. The leaves can be soaked in water to make a tonic hair wash[257]. An essential oil distilled from the leaves is used in perfumery where it acts as an excitant and fixative for other aromas[238]. The plant has a very aggressive root system and has been planted to stabilize banks[74].

dwatta Birthing aid Febrifuge Skin VDA tea made from the leaves is used in the treatment of fevers, coughs, sore throats, chafing and venereal infections[222, 257]. It is also used to stop vaginal bleeding and to expel afterbirth[222]. The stems can be soaked in water and used to treat wind-burn and chapping and as an eyewash[257]. Some caution is advised when using this plant internally, see the notes above on toxicity[222]. The leaves are harvested in the summer and dried for later use[238]. Smoke from the burning leaves has been inhaled in the treatment of colds[257].

nrakta Central and northern Europe, including Britain, to N. Asia and N. America. ksacta Wet banks in only a few sites in Scotland[17].

propta Seed - sow spring in situ and only just cover the seed [162]. Germination usually takes place within 2 weeks. If the seed is in short supply it can be sown in the cold frame in the spring. When large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. Division in spring or summer[162]. Very simple, virtually any part of the root will regrow to make a new plant [K].

nwatta Prefers a damp position in a rich soil but succeeds in most soils including quite dry conditions[162]. Grows best in a sunny position[238]. The plants have a running root system and can spread aggressively when grown in suitable conditions[74]. The plant, as it dries, emits a powerful scent of newly mown hay[245].

# 5.2.625 Taraxacum obovatum

4tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Taraxacum obovatum is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Coffee TeaLeaves - raw or cooked. They have a mild flavour[217]. The following uses are also probably applicable to this species, though we have no records for them[K] Root - cooked[183]. Flowers - raw or cooked[183]. The unopened flower buds can be used in fritters[183]. The whole plant is dried and used as a tea[177, 183]. A pleasant tea is made from the flowers. The leaves and the roots can also be used to make tea. The root is dried and roasted to make a coffee substitute.

nrakta S. Europe - Mediterranean. ksacta Not known

propta Seed a sow spring in a cold frame and either surface-sow or only just cover the seed. Make sure the compost does not dry out. Germination should take place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle, choosing relatively deep pots to accommodate the tap root. Plant them out in early summer. Division in early spring as the plant comes into growth.

nwatta Prefers a well-drained humus-rich soil in full sun or light shade. According to one report this species reproduces apomictically and sexually[50], whilst another report says that only apomictic seed production is undergone[110]. Apomixy is an asexual method of seed production where each seed is genetically identical to the parent plant. Occasionally seed is produced sexually, the resulting seedlings are somewhat different to the parent plants and if these plants are sufficiently distinct from the parents and then produce apomictic seedlings these seedlings are, in theory at least, a new species.

#### 5.2.626 Daucus pusillus

Rattlesnake Weed, American wild carrot 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Daucus pusillus is a BIENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies,

September. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw or cooked[8, 52, 105, 183]. A hot cress-like flavour. Nice as a flavouring in salads, it is usually available all year round. Root - raw or cooked[183].

nrakta Much of Europe, including Britain, east through Asia to China and Japan. ksacta Moist shady places by streams and occasionally on cultivated ground[17].

propta Seed - sow spring or autumn in situ. This species needs very little encouragement and is quite capable of sowing itself, often too freely.

nwatta Prefers a moist humus rich soil in shade or semishade[200] but it succeeds in most soils and positions[1]. A common garden weed, it is found especially in pot-grown plants[8].

#### 5.2.621 Allium flavum

Small Yellow Onion, Ornamental Onion

4 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium flavum is a BULB growing to 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. The bulb is rather small, about 15mm tall and 10mm in diameter[203]. Leaves - raw or cooked. Flowers - raw.

tcanta Insecticide RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Southern and central Europe. ksacta Dry slopes[203].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division of the bulbs in late summer or the autumn. Larger bulbs can be planted straight out into their permanent positions, though it might be best to pot up the smaller bulbs and grow them on for a year before planting them out

nwatta Landscape Uses:Border. A very easily grown plant, it prefers a sunny position in a light well-drained soil[1, 203]. It succeeds in clay soils and also in areas of higher rainfall, so long as the soil drains fairly well[203]. A very variable species with forms ranging in height from 8 - 50cm[203]. Closely related to A. carinatum[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special

Features: Not North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers.

# 5.2.622 Tragopogon crocifolius

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.8 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tragopogon crocifolius is a ANNUAL/BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[2, 177]. Leaves - raw or cooked[105].

cooked[2, 177]. Leaves - raw or cooked[105]. nrakta S. Europe - Italy. ksacta Cultivated land and stony ground in the mountains[45].

propta Seed - sow spring in situ. Make sure to water the seed in if the weather is dry.

nwatta Succeeds in ordinary garden soils, including heavy clays[200].

# 5.2.623 Aguilegia canadensis

Wild Columbine, Red columbine, Meeting Houses, Common Columbine

4 tlin 10 cyuc 2 kcak 2 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aquilegia canadensis is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: Flowers RootEdible Uses: Flowers - raw. Sweet and delightful[172]. Rich in nectar[213], hey make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K]. Root[2, 105, 177]. These reports possibly refer to the root being chewed for its medicinal virtues[K]. Caution is advised, see notes above on toxicity[172].

tcanta Essential Parasiticide ParasiticideThe seed is rubbed into the scalp to rid the hair of lice[172, 222]. The crushed seed is pleasantly aromatic and is used as a perfume. The fragrance persists for a long time[207].

dwatta Anodyne Antispasmodic Astringent Diaphoretic Diuretic Febrifuge Parasiticide Parasiticide Resolvent SalveAntispasmodic, diaphoretic, parasiticide, resolvent, salve[172, 222]. The root is astringent and diuretic[222, 257]. It is chewed or made into a weak tea for the treatment of diarrhoea and stomach aches[222]. The tea is used in the treatment of uterine bleeding[222]. The boiled plant was used as a hair wash[213]. The seed is anodyne and febrifuge[257]. An infusion is used in the treatment of headaches and fevers[257].

nrakta N. America - Nova Scotia to the Northwest Territories and south to Nebraska, Texas and Florida. ksacta Rocky, wooded or open slopes and sometimes in swamps[43]. Shaded or open woods, often around cliffs, rock outcrops, and forest edge, sometimes in swamps, from sea level to 1600 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots

out into individual pots and plant them out into their permanent positions in the summer.

nwatta Succeeds in a sunny position in ordinary garden soil[111]. Prefers a neutral to alkaline soil[138, 238]. Prefers a poor soil[200]. Established plants are drought tolerant[190]. Plants are hardy to about -20°c[187]. The stemless carline thistle is a protected plant in the wild because of its rarity[7]. This species resents root disturbance, it should be planted into its final position as soon as possible[138]. Plants are usually short-lived or monocarpic[187]. The plant is popular in dried flower arranging, the dried heads keeping their appearance indefinitely[7].

# 5.2.546 Aquilegia pubescens

Columbine, Sierra columbine 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aquilegia pubescens is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: Flowers Edible Uses: Flowers - raw. Rich in nectar, they are sweet and delightful[172], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K].

tcanta Parasiticide ParasiticideThe seed is used as a parasiticide to rid the hair of lice[172].

dwatta Antispasmodic Diaphoretic Parasiticide Parasiticide Resolvent SalveAntispasmodic, diaphoretic, parasiticide, resolvent, salve[172].

nrakta South-western N. America - the southern Sierra Nevada of California. ksacta Open rocky places and talus in the alpine and sub-alpine zones at elevations of 2700 - 4000 metres in California[71, 270].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Prefers a well-drained friable sandy loam with leaf mold(1]. Intolerant of heavy clay[200]. Most species of Aquilegia are short-lived, dying out after 2 - 3 years, though they usually produce seed prolifically[200]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. This species is endemic to the southern Sierra Nevada., it sometimes forms extensive hybrid swarms with A . formosa pauciflora in the wild[71, 270]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 5.2.547 Ambrosia artemesiifolia

Roman Wormwood, Bitterweed, Blackweed, Carrot Weed, Hay Fever Weed, Stickeweed, Tassel Weed, Wild Ta 4 tlin 8 cyuc 2 kcak 1 tcan 3 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ambrosia artemesiifolia is a ANNUAL growing to 0.9 m (3ft) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline)

soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The pollen of this plant is a major cause of hayfever in N. America[207, 222]. Ingesting or touching the plant can cause allergic reactions in some people[222].

kcakta Edible Parts: OilEdible Uses: OilAn oil is obtained from the seed. It has been suggested for edible purposes because it contains little linolenic acid[61, 183]. The seed contains up to 19% oil[61], it has slightly better drying properties than sova bean oil[183].

tcanta Disinfectant OilThere is some indication it has been used as a disinfectant and Oil.

dwatta Antidote Astringent Disinfectant Emetic Febritique Women's complaintsThe leaves are very astringent, emetic and febrifuge[222, 257]. They are applied externally to insect bites, rheumatic joints and various skin complaints, internally they are used as a tea in the treatment of fevers, pneumonia, nausea, intestinal cramps, diarrhoea and mucous discharges[222, 257]. Juice from the wilted leaves is disinfectant and is applied to infected toes[257]. At a made from the roots is used in the treatment of menstrual disorders and stroke[222]. The pollen is harvested commercially and manufactured into pharmaceutical preparations for the treatment of allergies to the plant[222].

nrakta N. America - British Columbia to Nova Scotia and Florida. Locally established casual in Britain[17]. ksacta Waste places in Western N. America[60]. Found in dry soils, it can become a pernicious weed in cultivated soils[235].

propta Seed - we have no details for this species but suggest sowing the seed in situ in April.

nwatta We have very little information on this species but suggest growing it in a sunny position in a well-drained soil. It has been suggested for commercial cultivation[61]. Some plants produce mainly sterile heads[60]. The pollen from the flowers of this species is an important cause of hayfever in N. America[17]. Special Features:North American native, Invasive, Inconspicuous flowers or blooms.

# 5.2.548 Polygonatum odoratum

Solomon's Soa

4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.9 m hkuc

pcimhmim cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum odoratum is a PERENNIAL growing to 0.9 m (3ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista The fruits are poisonous[9, 10, 19, 65].

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked. They can be used as an asparagus substitute[46, 55, 61]. Root - cooked[2, 55, 105, 179]. Rich in starch.

dwatta Antiperiodic Antitussive Cardiotonic Demulcent Diuretic Hypoglycaemic Miscellany Ophthalmic Resolvent Sedative TonicSolomon's seal has been used for thousands of years in herbal medicine. It is used mainly in the form of a poultice and is believed to prevent excessive bruising and to stimulate tissue repair[254]. The root is antiperiodic, antitussive, cardiotonic, demulcent, diuretic, energizer, hypoglycaemic, ophthalmic, resolvent, sedative and tonic[7, 9, 21, 147, 174, 176, 178, 218]. It is used in the treatment of, dry throat, dry coughs and coronary heart disease[176]. The plant is only used in domestic medicine[9]. An infusion is used as a diuretic and stimulant to the metabolism, though no more than 3 cups per day should be taken and only over short periods[9]. It can also be applied externally as a poultice to treat bruises, small wounds etc[7, 9]. It has also been used to remove freckles[9, 21, 174, 176, 178]. The root is harvested in the autumn and can be dried for later use[9] It should not be used internally except under expert supervision[254].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Siberia, China, Himalayas. ksacta Limestone woods and rocky places[17, 100].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Container, Massing, Specimen, Woodland garden. Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Prefers a dryish soil[10, 19]. Does well in woodlands and copses[1, 19]. Hardy to about -25°c[187]. The rhizomes are long and creeping, the plant forming large colonies[187]. The flowers are sweetly scented[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Hybridizes with other members of this genus[200]. A number of named forms have been selected for their ornamental value[187]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers, Fragrant flowers.

# 5.2.549 Cardamine scutata

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine scutata is a ANNUAL/BIENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105, 177]. A hot peppery flavour.

nrakta E. Asia - Japan ksacta Wet places in lowland and mountains all over Japan [58]. Valleys, shady slopes, damp sites, along ditches, rock crevices, mountain slopes, road-sides, streamsides, sea level to 2100 metres [266].

propta Seed - sow spring or autumn in situ.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

#### 5.2.550 Lilium formosanum pricei

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium formosanum pricei is a BULB growing to 0.1 m (0ft 4in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb -cooked[105, 177]. The bulb is 2 - 4cm in diameter[266]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

nrakta E. Asia - Formosa and Taiwan. ksacta Open grassland in sandy or volcanic soils in the alpine zone[260].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. This species can flower within a year from seed, especially if sown in the early autumn[143]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. This sub-species tolerates temperatures down to about -10°c and can succeed outdoors in many parts of the country if care is given in its siting[260]. It can flower in the first year from seed[143, 260]. In a warm climate the plant grows continually and will grow happily in pots in a conservatory[260]. The bulbs can be crammed into the pot with crocks below to give good drainage and a good loose compost above[260]. The flowers diffuse a delicious sweet perfume[245]. Stem rooting, the bulbs should be planted 20cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[143]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

# 5.2.551 Muscari neglectum

Grape Hyacinth, Starch grape hyacinth 4 tlin 7 cyuc 2 kcak 2 tcan 0 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Muscari neglectum is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The bulb is poisonous[4]. It contains a substance called comisic acid, which is said to act like saponin[4]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers RootEdible Uses: Bulb-cooked[2, 132, 177, 183]. The bulb is up to 25mm diameter[200]. One report says that the bulb might be poisonous[4]. The flowers, sprinkled over rhubarb, add a wonderful scented flavour[183].

tcanta Landscape Uses: Border, Container, Massing, Rock garden, forest garden.

nrakta Mediterranean region, north to Britain, Belgium, Germany and S. Russia. ksacta Dry grassland in sandy soils[4, 17].

propta Seed - best sown as soon as ripe in a greenhouse[200]. The seed can also be sown in early spring in a greenhouse. A good proportion of the seed usually germinates within  $2 \cdot 3$  months. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first year

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis it will probably require a period of cold stratification. Germihpa7tmwatli xre7t hjonli it will probably require a period of cold stratification. Germination usually takes place in 1 - 6 months at 15°c[134]. When

drutta Thymus pannonicus is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe leaves are sometimes used as a condiment[183]. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quicklv[200].

tcanta Deodorant Disinfectant EssentialThe essential oil obtained from the leaves is also used in perfumery, as a mouth wash, medicinally etc[200].

dwatta Antiseptic Deodorant DisinfectantThe leaves, and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta S.W. and C. Europe. ksacta Not known

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Requires a light well-drained preferably calcareous soil in a sunny position[1, 200]. Succeeds in dry soils. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. The flowers are rich in nectar and are very attractive to honey bees[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200].

#### 5.2.618 Arisaema utile

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta Arisaema utile is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves and flowering spathes - cooked as a potherb[272].

nrakta E. Asia - Himalayas - Pakistan to Nepal and Bhutan. ksacta Forest openings at elevations of 1800 -3700 metres in Nepal[272]. The margins of evergreen Tsuga forests, thickets at elevations of 2800-3100 metres[266].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame [134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but

it will probably require a period of cold stratification. Germination usually takes place in 1-6 months at  $15^{\circ}c[134].$  When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Prefers a cool peaty soil in the bog garden, woodland garden or a sheltered border in semi-shade[90, 134, 200]. Prefers a loamy or peaty soil and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too hot or exposed[1, 200]. Tubers should be planted about 10cm deep[233]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants need protection from slugs[200]. Closely related to A. griffithii[272]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year.

# 5.2.619 Aguilegia flavescens

Columbine. Yellow columbine

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aquilegia flavescens is a PERENNIAL growing to 0.8 m (2ft 7im). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: Flowers Edible Uses: Flowers - raw. Rich in nectar, they are sweet and delightful[172], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K].

tcanta Parasiticide ParasiticideThe seed is used as a parasiticide to rid the hair of lice[172].

dwatta Antispasmodic Diaphoretic Parasiticide Parasiticide Resolvent SalveAntispasmodic, diaphoretic, parasiticide, resolvent, salve[172].

nrakta Western N. America - British Columbia to Colorado. ksacta Moist mountain meadows and alpine slopes at elevations of 1300 - 3500 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sunny position[1]. Intolerant of heavy clay[200]. A very ornamental plant[1], it is closely related to A. formosa and hybridizes with it where their ranges overlap[200, 270]. Most species are short-lived, dying out after 2 - 3 years, though they usually produce seed prolifically[200]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 5.2.620 Cardamine flexuosa

Wavy Bittercress, Woodland bittercress
4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc
hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine flexuosa is a ANNUAL/PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to September, and the seeds ripen from May to

grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A vigorous plant, forming medium sized clumps[200]. A hybrid species of garden origin, the flowers are sterile[200]

#### 5.2.615 Lewisia rediviva

Bitter-Root

4tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lewisia rediviva is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from September to July, in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers weit soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[2. 4, 94, 161]. The root was a staple food of some native North American Indian tribes[257]. It is said to be extremely nutritious, 50 - 80 grams being sufficient to sustain an active person for a day[4, 207]. The root is, however, rather small and tedious to collect in quantity[207]. It is easiest to use when the plant is in flower in the spring, because the outer layer of the root (which is very bitter) slips off easily at this time of the year[85, 95]. Whilst being boiled the roots become soft and swollen and exude a pink mucilaginous substance[183]. The root swells to about 6 times its size and resembles a jelly-like substance[105]. The root has a good taste though a decided bitter flavour develops afterwards[85]. If the root is stored for a year or two the bitterness is somewhat reduced[183]. The root can also be dried, ground into a powder and used as a mush or a thickener in soups etc[212, 257].

dwatta Blood purifier Cardiac Galactogogue PoulticeThe root is cardiac and galactogogue[257]. An infusion of the root has been used to increase the milk flow in nursing mothers, to relieve heart pain and the pain of pleurisy and also as a blood purifier[257]. The root has been eaten raw to counteract the effects of poison ivy rash and as a treatment for diabetes[257]. The pounded dry root has been chewed in the treatment of sore throats[257]. A poultice of the raw roots has been applied to sores[257].

nrakta Western N. America - Montana to British Columbia, south to California and Colorado. ksacta Gravelly to heavy, usually dry soils [60]. Rocky dry soils of valleys, or on foothills, stony slopes, ridges and mountain summits to about 2.500 metres[212].

propta Seed - best sown as soon as it is ripe in a cold frame in a very freely draining soil[129]. Sow stored seed as

soon as possible in a cold frame. One months cold stratification should improve germination, though this is still likely to be very slow. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first two winters. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March/April. Very difficult.

nwatta Requires a very well-drained gritty humus-rich deep soil in a sunny position[1, 200]. This species is not reliably hardy in Britain. It can withstand consistently very cold weather but does not like alternating periods of mild and cold conditions, nor does it like winter wet[1]. The plant is very susceptible to rotting at the neck in a damp soil[200]. The plant is easy to kill by over-watering but extremely difficult to kill by under-watering. Roots that have been dried and stored for a number of years have been known to come back into growth when moistened[95]. The plant dies down after flowering and re-appears in September. It must be kept dry whilst dormant[129]. It is best grown in a greenhouse or bulb frame[200]. A very ornamental plant[1], it is the state flower of Montana[85, 95]. Very apt to hybridize with other members of this genus[1].

# 5.2.616 Chenopodium ficifolium

Fig-Leaved Goosefoot

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Chenopodium ficifolium is a ANNUAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Condimenteaves and flower buds - cooked[12, 105, 177]. Used like spinach or added to soups etc[183]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Seed - roasted and used as a condiment[105]. Used like sesame for flavouring foods[183].

tcanta DyeGold/green dyes can be obtained from the whole plant[168].

nrakta Central and southern Europe, including Britain, south and east to N. Africa and central Asia. ksacta Waste ground and arable land, especially on rich soils and near compost heaps. Avoids acid soils[17].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200].

# 5.2.617 Thymus pannonicus

Eurasian thyme 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.2 m hkuc of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in late summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of offsets in July/August after the leaves die down[1]. It can be done every other year if a quick increase is required[1]. Larger bulbs can be replanted direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out when they are dormant in late summer.

nwatta Prefers a rich open well-drained soil and a sunny position[1, 90]. Easily grown in any well-drained soil[90]. Grows very well in short grass[1], increasing freely[42] and it can become invasive[200]. A very variable plant[89, 200]. The flowers secrete lots of nectar and are a valuable bee plant in the spring[41]. The flowers are said to have a smell like wet starch[4] whilst another report says that they are deliciously plum-scented[245]. Special Features: Attractive foliage, Naturalizing, Fragrant flowers.

#### 5.2.552 Papaver rhoeas

Corn Poppy, Field Poppy, Shirley Poppy 4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Papaver rhoeas is a ANNUAL growing to 0.6 m (2ft) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant is toxic to mammals, though the toxicity is low[76]. The seed is not toxic[76].

kcakta Edible Parts: Flowers Leaves Oil SeedEdible Uses: Colouring OilSeed - raw or cooked. Much used as a flavouring in cakes, bread, fruit salads etc[4, 5, 21, 183], it imparts a very nice nutty flavour[K]. The seeds are rather small, but they are contained in fairly large seed pods and so are easy to harvest. The seeds are perfectly safe to eat, containing none of the alkaloids associated with other parts of the plant[238]. Leaves - raw or cooked[7, 52]. Used like spinach or as a flavouring in soups and salads[132, 183]. The leaves should not be used after the flower buds have formed[7]. Some caution is advised, see the notes above on toxicity. An edible oil is obtained from the seed[2, 4]. Said to be an excellent substitute for olive oil[4, 183], it can be used in salad dressings or for cooking[2]. A syrup can be prepared from the scarlet flower petals, it is used in soups, gruels etc[4, 183]. A red dye from the petals is used as a food flavouring, especially in wine[183].

tcanta Dye Ink Oil Pot-pourriA red dye is obtained from the flowers[7, 46, 61], though it is very fugitive[4]. A syrup made from the petals has been used as a colouring matter for old inks[4, 13, 89]. The red petals are used to add colour to pot-pourri[238].

dwatta Anodyne Cancer Emmenagogue Emollient Expectorant Hypnotic Sedative TonicThe flowers of corn poppy have a long history of medicinal usage, especially for ailments in the elderly and children[244, 254]. Chiefly employed as a mild pain reliever and as a treatment for irritable coughs, it also helps to reduce nervous over-activity[254]. Unlike the related opium poppy (P. somniferum) it is nonaddictive[244]. However, the plant does contain alkaloids, which are still under investigation, and so should only be used under the supervision of a qualified herbalist[244]. The flowers and petals are anodyne, emollient, emmenagogue, expectorant, hypnotic, slightly narcotic and sedative 4, 7, 9, 13, 46, 53]. An infusion is taken internally in the treatment of bronchial complaints and coughs, insomnia, poor digestion, nervous digestive disorders and minor painful conditions[9] 238]. The flowers are also used in the treatment of jaundice[218]. The petals are harvested as the flowers open and are dried for later use[238]. They should be collected on a dry day and can be dried or made into a syrup[4]. The latex in the seedpods is narcotic and slightly sedative[240]. It can be used in very small quantities, and under expert supervision, as a sleep-inducing drug[7]. The leaves and seeds are tonic[240]. They are useful in the treatment of low fevers[240]. The plant has anticancer properties[218].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and temperate Asia. ksacta A common weed of cultivated land and waste places, avoiding acid soils[17]. Becoming far less frequent on cultivated land due to modern agricultural practices.

propta Seed - sow spring or autumn in situ[200].

nwatta Landscape Uses:Border, Massing, Seashore, Specimen. Prefers a well-drained sandy loam in a sunny position[1, 200]. Does not do well on wet clay soils but succeeds in most other soils[115]. Plants usually self-sow freely when growing in suitable conditions so long as the soil surface is disturbed[238]. There are several named varieties selected for their ornamental value[200]. A polymorphic species, varying in leaf shape and flower colour[17]. When growing in cereal fields, poppies decrease the yields of nearby cereal plants[18, 20]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers, Suitable for dried flowers.

# 5.2.553 Apocynum cannabinum

Indian Hemp

4 tlin 8 cyuc 2 kcak 3 tcan 2 dwat 0.6 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Apocynum cannabinum is a PERENNIAL growing to  $0.6~\mathrm{m}$  (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[1, 4, 19, 62]. It contains toxic cardioactive glycosides[222].

kcakta Edible Parts: SeedEdible Uses: GumSeed - raw or cooked[257]. It can be ground into a powder and used as a meal[94]. A latex obtained from the plant is used as a chewing gum[61, 94, 177]. After the latex has been squeezed from the plant it s allowed to stand overnight to harden into a white gum[257]. The latex was sometimes mixed with clean clav[257].

tcanta Fibre Gum LatexThe flowers are attractive to bees[418]. Other Uses: A very good quality fibre obtained from the bark is used for making clothes, twine, bags, linen, paper etc[1, 46, 61, 92, 94, 95, 189, 257]. It is about 12 -18mm long[189]. Very strong[99], it is used as a flax substitute[57], it does not shrink and it retains its strength in water[99]. The fibre is produced late in the season[85], it can be harvested after the leaves fall in autumn but are probably at its best as the seed pods are forming[169]. When making paper, the stems can be retted by leaving them in the ground until they are dry in the winter or they can be harvested in late summer the leaves removed and the stems steamed to remove the fibre[189]. The stems are then cooked for two hours with lye and pounded with mallets[189]. The plant yields a latex which is a possible source of rubber[46, 61, 177]. The latex is also used as chewing gum. Carbon Farming - Industrial Crop: hydrocarbon, fibre. The dogbanemilkweed family Asclepias, Apocynum, Calotropis, and Trachomitum spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed fibre or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Antirheumatic Cardiotonic Diaphoretic Diuretic Emetic Expectorant Tonic Urinary VD Vermifuge WartsIndian hemp is an unpleasantly bitter stimulant irritant herb that acts on the heart, respiratory and urinary systems, and also on the uterus[238]. It was much employed by various native North American Indian tribes who used it to treat a wide variety of complaints including rheumatism, coughs, pox, whooping cough, asthma, internal parasites, diarrhoea and also to increase milk flow in lactating mothers[257]. The plant is still used in modern herbalism, but it should be used with great caution, and only under the supervision of a qualified practitioner if taken internally[[4, 222, 238]. See the notes above on toxicity[4, 222]. The root is cardiotonic, diaphoretic, diuretic, emetic and expectorant[4, 46, 61, 94, 238]. It is harvested in the autumn and dried for later use[238]. The fresh root is the most active part medicinally. It has been used in the treatment of syphilis and as a tonic[207]. A weak tea made from the dried root has been used for cardiac diseases[207, 222]. A tea made from the root has been used as a vermifuge[213]. The milky sap is a folk remedy for venereal

nrakta North-eastern N. America. ksacta Gravelly or sandy soil, mainly near streams[4]. A common weed of cultivated land[60], usually found in shady or moist places[94].

propta Seed - best sown as soon as it is ripe in late summer and overwintered outdoors. The seed requires a period of cold stratification if it is to germinate well[238]. Prick out the seedlings when large enough to handle and grow them on in a cold frame for their first winter, planting out in late spring of the following year[K]. Division in spring just before active growth begins[200]. Plants can also be divided in the autumn[238].

nwatta Industrial Crop: Fiber Industrial Crop: Hydrocarbon Management: Hay Minor Global CropSucceeds in sun or shade in most well-drained moist soils[169, 238]. Plants can be invasive[200]. The young shoots of this plant are extremely attractive to slugs[K]. Carbon Farming - Cultivation: minor global crop. Management: hay.

# 5.2.554 Amaranthus spinosus

Spiny Amaranth

4 tlin 11 cyuc 2 kcak 1 tcan 3 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Amaranthus spinosus is a ANNUAL growing to  $0.6~\mathrm{m}$  (2ft) by  $0.2~\mathrm{m}$  (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from April to October, in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is polinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista No members of this genus are known to be poissonous, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and stems - raw or cooked as a spinach[2, 61, 177]. If older leaves and stems are used the spines must be removed[183]. Highly esteemed[183]. The dried leaves contain (per 100g) 267 - 276 calories, 20 - 34.4% protein, 2 - 4.5% fat, 45 -54% carbohydrate, 9.8 - 10.4% fibre, 16.6 - 24% ash, 1795 - 5333mg calcium, 333 - 460mg phosphorus, 13.5 - 152.7mg iron, 13 - 37mg sodium, 337 - 3528mg potassium, 27.9 -40.8mg betacarotene equivalent, 0.06mg thiamine, 2.02mg riboflavin, 7.7 - 8.6mg niacin and 503mg ascorbic acid[218]. Seed - cooked. Very small, about 1mm in diameter[266], but easy to harvest and very nutritious. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. a valued food plant in Africa. In Thai cuisine, where it is called phak khom and in Tamil mullik

tcanta DyeYellow and green dyes can be obtained from the whole plant[168]. A red pigment obtained from the plant (the report does not specify which part of the plant) is used as a colouring in foods and medicines[238].

dwatta Antidote Astringent Diaphoretic Dysentery Eczema Emmenagogue Emollient Febrifuge Urinary VDThe seed is used as a poultice for broken bones[218]. The plant is astringent, diaphoretic, diuretic, emollient, febrifuge and galactogogue[4, 61, 147, 218, 238, 240, 272]. It is used internally in the treatment of internal bleeding, diarrhoea and excessive menstruation[238, 254]. It is also used in the treatment of snake bites[243]. Externally, it is used to treat ulcerated mouths, vaginal discharges, nosebleeds and wounds[238, 243]. The plant can be used fresh or it can also be harvested when coming into flower and dried for later use[238]. The root is emmenagogue and galactogogue[243]. A paste of the root is used in the treatment of menorrhagia, gonorrhoea, eczema and colic[243, 272]. It helps to remove pus from boils[272]. The juice of the root is used in Nepal to treat fevers, urinary troubles, diarrhoea and dysentery[272]. It is also used, often combind with the root juice of Dichrophela integra and Rubus ellipticus, to treat stomach disorders and, on its own, to treat indigestion and vomiting that occur after eating unusual foods[272].

nrakta Tropical America. ksacta Roadsides, waste places and fields in South-eastern N. America[72].

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196].

#### 5.2.555 Orchis italica

4tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Orchis italica is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from October to June, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist

kcakta Edible Parts: RootEdible Uses: DrinkRoot -cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antidiarrhoeal Antiflatulent Demulcent NutritiveSalep (see above for more details) is very nutritive and
demulcent[4]. It has been used as a diet of special value
for children and convalescents, being boiled with water,
flavoured and prepared in the same way as arrowroot[4].
Rich in mucilage, it forms a soothing and demulcent jelly that
is used in the treatment of irritations of the gastro-intestinal
canal[4]. One part of salep to fifty parts of water is sufficient
to make a jelly[4]. The tuber, from which salep is prepared,
should be harvested as the plant dies down after flowering
and setting seed[4].

nrakta Europe. ksacta Calcareous soils in grassland, garique and open places in pine woodland[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a

Hardy to about -20°c[187]. Plants form extensive patches, spreading by means of a creeping tuberous rhizome[187]. Plants are dormant in summer[187].

# 5.2.611 Potentilla egedei

Pacific Silverweed

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla egedei is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: RootEdible Üses: Root - raw or cooked[118, 172, 257]. The raw root has a bitter flavour but most of the bitterness is lost once the root is cooked and the flavour then becomes somewhat like a sweet potato[256]. The roots are rather thin but were a staple food of some North American Indian tribes[256].

dwatta Astringent Ophthalmic PoulticeThe whole plant is astringent[172]. A poultice of the boiled roots and oil can be applied to sores and swellings[257]. The juice from the roots has been used as a wash for sore eyes[257].

nrakta E. Asia. Western N. America - Alaska to California.. ksacta Coastal dunes, beaches, sand flats, marsh edges and streambanks, occasionally inland, from Alaska to California[60]

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. This species is closely related to P. anserina[43, 200].

# 5.2.612 Nepeta raphanorrhiza

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Nepeta raphanorrhiza is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Root cooked[177]. An almond flavour[105].

nrakta E. Asia - W. Himalayas from Afghanistan to Kashmir. ksacta Locally common on open dry slopes, 1700 - 2000 metres in Kashmir[145].

propta Seed - best sown as soon as it is ripe in a cold frame in the autumn[200]. The germination of spring sown seed can be erratic[200], it is best sown in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. If you have sufficient freshly ripe seed then it is well worth trying a sowing outdoors in situ in the autumn. Division in spring or autumn[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the

smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in late spring or early summer tharvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Easily grown in a well-drained soil in a sunny position[200]. Plants are bushier when grown in fertile soils[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A good bee plant[108].

### 5.2.613 Iovibarba sobolifera

Hen And Chickens Houseleek

4tlin8cyuc2kcak0tcan0dwat0.1~m~hkuc

htut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Jovibarba sobolifera is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaf rosettes and young shoots - raw[74].

nrakta Europe to Asia. ksacta Dry sandy sites, especially in pine forests and on limestone, also on rocky river banks[74].

propta Seed - we have no details for this species but suggest surface sowing the seed in a sunny position in a greenhouse in late winter or early spring. Do not allow the compost to become dry. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of offsets in the summer[2001].

nwatta Succeeds in any sandy soil[1]. Requires a gritty well-drained soil in full sun[200]. Succeeds on a wall[188]. Plants are hardy to about -15°c[200] so long as they are in a well-drained soil. They strongly dislike winter wet[200]. Individual offsets take several years to reach flowering size but then die after flowering, though more offsets are produced[188, 200]. This species does not hybridize naturally[1].

#### 5.2.614 Hosta undulata

4tlin 8 cyuc 2 kcak 0 t<br/>can 0 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik<br/>frip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hosta undulata is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Root StemEdible Uses: Young leaves and leaf stems - cooked[105, 177]. Root[105, 177]. No more details are given.

tcanta A good ground cover plant, succeeding in dense shade but rather slow to spread[197]. Plants should be spaced about 25cm apart each way[208]. The sub-species H. undulata erromena has been specially mentioned[197] and this can be spaced about 60cm apart each way[208].

nrakta This species is a hybrid of garden origin. ksacta Not known in a truly wild situation.

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and

#### 5.2.608 Fritillaria verticillata

4tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fritillaria verticillata is a BULB growing to 0.6 m (2ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - cooked or candied[183]. The bulb is about 2cm in diameter[266]. Young plant - cooked. Used in soups[183]. Eating the young plant will greatly reduce the vigour of the bulb, and could even kill it[K]. Petals and flower buds - cooked. Used in soups[183].

dwatta Antidote Antitussive Astringent Cancer Expectorant GalactogogueThe bulbs are antidote, antitussive, astringent, expectorant, galactogogue and purgative[116, 218]. They contain fritimine which diminishes excitability of respiratory centres, paralyses voluntary movement and counters effects of opium[61]. The bulb is used internally in the treatment of coughs, bronchitis, pneumonia, feverish illnesses, abscesses etc[238]. The bulbs also have a folk history of use against cancer of the breast and lungs in China[218, 238]. This remedy should only be used under the supervision of a qualified practitioner, excessive doses can cause breathing difficulties and heart failure[238]. The bulbs are harvested in the winter whilst they are dormant and are dried for later use[238].

nrakta E. Asia - China, Siberia. ksacta Stony and dry slopes from W. Siberia eastwards[74]. Hill thickets and gravelly meadows at elevations of 1300 - 2000 metres in NW Xinijang China[266]

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta Prefers a moist peaty soil in the open garden[90]. Easily grown in a moderately fertile soil in sun or semishade[200]. Succeeds in drier soils and is drought tolerant when established[190]. The scaly bulbs are best planted on their sides or surrounded in sand to prevent water collecting in their hollow crowns[238]. Cultivated as a medicinal plant in Japan[90], the sub-species F. verticillata thunbergii. Baker. is most often used[61]. (this species is now known as F. thunbergii. q.v.). Plants take 3 - 5 years to flower from seed.

# 5.2.609 Anemonella thalictroides

Rue-Anemone

4 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 0.1 m hkuc pcimhmim cyutli tcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Anemonella thalictroides is a PERENNIAL growing to 0.1 m (0ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in April. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, it belongs to a family that contains many toxic species. The toxins are not normally fairly mild in effect and

they are usually destroyed by thoroughly heating or drying the plant.

kcakta Edible Parts: RootEdible Uses: Root - cooked[46, 61, 222]. Starchy[105, 177]. Some caution is advised, see the notes above on toxicity.

dwatta AstringentA tea made from the roots is used in the treatment of diarrhoea and vomiting[222]. A preparation of the root has historically been used in the treatment of niles[222]

nrakta Eastern N. America - New Hampshire to Massachusetts, south to Florida and west to Kansas. ksacta Damp deciduous and mixed open woods[43, 187].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in the spring. Division - this is best done in the autumn by carefully removing pieces from the outside of the clump and growing them on in pots until they are established[1, 200]. Be careful to disturb the main clump as little as possible[1].

nwatta Landscape Üses:Massing, Rock garden, Woodland garden. Requires a moist shady light soil[1], it strongly resents any wetness at the roots[200]. A delicate plant for a loose leafy soil in sun or part shade[187]. Plants dislike any root disturbance, they should be planted in their final positions whilst still young[1]. A greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Plants are slow to establish, often falling victim to slug predations[200]. Special Features: Attractive foliage, North American native.

# 5.2.610 Symphytum tuberosum

Tuberous comfrey

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Symphytum tuberosum is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista No reports of toxicity have been seen for this species, but the following reports have been seen for S. officinale. This plant contains small quantities of a toxic alkaloid which can have a cumulative effect upon the liver. Largest concentrations are found in the roots, leaves contain higher quantities of the alkaloid as they grow older and young leaves contain almost none. Most people would have to consume very large quantities of the plant in order to do any harm, though anyone with liver problems should obviously be more cautious. In general, the health-promoting properties of the plant probably far outweigh any possible disbenefits, especially if only the younger leaves are used.

kcakta Edible Parts: Edible Uses: CoffeeWhen roasted until brown and brittle, and then finely ground, the root is used as a coffee substitute. It has a smoothness that is not found in real coffee[183].

tcanta A good, and sometimes rampant, ground cover plant for a shady border or woodland.

nrakta Europe, including Britain, south and east from Germany to Spain, S.w.Russia and Turkey. ksacta Woods, scrub and by rivers[187].

propts Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed you can try an outdoor sowing in situ in the spring. Division succeeds at almost any time of the year. Simply use a spade to chop off the top 7cm of root just below the soil level. The original root will regrow and you will have a number of root tops, each of which will make a new plant. These can either be potted up or planted out straight into their permanent positions.

nwatta Tolerates most soils and situations but prefers a moist soil and some shade. Grows well in heavy clay soils.

550

symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Requires a deep rich soil[1]. Best grown in a sunny position in a well-drained bank and a loamy soil[42]. Plants are fairly hardy in Britain but, because they come into growth in the winter, they are best cultivated in a frame or cold greenhouse[230]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Plants seem to be immune to the predations of rabbits[233]. Cultivated plants are very susceptible to the predation of slugs and snails[230].

# 5.2.556 Panicum capillare

Old Witch Grass, Witchgrass 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Panicum capillare is a ANNUAL growing to  $0.6\,\mathrm{m}$  (2ft) by  $0.3\,\mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked whole or ground into a powder and used as a flour[257]. It is often mixed with corn[[161, 177]. The seed is very small and fiddly to use, it has a mild flavour and can be used like millet[K]. In the wild, the seed stem breaks off when the seed is ripe and then blows away in the wind, scattering the seed[236].

tcanta BroomThe grass can be made into brooms[257].
dwatta EmeticAn infusion of the leaves has been used as an emetic[257]. An infusion of the plant has been used as a

reducing aid when dieting[257].

nrakta N. America - Nova Scotia to North Dakota, south

to Florida and Texas. An occasional weed in Britain. ksacta Open sandy or stony soil or cultivated land in N. America[43]. An occasional abundant weed of carrot crops in E. Anglia[17].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination should take place within a week.

Prick out the seedlings into trays or individual pots and plant them out after the last expected frosts[200, K].

nwatta Requires a moderately fertile well-drained soil in full sun[200].

# 5.2.557 Primula denticulata

Drumstick Primula

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Primula denticulata is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw[105, 177]. They make a very attractive addition to salads[183].

tcanta Plants can be grown as a ground cover, they are best spaced about 35cm apart each way[208].

nrakta E. Asia - Himalayas. ksacta Shrubberies and open slopes in moist situations, often along drains, 1500 - 4500 metres[51, 145].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Root cuttings[2001].

nwatta Easily grown in any moist soil in sun or part shade[187, 200]. Prefers a damp position[133, 200]. Grows well in heavy clay soils[208]. Dislikes very light or dry soils[1]. Grows well in the shade of a north-facing wall[208]. Plants are hardy to about -25°c[187]. A very ornamental plant, there are many named varieties[187]. It can be grown in a wild garden, rock garden or the flower border[1].

# 5.2.558 Liriope spicata

Lily Turf, Creeping liriope, Creeping Lilyturf 4 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hoa7tmwatli xre7t hionli

drutta Liriope spicata is an evergreen Perennial growing to  $0.3 \, \mathrm{m}$  (1ft) by  $0.4 \, \mathrm{m}$  (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: RootEdible Uses: The following use is reported for L. graminifolia, but there is a lot of confusion between members of this genus (compare [58] and [200]) and it is quite possible that the root of this species is also used[K]. Root - cooked[105, 177, 179]. Candied and used medicinally[61]. The roots are usually with fusiform with a fleshy, tuberous part near the tip[266]. Rich in mucilage, the root also contains about 1.6% protein, 0.5% fat, 80% carbohydrate and 2.3% ash[179].

tcanta A good drought tolerant evergreen ground cover plant[200]. Plants should be spaced about 45cm apart each way, they can be invasive though[208]. Plants have been grown indoors in pots in order to help remove toxins from the atmosphere. It is especially good at removing ammonia[259].

dwatta Aphrodisiac Pectoral StimulantThe root is aphrodisiac, pectoral and stimulant[61].

531

nrakta E. Asia - China. ksacta Forests, grassy slopes, hillsides and moist places from near sea level to 1800 metroc[366]

propta Seed - we have no information on this species but suggest sowing it in a cold frame or greenhouse as soon as the seed is ripe if possible, if not then sowing the stored seed in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, the larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Container, Erosion control, Ground cover, Massing, Rock garden, Seashore, Woodland garden. Prefers a sandy soil[1]. Succeeds in full sun so long as the soil does not dry out in the summer, otherwise it should be grown in partial shade in any moderately fertile well-drained soil[200]. There are some named forms selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Inconspicuous flowers or blooms.

#### 5.2.559 Salvia lavandulifolia

Spanish Sage

4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia lavandulifolia is an evergreen Shrub growing to  $0.3 \, \mathrm{m}$  (1ft) by  $0.5 \, \mathrm{m}$  (1ft  $8 \, \mathrm{lm}$ ). See above for USDA hardness. It is hardy to UK zone 5. It is in leaf all year, in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaThe amontic leaves are used as an adulterant for the common sage[177, 183]. They are used as a substitute for sage in commercial food flavourings[238]. A sage-like tea is made from the dried leaves[238]. The plant is a source of an essential oil that is used commercially to flavour ice cream, sweets, baked goods, chewing gum, soft drinks etc[183, 238].

tcanta EssentialThe essential oil obtained from the leaves is used in perfumery and to perfume soaps and cosmetics[238].

dwatta Alterative Antiseptic Astringent Depurative Digestive Expectorant Febrifuge TonicThe leaves are alterative, antiseptic, astringent, depurative, digestive, expectorant, febrifuge and tonic[238]. They are used internally in the treatment of digestive and respiratory complaints, menstrual problems, infertility, nervous tension and depression[238]. This remedy should not be prescribed to pregnant women[238]. The leaves can be harvested as required and used fresh, or they can be harvested before the flowers open and dried or distilled for their essential oil[238].

nrakta S.W. Europe - Spain. ksacta Dry hills and slopes amongst bushes.

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a light well-drained soil in a sunny position[182, 200]. Soils rich in nitrogen encourage excessive leaf growth at the expense of flowering[11]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It is as hardy as common sage, S. Officinalis[182], to which it is closely related[11]. Plants can be killed by excessive winter wet[200]. The leaves have a pungent lavender scent[182]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.560 Chrysosplenium alternifolium

Golden Saxifrage, Alternate-leaf golden saxifrage, Iowa golden saxifrage

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Chrysosplenium alternifolium is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw[2, 46, 61, 66, 105, 177]. Added to salads[183]. The leaves are rather small, and there is a distinct bitterness in the flavour, especially during hot weather[K].

tcanta The plants creeping habit makes it a good ground cover for the bog garden[200].

nrakta Europe, including Britain, from Scandanavia south to C. France, east to C. Asia and the Himalayas. ksacta Acid soils[200] by the sides of streams, wet rocks and wet ground in woods, usually in shade[17].

propta Seed - sow spring or autumn in a lightly shaded position in a cold frame. Stand the pot in 2cm of water. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a tray of water in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in light shade in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils if they are moist[200]. Requires a constantly wet but well-drained soil[200]. Prefers a shady position, succeeding in woodland[200].

# 5.2.561 Succisa pratensis

Devil's Bit Scabious, Devilsbit

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hionli

drutta Succisa pratensis is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoots - raw[7]. The tender young shoots are sometimes added to spring salads[7].

tcanta DyeA green dye is obtained from the leaves[7, 115].

dwatta Anthelmintic Demulcent Depurative Diaphoretic Diuretic Eczema Emmenagogue Expectorant Febrifuge StomachicThe herb is anthelmintic, demulcent, depurative, slightly diaphoretic, diuretic, emmenagogue, mildly expectorant, febrifuge and stomachic[4, 7, 9]. It makes a useful tea for the treatment of coughs, fevers and internal inflammations and is also a popular application externally to eczema and other cutaneous eruptions[4, 7]. A tincture of the plant is a gentle but reliable treatment for bruises, aiding quick re-absorption of the blood pigment[7]. The whole herb is collected in early autumn and dried for later use[4]. Good results have been achieved by using a distilled water from the plant as an eye lotion to treat conjunctivitis[7].

nrakta Europe, including Britain, south and east from Norway to N. Africa, Siberia and the Caucasus. ksacta Meadto move considerably from their original planting place because of their means of vegetative reproduction, it is therefore wise not to grow different species in close proximity[1]. The corms should be planted about 5 - 8cm deep in the soil[200]. Any planting out is best done in late spring or early summer[245]. Plants take 4 - 5 years to come into flowering from seed. The flowers are only open during the day time, closing at night[245].

#### 5.2.606 Calluna vulgaris

Heather, Scotch Heather 4 tlin 7 cyuc 2 kcak 5 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Calluna vulgaris is an evergreen Shrub growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from July to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), wind. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pff: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Edible Uses: Condiment TeaA tea is made from the flowering stems[177, 183]. A kind of mead was once brewed from the flowers and the young shoots have been used instead of hops to flavour beer[7, 183].

tcanta Basketry Besom Dye Fuel Hedge Hedge Insulation Musical Tannin ThatchingThe branches have many uses, including in thatching, as a bedding or a stuffing for mattresses, for insulation, basketry, rope making and for making brooms[6, 7, 11, 46, 61, 66, 100, 254]. The dried branches are a good fuel[6, 66]. The rootstock can be made into musical pipes[254]. A yellow dye is obtained from the plant[7, 46, 61]. The bark is a source of tannin[46]. Heather can be grown as a low hedge and is quite useful as an edging to beds. It is fairly amenable to trimming[29]. A useful ground cover plant for covering dry banks[188, 197]. The cultivar 'White Lawn' has been recommended[188]. All except the very dwarf cultivars will need trimming each spring in order to keep them compact[208].

dwatta Antianxiety Antirheumatic Antiseptic Bach Cholagogue Depurative Diaphoretic Diuretic Expectorant Sedative Urinary VasoconstrictorHeather has a long history of medicinal use in folk medicine. In particular it is a good urinary antiseptic and diuretic, disinfecting the urinary tract and mildly increasing urine production[254]. The flowering shoots are antiseptic, astringent, cholagogue, depurative, diaphoretic, diuretic, expectorant, mildly sedative and vasoconstrictor[7, 8, 9, 21, 165, 238]. The plant is often macerated and made into a liniment for treating rheumatism and arthritis, whilst a hot poultice is a traditional remedy for chilblains[7, 254]. An infusion of the flowering shoots is used in the treatment of coughs, colds, bladder and kidney disorders, cystitis etc[9, 238, 254]. A cleansing and detoxifying plant, it has been used in the treatment of rheumatism, arthritis and gout[254]. The flowering stems are harvested in the autumn and dried for later use[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Self-centredness' and 'Self-concern'[209]. A homeopathic remedy is made from the fresh branches[9]. It is used in the treatment of rheumatism, arthritis and insomnia[9].

nrakta Much of Europe, including Britain, to N. W. Morocco. Less abundant in the east of its range. ksacta Acid soils in open woodlands, moors and marshy ground[7]. Often the dominant plant on well-drained acid moors and heaths[17].

propta Seed - sow as soon as it is ripe or in February in a shaded part of the greenhouse [78, 113]. Surface sow or only just cover the seed [113, 138]. Cold stratification for  $4 \cdot 20$  weeks aids germination [138]. The seed usually germinates in  $1 \cdot 2$  months at  $20^\circ c$ . When large enough to handle, prick he seed lings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early sumer, after the last expected frosts. Cuttings of half-ripe wood 4 - 5cm with a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 5 - 7cm with a heel, October/November in a frame. Good percentage[78]. Layering in autumn[78]. Division in spring. Dig up the plant 12 months prior to division and replant it 15 - 30cm deeper in the soil in order to encourage rooting along the stems. When ready to take the divisions, it is just a matter of digging up the plant and cutting off sections of stem with roots on them. These are best potted up and kept in a cold frame or greenhouse until they are well rooted before planting them out in the summer or following spring.

nwatta Landscape Uses: Alpine garden, Border, Foundation, Ground cover, Massing, Rock garden, Specimen. Requires a light acid soil and a sunny position[138, 182] Prefers a sunny position but tolerates light shade [186]. Only succeeds if the pH is below 6.5[186]. Prefers a poor peaty soil[11]. Plants are tolerant of fairly dry soils but they dislike prolonged drought[186]. They tolerate wet conditions in the winter[238]. Plants regenerate well from the base after a fire if the heat was not too great, if the fire was slow and intense then new seedlings will quickly become established[186]. Commonly grown in the ornamental garden. there are many named varieties[200, 238]. The flowers are rich in nectar and are very attractive to bees, butterflies and moths[7, 11, 30]. This plant is also an important food source for the caterpillars of many lepidoptera[30]. Special Features: Attractive foliage, Not North American native, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching; a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 5.2.607 Taraxacum albidum

4tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Taraxacum albidum is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Coffee TeaLeaves - raw or cooked[177, 183]. A rather bitter flavour, though it is a good tonic for the digestive system. Root - cooked[183]. Flowers - raw or cooked[183]. The unopened flower buds can be used in fritters[183]. The whole plant is dried and used as a tea[177, 183]. The root is dried and roasted to make a coffee substitute. A pleasant tea is made from the flowers. The leaves and the roots can also be used to make tea.

nrakta E. Asia - C. and S. Japan, Korea. ksacta Sunny ruderal habitats such as roadsides and cultivated fields at elevations below 500 metres[275].

propta Seed - sow spring in a cold frame and either surface-sow or only just cover the seed. Make sure the compost does not dry out. Germination should take place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle, choosing relatively deep pots to accommodate the tap root. Plant them out in early summer. Division in early spring as the plant comes into growth.

nwatta Prefers a well-drained humus-rich soil in full sun or light shade. Isozyme analysis suggests that this species is uniclonal and of unique hybrid origin between T. japonicum and an unknown tetraploid species[275]. Many species in this genus produce their seed apomictically. This is an asexual method of seed production where each seed is genetically identical to the parent plant. Occasionally seed is produced sexually, the resulting seedlings are somewhat different to the parent plants and if these plants are sufficiently distinct from the parents and then produce apomictic seedlings these seedlings are, in theory at least, a new species.

pcista Although no records of toxicity have been seen for this species, the following notes have been seen for another member of this genus and so some caution is advised. Skin contact with the bulbs has been known to cause dermatitis in sensitive people[65].

kcakta Edible Parts: RootEdible Uses: The following use has been noted for the closely related E. origonum and probably also applies to this species[K], which has corms 6 - 8cm long and up to 15mm thick[71]. Bulb - raw, cooked or dried for later use[183].

nrakta Western N. America - N.W. California. ksacta Well-watered volcanic soils and leaf mold, in brush and woods, 450-700 metres[71].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame. Water lightly in summer, it should germinate in autumn or winter[164, 200]. Stored seed reguires a period of cold stratification[164]. Sow as early in spring as possible in a cold frame. Sow the seed thinly so that it will not be necessary to prick them out for their first year of growth. Give an occasional liquid feed to the seedlings to make sure that they do not become nutrient deficient. When the plants are dormant, pot up the small bulbs putting 2 -3 bulbs in each pot. Grow them on in a shady position in the greenhouse for another 2 3 years and then plant them out into their permanent positions when they are dormant in late summer. Division of the bulbs in the summer as the leaves die down[1]. Larger bulbs can be replanted immediately into their permanent positions, but it is best to pot up smaller bulbs and grow them on in a shady position in a greenhouse for a year before planting them out when dormant in late summer.

nwatta Prefers slightly acid soil conditions but succeeds in chalky soils if these contain plenty of humus[164]. Requires semi-shade, preferably provided by trees or shrubs, and a well-drained soil[42, 164]. Succeeds in almost any light soil, preferring one that is rich in humus[1]. Plants prefer perfect drainage and require drier conditions when dornant[200]. Plants are hardy to at least -15°c[200]. Plants are growing well in the light shade of a woodland garden at Kew[K]. Bulbs should be planted about 7cm deep[1]. This species is closely related to E. californicum, E. origonum, E. citrinum and E. howellii[207].

#### 5.2.604 Cardamine schinziana

4tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine schinziana is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leafy stems - raw or cooked[105, 177]. A hot peppery flavour.

nrakta E. Asia - Japan, Korea. ksacta Wet places in N. Japan[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at  $15^{\circ}$ c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

## 5.2.605 Crocus nudiflorus

4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crocus nudiflorus is a CORM growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, butterflies. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The following reports are for C. sativus. They quite possibly also apply to this species. The plant is poisonous[21]. The plant is perfectly safe in normal usage but 5 - 10 grams of saffron has been known to cause death[65].

kcakta Edible Parts: Edible Uses: Colouring Condiment TeaThis species has been used as a saffron substitute[200]. The following notes are for the genuine saffron, C. sativus: The flower styles are used as a flavouring and yellow colouring for various foods such as bread, soups, sauces, rice and puddings[2, 4, 7, 14, 21, 27, 34, 183]. Extremely rich in riboflavin[137]. Water soluble[171]. Yields per plant are extremely low, about 4000 stigmas yield 25g of saffron[89]. Saffron is the world's most expensive spice, it takes 150,000 flowers and 400 hours work to produce 1 kilo of dried saffron[238]. About 25 kilos of styles can be harvested from a hectare of the plant[4]. The flower styles are used as a tea substitute[183].

tcanta DyeThe yellow dye obtained from the stigmas has been used for many centuries to colour cloth[4, 7, 14, 21]. It is the favoured colouring for the cloth of Indian swamis who have renounced the material world. A blue or green dye is obtained from the petals[168].

dwatta Anodyne Antispasmodic Aphrodisiac Appetizer Carminative Diaphoretic Emmenagogue Expectorant SedativeThis species has been used as a saffron substitute[200]. The following notes are for the genuine saffron, C. sativus:-Saffron is a famous medicinal herb with a long history of effective use[4, 7]. The flower styles and stigmas are the parts used, but since these are very small and fiddly to harvest they are very expensive and consequently often adulterated by lesser products[7]. They are anodyne, antispasmodic, aphrodisiac, appetizer, carminative, diaphoretic, emmenagogue, expectorant, sedative and stimulant[4, 7, 21, 174, 176, 218]. They are used as a diaphoretic for children and to treat chronic haemorrhages in the uterus of adults[4]. A dental analgesic is obtained from the stigmas[7]. The styles are harvested in the autumn when the plant is in flower and are dried for later use[4], they do not store well and should be used within 12 months[238]. This remedy should be used with caution[21], large doses can be narcotic[240] and quantities of 10g or more can cause an abortion[218].

nrakta S. Europe - S.W. France to N.E. Spain. ksacta Meadows[90].

propta Seed - best sown as soon as it is ripe in a light sandy soil in pots in a cold frame[1]. The seed can also be sown in a cold frame in early spring[1]. Sow thinly because the seed usually germinates freely[1], within 1- 6 months at  $18^{\circ}\text{C}[164]$ . Unless the seed has been sown too thickly, do not transplant the seedlings in their first year of growth, but give them regular liquid feeds to make sure they do not become deficient. Divide the small bulbs once the plants have died down, planting 2- 3 bulbs per 8cm pot. Grow them on for another 2 years in a greenhouse or frame and plant them out into their permanent positions when dormant in late summer[K]. Plants take 3- 4 years to flower from seed[200]. Division of the clumps after the leaves die down in spring[1, 200]. The bulbs can be replanted direct into their permanent positions if required.

nwatta Prefers a well-drained sandy or loamy soil that is free from clay[137]. Prefers some shade from the hottest sun in summer and at least a modicum of moisture during its summer dormancy[200]. Succeeds in grass, so long as this is not mown until the leaves die down, it also grows well under deep-rooting deciduous trees and shrubs[200]. It can also be grown with very low shallow-rooting groundcover plants such as lawn camomile (Chamaemelum nobile 'Trenague')[200]. Plants are very frost hardy[137]. Plants tend

ows, pastures, marshes, fens and damp woods[7, 17] on slightly acid or calcareous soils[200].

propta Seed - sow April in a cold frame. Germination is usually rapid, but the seedlings are prone to damp off so make sure they are well ventilated[1]. Prick them out into individual pots once they are large enough to handle and plant them out in the summer. Division in spring. Plant them straight out into their permanent positions.

nwatta Succeeds in ordinary garden soil[1], preferring damp conditions[24, 200], in sun or semi-shade[200]. Prefers a moist peaty soil[187]. Hardy to about -20°c[187]. Grows well in the summer meadow[24], it is an excellent bee and butterfly plant and a food plant for the caterpillars of many butterfly species[17, 24, 30].

#### 5.2.562 Prunella grandiflora

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Prunella grandiflora is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[46, 61, 105]. A mild flavour[K].

tcanta Can be used as a ground cover plant in a sunny position or light shade[188, 197]. It requires weeding for the first year or so[197]. They are best spaced about 45cm apart each way[208]. Plants have not been a reliable ground cover in Cornwall, often dying after flowering, though they usually self-sow(Kl.

nrakta Europe. ksacta Grassland, usually in calcareous soils [501.

propta Seed - sow in mid spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed then it can be sown outdoors in situ in mid to late spring. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Thrives in any damp soil in a shady position[1, 111] or in full sun[200]. Plants are hardy to about -25°c[187]. The sub-species P grandiflora pyrenaica has larger flowers and is found wild on acid soils whilst the type species is usually found on alkaline soils[187]. Plants tend to be shortlived, often dying out after flowering heavily in the summer[208]. Fortunately, they will usually self-sow freely[K]. Most plants are hermaphrodite but sometimes male plants are found.

# 5.2.563 Polygonatum falcatum

4tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc pcimhmim cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum falcatum is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, some members of this genus are believed to have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[105]. They can be used as an asparagus substitute. Root - cooked[105]. Rich in starch.

tcanta Miscellany

dwatta Miscellany Tonic<br/>Energizer, tonic. Used to remove freckles<br/>[174].

nrakta E. Asia - Japan, Korea. ksacta Woods in hills and low mountains all over [apan[58, 187].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

mvatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shadel(200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. Thrives in dry shade as long as the soil is rich in humus, the plant is also fairly drought tolerant[190]. Requires a mulch protection for the roots in areas where winter temperatures go below -10°c[200]. The rhizomes are shortly-creeping, the plant forming clumps[187]. This species is often grown mistakenly as P pumilum[200]. P humile is often mistakenly grown as this species[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Young shoots are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

## 5.2.564 Arabis caucasica

Rock Cress. Wall Rockcress

4 tlin 9 cvuc 2 kcak 3 tcan 0 dwat 0.2 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arabis caucasica is an evergreen Perennial growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from January to May, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: The leaves are used as a garnish in much the same way as watercress[183]. They are also sometimes used as a potherb[183].

tcanta A good ground cover plant for sunny positions[188, 197], forming a carpet[208].

nrakta S.E. Europe - Mediterranean. Occasionally naturalized in Britain[17]. ksacta Mountain rocks and dry sites[45]

propta Seed - it is best to surface sow the seed as soon as it is ripe in a light position in a cold frame[134]. Seed can also be sown in spring. It usually germinates in 2 - 3 weeks at 21°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering[111]. Very easy, the divisions can be planted out straight into their permanent positions if required. Cuttings in a shady border in summer[1].

nwatta Landscape Uses:Alpine garden, Border, Ground cover, Rock garden. Easily grown in ordinary well-drained soil[1]. Prefers a poor soil[187]. Succeeds in partial shade[134] though it tends to become straggly[197]. Established plants are very tolerant of drought and grow very well on a dry bank[190], they also succeed when grown in walls[219, K]. A very ornamental plant[1], it is hardy to about -15°([187]), but can be rather invasive[200]. There are some named varieties selected for their ornamental value[187]. A

good butterfly and moth plant[30]. Bees are attracted to the flowers. Plants resent root disturbance and are best put in their final positions whilst still small[134]. This species is closely related to A. alpina[200]. Special Features: Attractive foliage. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

#### 5.2.565 Blephilia hirsuta

Hairy wood-mint or hairy pagoda plant 4 tiin 7 cyuc 2 kcak 2 tcan 0 dwat 0.7 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli hionli

drutta Blephilia hirsuta is a PERENNIAL growing to  $0.7\,\mathrm{m}$  (2ft 4in) by  $0.4\,\mathrm{m}$  (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The flowers are pollinated by Bees, Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista None Known

kcakta Edible Parts: LeavesEdible Uses: Leaves. Minty leaves eaten raw and used in teas. The fresh or dried leaves are used for tea [1-4].

tcanta A strong scented plant that may act as an aromatic pest confuser reducing their ability to find other nearby crops [1-3]. A good plant for food forests, wild, native plant or open woodland gardens.

dwatta None Known

nrakta Eastern and northcentral United States ksacta Occurs in rich, moist, shady woods, slopes and valleys. Habitats include mesic deciduous woodlands, areas along woodland paths, woodland borders, woodland openings, limestone glades, and thickets.

propta Propagate by division or by Seed

nwatta An herbaceous perennial of the mint family. Hairy wood mint prefers rich moist to mesic soil in hardwood forests, along streams and rivers, in forest openings and thickets underlain by limestone, and is occasionally found near wetlands. A rich loamy soil with decaying leaf mold is ideal. It likes partial sun or light shade. Forests with infrequent, low-intensity disturbances (i.e., gap dynamics) are ideal. This species also grows in soil that is somewhat rocky. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Fibrous shallow roots. Bloom Time: May to September (Northern Hemisphere). Flower are Showy and the leaf is fragrant.

#### 5.2.566 Cardamine leucantha

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine leucantha is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves - raw or cooked[105, 177]. The seedlings are edible[266]. Dried plants are used as a tea substitute[266].

dwatta The rhizomes are used medicinally [266]. No further information is given.

nrakta E. Asia - China, Japan. ksacta Wet places by ponds and streams, in mountains all over Japan[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at  $15^{\circ}c[175].$  When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dryf11.

#### 5.2.567 Cardamine pennsylvanica

Bittercress

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine pennsylvanica is a BIEN-NIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - raw or cooked[46, 61, 159, 171]. An excellent water cress substitute[105]. A slightly bitter flavour, but not disagreeable[207]. The grated raw root is used as a condiment[207].

dwatta Carminative DigestiveThe leaves and the flowering plant are carminative and digestive[172].

nrakta N. America - Newfoundland to Minnesota and Montana, south to Florida, Tennessee and Kansas. ksacta Usually found in moist or wet soils[159], it grows in most soils and habitats in eastern N. America[43].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division.

nwatta We have very little information on this species and to not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. A polymorphic species[43], it is closely related to C. parviflora[274]. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

# 5.2.568 Cardamine prorepens

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.4 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine prorepens is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is polinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-

dwatta Astringent Cancer Skin StomachicThe leaflets have been chewed in the treatment of internal cancer, lung disorders and stomach problems[257]. The fronds are used externally as a medicine for skin sores[257]. A decoction of the root has been used in the treatment of diarrhoea[257].

nrakta Most of Europe, including Britain, N. Africa, Japan, Western N. America. ksacta Woods, heaths, moors, mountain grassland and on rocks, to 1200 metres[17].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Overwinter for the first year in a greenhouse and plant outside in late spring or early summer. Division in spring or autumn. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta A calcifuge plant[17], it prefers a moist shady nook in the rock garden or a position in open woodland in a moist soil[1]. Succeeds in quite dense tree shade if the soil is moist[200]. Prefers a moist position and a northerly aspect but succeeds in sun and in clay soils[1]. A polymorphic and very ornamental species[1], there are several named varieties[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.601 Acinos arvensis

Basil Thyme

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Acinos arvensis is a ANNUAL/PERENNIAL growing to  $0.2\,\mathrm{m}$  (0ft 8in) by  $0.3\,\mathrm{m}$  (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Condiment-The flowering tops are used as a flavouring[4, 177, 183] and in salads[238]. Said to be similar to thyme in odour but milder and more pleasant[183]. The plant is only faintly aromatic and does not really make a very good substitute for thyme[238, K].

tcanta The plant makes a good ground cover[244].

dwatta Diuretic Odontalgic Rubefacient StomachicBasil thyme was a great favourite of the ancient herbalists, though it is little used medicinally at present[4]. The herb is diuretic, odontalgic, rubefacient and stomachic[4, 61, 238]. The essential oil has been applied externally as a rubefacient, whilst one drop of it put into a decayed tooth is said to alleviate the pain[4]. The plant has also been added to bath water, especially for children, and is said to be a strengthener and nerve soother[4]. The flowering plant is harvested in the summer and is normally used fresh in infusions[238].

nrakta Europe, including Britain, from Scandanavia to the Mediterranean and east to W. Asia. ksacta Dry sunny banks and in fields on chalky, gravelly and sandy soils[17].

propta Seed - sow early spring in a cold frame. If you have sufficient seed then you could try sowing in situ in April or May. Germination should take place within a month. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Basal cuttings in late spring. Very easy[K].

nwatta Succeeds in any well-drained soil[244], though it prefers a light well-drained dry soil in full sun[1, 238]. Prefers sandy and alkaline growing conditions[238]. Dislikes shade. A very hardy plant, tolerating temperatures down to at least -15°c[238]. A short-lived perennial, but the plants usually self-sow when they are growing in a suitable position[238].

#### 5.2.602 Cirsium arvense

Creeping Thistle, Canada thistle 4 tlin 7 cyuc 2 kcak 2 tcan 2 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cirsium arvense is a PERENNIAL growing to 0.9 m (3ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil Root StemEdible Uses: Curdling agent OilRoot of first year plants - raw or cooked[183]. Nutritious but rather bland, they are best used in a mixture with other vegetables[9]. The root is likely to be rich in inulin, a starch that cannot be digested by humans. This starch thus passes straight through the digestive system and, in some people, ferments to produce flatulence[K]. Stems - they are peeled and cooked like asparagus or rhubarb[9, 12, 177, 183]. Leaves - raw or cooked[177, 183]. A fairly bland flavour, but the prickles need to be removed before the leaves can be eaten - not only is this rather fiddly but very little edible leaf remains[K]. The leaves are also used to coagulate plant milks etc[46, 61, 183].

tcanta Oil TinderThe seed fluff is used as a tinder[106]. The seed of all species of thistles yields a good oil by expression[4]. The seed of this species contains about 22% oil[240]. Dynamic accumulator.

dwatta Antiphlogistic Astringent Diuretic Emetic Emmenagogue Hepatic TonicThe root is tonic, diuretic, astringent, antiphlogistic and hepatic[207]. It has been chewed as a remedy for toothache[4]. A decoction of the roots has been used to treat worms in children[257]. A paste of the roots, combined with an equal quantity of the root paste of Amaranthus spinosus, is used in the treatment of indigestion[272]. The plant contains a volatile alkaloid and a glycoside called cnicin, which has emetic and emmenagogue properties[240]. The leaves are antiphlogistic[207]. They cause inflammation and have irritating properties[207[.

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and Asia. ksacta Arable land, roadsides etc[9, 13], a common weed of cultivated land[17].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°c. A pernicious weed, not many people would want to invite this plant into their garden.

nwatta The creeping thistle is a pernicious garden weed, spreading freely from its aggressive root system[17, K], It can quickly form dense clumps of growth and really does not need to be introduced into the garden. Succeeds in any ordinary garden soil in a sunny position[200]. Plants are often dioecious[17]. A polymorphic species[17]. Special Features:North American native, Invasive, Attracts butterflies. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

## 5.2.603 Erythronium helenae

Mt. St. Helena Fawm Lily, Pacific fawnlily 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Erythronium helenae is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

self-fertile[221]. Plants produce seed freely in British gardens[221]. There is at least one named variety, selected for its ornamental value. 'Alba' has white flowers[200].

#### 5.2.598 Fritillaria cirrhosa

Chuan Bei Mu

4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fritillaria cirrhosa is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - boiled or roasted as a vegetable[272]. The bulb is bitter-sweet. The bulb is about 2cm in diameter[266].

dwatta Antispasmodic Antitussive Demulcent Expectorant Febrifuge PectoralThe bulbs of Chuan bei mu are antitussive, astringent, demulcent, expectorant, febrifuge and pectoral[91, 176, 238]. They contain fritimine which lowers blood pressure, diminishes excitability of respiratory centres, paralyses voluntary movement and counters the effects of opium[61, 176, 238]. The dried bulb is used internally in the treatment of coughs, bronchitis, pneumonia, asthma, feverish illnesses, abscesses etc[238]. The bulbs also have a folk history of use against cancer of the breast and lungs in China[218, 238]. This remedy should only be used under the supervision of a qualified practitioner, excessive doses can cause breathing difficulties and heart failure[238]. The bulbs are harvested in the winter whilst they are dormant and are dried for later use[238].

nrakta E. Asia - Himalayas - Nepal to China. ksacta Mountain slopes in alpine and sub-alpine meadows and scrub, usually on open stony moist hillsides[90, 91] Forests, alpine thickets, meadows, flood lands and moist places, 3200 - 4600 metres[266].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta Succeeds in a well-drained loamy soil[42]. Prefers peat bed conditions, the plant should not be allowed to dry out[134]. In cultivation at Kew[42] and thriving in a sunny stony bed at Keillour Castle in Perthshire[90], this species does not, however, do well in all gardens[1]. It is much valued as a herbal remedy in China[163]. This species is closely related to F. meleagris[42].

#### 5.2.599 Erythronium oregonum

Giant White Fawnlily

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.5 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Erythronium oregonum is a BULB growing to  $0.5\,$ m (1ft 8in) by  $0.1\,$ m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The bulbs have been suspected of poisoning poultry[256]. The following notes have also been seen for another member of this genus - skin contact with the bulbs has been known to cause dermatitis in sensitive people[65].

kcakta Edible Parts: RootEdible Uses: Bulb - raw, cooked or dried for later use[183, 257]. The bulb is from 25 - 60mm long[270]. Some caution should be employed, see the notes above on toxicity[256].

dwatta PoulticeThe crushed corm is used as a poultice for boils[207, 257].

nrakta Western N. America - Oregon to British Columbia. ksacta Open coniferous forests, rocky outcrops, oak woodlands and meadows from sea level to 500 metres[270]

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame. Water lightly in summer, it should germinate in autumn or winter[164, 200]. Stored seed requires a period of cold stratification[164]. Sow as early in spring as possible in a cold frame. Sow the seed thinly so that it will not be necessary to prick them out for their first year of growth. Give an occasional liquid feed to the seedlings to make sure that they do not become nutrient deficient. When the plants are dormant, pot up the small bulbs putting 2 -3 bulbs in each pot. Grow them on in a shady position in the greenhouse for another 2 3 years and then plant them out into their permanent positions when they are dormant in late summer. Division of the bulbs in the summer as the leaves die down[1]. Larger bulbs can be replanted immediately into their permanent positions, but it is best to pot up smaller bulbs and grow them on in a shady position in a greenhouse for a year before planting them out when dormant in late summer

nwatta Prefers slightly acid soil conditions but succeeds in chalky soils if these contain plenty of humus[164]. Requires semi-shade, preferably provided by trees or shrubs, and a well-drained soil[42, 164]. Succeeds in almost any light soil, preferring one that is rich in humus[1]. Plants are hardy to about -15°c[90]. Flowers are produced in 3 - 4 years from seed[164]. Plants increase rapidly by offsets[188]. Bulbs should be planted about 7cm deep[1]. This species is closely related to E. revolutum and occasionally hybridizes with it where their ranges meet[270]. In addition, E. citrinum and E. hendersonii are reported to hybridize with E. oregonum in the southern part of its range[270]. This species is closely related to E. californicum[200].

#### 5.2.600 Blechnum spicant

Hard Fern, Deer fern

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatorik hpa7tmwatli hjonli

drutta Blechnum spicant is an evergreen Fern growing to 0.3 m (1ft) by 0.3 m (1ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen from June to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminasel 1721.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked. An emergency food, used when all else fails[177]. Young shoots (often called croziers) - cooked[177]. The young tender stems can be peeled and the centre portion eaten[257]. An emergency food, it is only used when all else fails[177, 213]. It is also chewed to alleviate thirst on long journews[213].

tcanta A good ground cover plant[208]. Relatively slow growing but succeeding in the dense shade of trees[197, 200]

shade (light woodland) or no shade. It prefers moist or wet soil

kcakta Edible Parts: LeavesEdible Uses: Leaves and young plant - cooked[105].

nrakta E. Asia - E. Siberia to Manchuria. ksacta Banks of streams and river beds[74].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at  $15^{\circ}$ c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

# 5.2.569 Polygonatum odoratum thunbergii

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum odoratum thunbergii is a PEREN-NIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil

pcista Although no reports of toxicity have been seen for this species, some members of this genus are believed to have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - raw or cooked[105]. They can be used as an asparagus substitute. Root - raw or cooked[2, 105]. Rich in starch. nrakta E. Asia - Japan. ksacta Wet grassy places in lowland areas all over Iapan[58].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture-retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but they tolerate most other conditions[200]. Naturalizes well in woodlands and copses[1]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs[K]. Hybridizes with other members of this genus[200].

#### 5.2.570 Anchusa officinalis

Alkanet, Common bugloss 4 tlin 8 cyuc 2 kcak 1 tcan 1 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Anchusa officinalis is a BIENNIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: ColouringLeaves and young shoots - cooked[9, 115, 166]. Used like spinach[2, 183]. Flowers - cooked or used as a garnish[183]. The red dye obtained from the roots can be used to colour oils and fats[105].

tcanta DyeA red dye is obtained from the roots[13].

dwatta Demulcent Expectorant HomeopathyAll parts of the plant are demulcent and expectorant[9]. They are used externally to treat cuts, bruises and phlebitis and internally to treat coughs and bronchial catarrh[9]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of stomach and duodenal ulcers[9].

nrakta Europe to W. Asia. An introduced casual in Britain[17]. ksacta Roadsides, pastures and waste ground, preferring warmer areas[9, 13].

propta Seed - sow spring in pots of sandy soil[200]. An overnight drop in temperature helps germination[133]. The seed usually germinates in 1 - 4 weeks at 21°c[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seed bed during July, transplanting the plants to their final positions during early autumn[245]. These plants will grow larger and flower earlier than those sown in spring.

nwaita Succeeds in most soils, preferring a sunny position[1]. Prefers a fertile well-drained soil[111]. The flowers are a rich source of nectar and are very attractive to bees[1]. The dry leaves emit a rich musky fragrance, rather like wild strawberry leaves drying.

# 5.2.571 Mimulus lewisii

Great Purple Monkey Flower, Purple monkeyflower 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Mimulus lewisii is a PËRENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The flowers are pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems - raw or cooked[172].

dwatta PoulticePoultice[172].

nrakta Western N. America - Alaska to Mexico. ksacta Moist areas, stream edges and wet slopes[172]. In and along streams from moderate to high elevations[60].

propta Seed - sow spring in a greenhouse and only lightly cover the seed[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can also be sown in situ in late spring after the last expected frosts[200]. Division in spring[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of softwood, 5cm long in spring or summer[200].

nwatta Prefers rather moist places such as damp borders, margins of streams and boggy spots[1]. Grows well in heavy clay soils. Thrives in full sun so long as the soil does not dry out[200], otherwise it is best grown in partial shade[187]. This species tolerates slightly drier conditions than M. guttatus, it prefers a rich soil in light woodland[200]. Hardy to at least -20°c[187]. Another report says that plants are only hardy in the milder parts of Britain[233]. There is some confusion over the naming of this plant, the entry on

edibility may refer to M. luteus, which is closely related to this species.

# 5.2.572 Hemerocallis forrestii

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemerocallis forrestii is an evergreen Perennial growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked. They must be consumed when very young or else they become fibrous[KJ, Flowers and flower buds - raw or cooked. Root - raw or cooked. The roots are swollen and conspicuously enlarged at each end[200]. The roots are slightly fleshy, with a large, globose, swollen, tuberous part near the tip[266].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote DiureticThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - W. China in Yunnan Province. ksacta Dry ridges and rocky banks around 250 metres[205]. Forests, grassy slopes and limestone cliffs at elevations of 2300 - 3200 metres in SW Sichuan and NW Yunnan[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones. preferring a rich moist soil[205]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Some reports say that this species is not hardy in Britain[205], whilst another says that it is hardy to zone 5 (tolerating guite heavy frosts[200]. There is a plant at Kew Botanical Gardens that bears this name and appears to be fully hardy, growing near the base of a west-facing brick wall[K]. It is possible that the plant is actually a hybrid H. forrestii x H. middendorffii[205]. Hybridizes freely with other members of this genus[200]. Individual flowers are very short-lived, usually withering within 24 hours of opening. The plants produce a succession of blooms over a period of a month or more[205]. Plants take a year or two to become established after being moved[1]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200].

#### 5.2.573 Arisaema serratum

4tlin 8 cyuc 2 kcak 0 t<br/>can 1 dwat 0.9 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7<br/>tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Arisaema serratum is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female

plants must be grown if seed is required). and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

kcakta Edible Parts: Leaves RootEdible Uses: Tuber-must be thoroughly dried or cooked[46, 61, 177]. The tubers are 15 - 55mm in diameter[266]. Use with caution, see the notes above on toxicity. Leaves - cooked[177]. Use with caution, see the notes above on toxicity.

dwatta Alterative Deobstruent Diuretic Expectorant VulneraryThe root is alterative, deobstruent, discutient, diuretic, expectorant, vulnerary[178, 218]. Use with caution[178].

nrakta E. Asia - China, Japan, Korea. ksacta Shady forests in C. and S. Japan[58, 200].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame [134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1 - 6 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Prefers a cool peaty soil in the bog garden, woodland garden or a sheltered border in semi-shade[134, 200]. Prefers a loamy or peaty soil and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too hot or exposed[1, 200]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants need protection from slugs[200]. A very polymorphic species[58]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year.

#### 5.2.574 Polygonum arenastrum

Small-Leaved Knotweed, Oval-leaf knotweed 4 tiin 8 cyuc 2 koak 0 toan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonum arenastrum is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Young leaves and plants - raw or cooked[105, 177]. Used as a potherb[183], they are very rich in zinc[179]. A nutritional analysis is available[218]. Seed - raw or cooked. Rather small and fiddly to utilize, they can be used in all the ways that buckwheat (Fagopyrum esculentum) is used, either whole or dried and ground into a powder for use in pancakes,

Special Features: Attractive foliage, North American native, Naturalizing, Wetlands plant, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

# 5.2.595 Chenopodium vulvaria

Stinking Goosefoot. Arrach - Wormseed 4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Chenopodium vulvaria is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponins are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plants will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and flower buds - cooked and used like spinach. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Although edible, the smell of the leaves would discourage most people from using this plant[K]. Seed - cooked. Ground into a powder, mixed with wheat or other cereals and used in making bread etc. The seed is small and fiddly, it should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins.

tcanta DyeGold/green dyes can be obtained from the whole plant[168].

dwatta Antispasmodic Eczema Emmenagogue Women's complaintsThe whole plant is antispasmodic and emmenagogue[4]. Used to expel worms from the bowel. [301] Also used for the fungal infections and as a cardiac stimulant. Form of treatment for acute gout [301]. An infusion of the dried leaves is used in the treatment of hysteria and nervous troubles connected with women's ailments[4]. In chinese medicine wormseed oil is used for rheumatism, eczema and bites [301].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and S.W. Asia. ksacta Landward edges of salt marshes and shingle beaches, inland in waste areas[17].

propta Seed - sow spring in situ. Most of the seed usually germinates within a few days of sowing.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. The plant contains trimethylamine, and when touched it gives off the nauseous odour of stale salt fish[4, 17]

#### 5.2.596 Lapsana communis

Nipplewort, Common nipplewort 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli fyifxre7t hionli drutta Lapsana communis is a ANNUAL growing to  $0.9 \, \mathrm{m}$  (3ft) by  $0.3 \, \mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and shoots - raw or cooked[2, 5, 17, 100]. They are best harvested before the plant comes into flower[9]. The leaves can be added to salads, cooked like spinach or added to soups and casseroles[9, 183]. They have a bitter or radish-like taste[183].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, western and central Asia. ksacta Waste ground, roadsides and walls, avoiding acid soils, in full sun or semi-shade[5, 9].

propta Seed - sow in situ during the spring or as soon as it is ripe and only just cover the seed. Plants usually self sow when they are well-sited.

nwatta A fairly common garden weed, nipplewort will maintain itself in the garden so long as it is given some disturbed soil in which to self-sow. It is a fairly tolerant plant that succeeds in most soils, so long as they are not too acid, and dislikes heavy shade. It was at one time cultivated as a vecetable 171.

#### 5.2.597 Campanula lasiocarpa

Mountain haroho

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli tcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula lasiocarpa is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Stems[177]. No more details are given, but the flowers and leaves of this plant should also be edible[K].

nrakta E. Asia - China, Japan to Western N. America - Rocky Mountains. ksacta Gravelly and sandy slopes in C. and N. Japan[58]. Crevices in rocks and on rocky slopes in alpine areas at elevations of 1600 - 3100 metres on Honshu, 1000 - 2000 metres on Hokkaido[275].

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c. Easy[221]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

n watta Prefers a moist but well-drained rich sandy loam an an eutral or alkaline soil in sun or partial shade[1, 200]. A rock garden plant, it is difficult to grow in the garden needing a very gritty soil and perfect drainage[1]. It grows freely amongst rocks or in a loose scree, but is very impatient of winter wet[221]. Plants are hardy to at least -15°c[200]. Slugs are very partial to this plant[221]. Members of this genus are rarely if ever troubled by browsing deer[233]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are

pods, 3 - 4 cm long, cooked[2, 43, 55, 85]. They are very appetizing. Best used when about 2 - 4 cm long and before the seed floss forms, on older pods remove any seed floss before cooking them[85, 159]. If picked at the right time, the pods resemble okra[183]. The sprouted seeds can be eaten[183]. An edible oil is obtained from the seed[55, 171]. The latex in the stems is made into a chewing gum[46, 61]. It is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112].

tcanta Fibre Gum Latex Oil Oil Pollution Stuffing Wick-The following reports refer to other members of this genus and are possibly also appropriate for this species[K]. A good quality fibre is obtained from the bark, used in making twine, cloth, paper etc[95, 112, 169]. It is of poor quality in wet seasons[112]. It is easily harvested in late autumn after the plant has died down by simply pulling the fibres off the dried stems[169]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[112, 159, 169, 171]. It is a Kapok substitute, used in Life Jackets or as a stuffing material[112]. Very water repellent, it can yield up to 550 kilos per hectare[112]. The floss has also been used to mop up oil spills at sea. Candlewicks can be made from the seed floss[112, 207]. Rubber can be made from latex contained in the leaves and the stems[46, 57, 102, 159]. It is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112]. Pods contain an oil and a wax which are of potential importance. The seed contains up to 20% of an edible semi-drying oil[74, 112]. It is also used in making liquid soap[74].

dwatta Diuretic Laxative VD WartsA tea made from the roots is diuretic and laxative[222, 257]. It has also been used in the treatment of venereal diseases[257]. The leaves have been rubbed on warts in order to remove them[222]. The latex from the leaves is used, it needs to be applied daily for some time in order to be effective[K].

nrakta Eastern N. America - New Hampshire to South Carolina, west to Kansas and Minnesota. ksacta Open deciduous woods and forest margins[222].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Succeeds in any good soil[187]. Prefers a well-drained light rich or peaty soil[1, 200]. Requires a moist peaty soil and a sunny position[111, 134]. A good bee plant[50, 74]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207]. The small, pale-lilac flowers are sweetly scented[245]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134].

# 5.2.593 Arabis alpina

Alpine Rock Cress, Alpine rockcress 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Arabis alpina is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to May, and the seeds ripen in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Edible Uses: Young leaves - cooked or raw[105, 177]. An agreeable cress-like flavour[183]. Flowers - raw or cooked[105, 177]. A cress-like flavour[183].

nrakta Europe. In Britain it is only found on the Isle of Skye[17]. ksacta Screes and rocks in moist sites in mountains[45, 50].

propta Seed - it is best to surface sow the seed as soon as its ripe in a light position in a cold frame[134]. Seed can also be sown in spring. It usually germinates in 2 - 3 weeks at 21°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering[111]. Very easy, the divisions can be planted out straight into their permanent positions if required. Cuttings in a shady border in summer[1].

nwatta Easily grown in ordinary well-drained soil[1, 134]. Prefers a sandy loam and a sunny position. Another report says that it prefers partial shade[134]. Plants resent root disturbance and are best put in their final positions whilst still small[134]. The flowers are attractive to bees.

#### 5.2.594 Tradescantia virginiana

Spiderwort, Virginia spiderwort 4 tiin 9 cyuc 2 kcak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hionli

drutta Tradescantia virginiana is a PERENNIAL growing to 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[61, 103, 105, 213, 257]. The very young shoots and leaves can be chopped and added to salads or cooked as a potherb[183]. Flowers - raw. They make an attractive edible garnish[183].

dwatta Kidney Laxative Poultice Women's complaints. The roots are laxative[222]. They are also used as a tea in the treatment of kidney and stomach ailments and women's complaints[222, 257]. A poultice of the leaves is applied to stings, insect bites and cancers[222, 257].

nrakta Eastern N. America - Connecticut to Wisconsin, south to Georgia and Tennessee. ksacta Woods, scrub, meadows and roadsides[43, 187].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[111]. Cuttings of young shoots, July in a frame. They root easily and quickly.

nwatta Landscape Üses:Border, Container, Ground cover, Woodland garden. An easily grown plant[233], it thrives in any good rather moist soil[1, 111]. Succeeds in dry soils[188]. Succeeds in dappled woodland shade[88, 111] or in full sun[111]. Hybridizes freely with other members of this genus[1]. Plants often self-sow in British gardens[1]. A very variable species, there are a number of named forms selected for their ornamental value[1]. Plants in this genus seem to be immune to the predations of rabbits[233]. Plants are self-sterile, at least two genetically distinct plants (and not divisions from the same plant) must be grown if seed is required.

biscuits and piñole[4, 55, 106, 161, 183]. The leaves are a tea substitute[183].

tcanta Yields a blue dye that is not much inferior to indigo[115]. The part used is not specified, but it is likely to be the leaves. Yellow and green dyes are obtained from the whole plant[168]. The roots contain tannins, but the quantity was not given[223].

dwatta DysenteryKnotweed is a safe and effective astringent and diuretic herb that is used mainly in the treatment of complaints such as dysentery and haemorrhoids. It is also taken in the treatment of pulmonary complaints because the silicic acid it contains strengthens connective tissue in the lungs[254]. The whole plant is anthelmintic, astringent, cardiotonic, cholagogue, diuretic, febrifuge, haemostatic, lithontripic and vulnerary[4, 7, 9, 21, 53, 147, 172, 176, 178]. It was formerly widely used as an astringent both internally and externally in the treatment of wounds, bleeding, piles and diarrhoea[4]. Its diuretic properties make it useful in removing stones[4]. An alcohol-based preparation has been used with success to treat varicose veins of recent origin[7]. The plant is harvested in the summer and early autumn and is dried for later use[9]. The leaves are anthelmintic, diuretic and emollient[218]. The whole plant is anthelmintic, antiphlogistic and diuretic[218]. The juice of the plant is weakly diuretic, expectorant and vasoconstrictor[218]. Applied externally, it is an excellent remedy to stay bleeding of the nose and to treat sores[4]. The seeds are emetic and purgative[4, 240]. Recent research has shown that the plant is a useful medicine for bacterial dysentery. Of 108 people with this disease, 104 recovered within 5 days when treated internally with a paste of knotweed[254].

nrakta Throughout Europe, including Britain. ksacta Waste places and roadsides, common throughout Britain[17].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment, in good soils the plant will cover an area up to a metre in diameter[1. 4]. Prefers an acid soil[20]. Dislikes shade. Knotweed is a common and invasive weed of cultivated ground[7]. It is an important food plant for the caterpillars of many species of butterflies[30]. It also produces an abundance of seeds and these are a favourite food for many species of birds[4]. Plants seem to be immune to the predations of rabbits[233]. The flowers have little or no scent or honey and are rarely visited by pollinating insects. Self-fertilization is the usual method of reproduction, though cross-fertilization by insects does sometimes occur[4]. The plant also produces cleistogomous flowers - these never open and therefore are always self-fertilized[4]. The plant is very variable according to habitat and is seen by most botanists as part of an aggregate species of 4 very variable species, viz. - P. aviculare, L.: P. boreale. (Lange.) Small.: P. rurivacum. Jord. ex Box.: and Parenastrum Bor[17]

#### 5.2.575 Rubus caesius

Dewberry, European dewberry 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicil hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyikre7t hjonli

drutta Rubus caesius is a deciduous Shrub growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can

grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[1, 2, 3, 12, 183]. Succulent but not very tasty[74]. A delicious flavour, it is considered to be superior to blackcurrants though the fruit is rather small and consists of just a few drupes[2]. The fruit can be used for making jellies, preserves etc[183]. The fresh or dried leaves are used as a tea substitute[46, 61, 183].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Siberia and W. Asia. ksacta Hedgerows, amongst shrubs and in rough dry meadowland, usually on basic soils[1, 17].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Succeeds on chalky soils[200]. This species is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.576 Oxalis corniculata

Yellow Sorrel, Creeping woodsorrel 4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Oxalis comiculata is a ANNUAL/PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers LeavesEdible Uses: Gum-Leaves - raw or cooked[2, 46, 61, 105]. Added to salads, cooked as a potherb with other milder flavoured greens or used to give a sour flavour to other foods[183]. The leaves are available all year round unless the winter is very cold, they have a pleasantly sour taste[114], but are very small and fiddly to harvest[K]. The leaves contain about 86% water, 2.3% protein, 0.8% fat, 8.2% carbohydrate, 150mg calcium, 78mg phosphorus, 8mg iron, 0.6mg niacin, 78mg vitamin C, 6050µg beta carotene[173]. The leaves contain between 7 - 12% oxalate[218]. Use in moderation, see notes at top of sheet, Flowers - raw. A nice acid flavour and a pleasant addition to the salad bowl[K].

tcanta Dye Gum MiscellanyA slimy substance collects in the mouth when the leaves are chewed, this is used by magicians to protect the mouth when they eat glass[114]. Yellow, orange and red to brown dyes are obtained from the flowers[168]. The boiled whole plant yields a yellow dye[257].

dwatta Anthelmintic Antiphlogistic Antiscorbutic Astringent Depurative Diuretic Emmenagogue Febrifuge Lithon-tripic Miscellany Stomachic Styptic Urinary Vitamin CThe whole plant is anthelmintic, antiphlogistic, astringent, depurative, diuretic, emmenagogue, febrifuge, lithontripic, stomachic and styptic[147, 178, 218, 240]. It is used in the

treatment of influenza, fever, urinary tract infections, enteritis, diarrhoea, traumatic injuries, sprains and poisonous snake bites[147]. The juice of the plant, mixed with butter, is applied to muscular swellings, boils and pimples[272]. An infusion can be used as a wash to rid children of hookworms[257]. The plant is a good source of vitamin C and is used as an antiscorbutic in the treatment of scurvy[240]. The leaves are used as an antidote to poisoning by the seeds of Datura spp. arsenic and mercury[218]. The leaf juice is applied to insect bites, burns and skin eruptions[218]. It has an antibacterial activity[218].

nrakta Original habitat is obscure, it is naturalized in Britain. ksacta Arable land and waste places, it is a common garden weed[9, 17] where it tends to become especially troublesome in pots of plants growing in greenhouses etc[200].

propta Seed - best sown as soon as ripe in a cold frame. This plant does not need any encouragement.

nwatta A very easily grown plant, succeeding in a sandy soil in a warm dry position[1]. It prefers dry open habitats[50]. Spreading rapidly by seed and underground bulbils, this species can guickly become a nuisance, it is a common weed of pot plants in nurseries[200].

# 5.2.577 Orchis ustulata

Dark-Winged Orchis

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.2 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Orchis ustulata is a BULB growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist or wet

kcakta Edible Parts: RootEdible Uses: DrinkRoot cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starchlike substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antiflatulent Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4] It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Caucasus and Siberia, ksacta Chalk downs and limestone pastures[17], it is also found in marshy places[42].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed.

The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Prefers a sunny position and a good limey loam soil[42]. Requires a deep rich soil[1]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1]. Plants seem to be immune to the predations of rabbits[233]. The flowers diffuse a powerful almond-like scent[245]. Cultivated plants are very susceptible to the predation of slugs and snails[230].

#### 5.2.578 Trillium erectum

Beth Root - Indian Balm, Red trillium, Wakerobin, Purple Tril-

4 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 0.4 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trillium erectum is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers

pcista Can cause nausea in high doses and promote labour and menstruation. Local application can cause irritation. Should not be used during pregnancy [301].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. Used in spring[207], the young unfolding leaves are an excellent addition to the salad bowl, tasting somewhat like sunflower seeds[183]. Leaves can also be cooked as a notherb[183]

dwatta Antiseptic Aphrodisiac Astringent Birthing aid Expectorant Poultice Tonic Urinary Uterine tonicBeth root was traditionally used by various native North American Indian tribes as a woman's herb to aid childbirth, as a treatment for irregular menstrual periods, period pains and excessive vaginal discharge[254]. Modern research has shown that the root contains steroidal saponins, which have hormonal effects on the body[222, 238]. These saponins are being used in gynaecological and obstetric medicine[238]. This herb should not be taken during pregnancy except under professional supervision[254]. The root is antiseptic, aphrodisiac, astringent, expectorant, tonic, uterine tonic[4, 46. 61. 165. 222. 2381. It is used internally in the treatment of a wide range of women's complaints including haemorrhage from the uterus, urinary tract and lungs, and also to curb excessive menstruation[238]. It has proved to be of value in stopping bleeding after parturition[244]. Externally, it is used to treat excessive vaginal discharge, ulcers (especially varicose), skin complaints, gangrene, insect bites and crushed roots has been applied as a treatment for boils[257]. A decoction of the plant has been used to treat any kind of sickness[257].

nrakta Eastern N. America. ksacta Rich woodlands, limestone districts, calcareous soils, floodplains, riverbanks, clayey alluvium, less fertile soils, high, dry limestone woods, persists under light pasturing, 100 - 300 metres[270].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 -3 months at 15°c. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst vet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humusrich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. The flowers have a scent similar to a butcher's shop[207]. Another report says that they are sweetly scented[245]. Some named varieties have been selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

# 5.2.591 Platycodon grandiflorus

Balloon Flower

4 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Platycodon grandiflorus is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The root is poisonous[116]. The older, basal leaves are also said to be slightly toxic[179]. If these reports are true then this is an exceptional species in a family that is generally free of toxins and often used for food[K].

kcakta Edible Parts: Leaves RootEdible Uses: CondimentYoung leaves - cooked[177]. The radical leaves are said to be slightly toxic so only the top leaves should be used. Old leaves are powdered and used as a flavouring. Root cooked[177]. Eaten in soups as a tonic vegetable[238]. It is also peeled and pickled or preserved in sugar[218]. A nutritional analysis is available[218].

dwatta Anthelmintic Anticholesterolemic Antiphlogistic Antitussive Astringent Expectorant Haemolytic Hypoglycaemic Sedative Stomachic TonicThis species has a history of herbal use in China going back over 2,000 years and modern clinical tests have demonstrated its efficacy[218, 2381. It is widely used there in patent remedies and is also made into cough tablets[238]. The root contains saponins and is anthelmintic, antiasthmatic, anticholesterolemic, antiphlogistic, antitussive, astringent, carminative, expectorant, haemolytic, hypoglycaemic, sedative, stomachic, tonic and vermifuge. It lowers blood sugar and cholesterol levels in the liver and inhibits the release of histamine[116, 147, 174, 176, 178, 218, 238, 279]. It is used internally in the

dwatta Miscellany SkinA poultice of the bruised leaves treatment of coughs with profuse phlegm, colds, bronchitis, pleurisy, pulmonary abscesses and throat infections[176, 238]. It is also used to treat hypertension and diabetes in Korea[279]. The root of plants 2 - 3 years old are harvested in the spring or autumn, peeled and used fresh or dried[238].

nrakta E. Asia - China, Japan, Korea, Manchuria. ksacta Grassy slopes in hills and mountains all over Japan[58].

propta Seed - sow spring in a cold frame[111]. Free and quick germination[K]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the winter when the plants are dormant[238, K]. Basal cuttings of non-flowering shoots in spring, preferably with a piece of root attached[188]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container, Rock garden, Specimen. An easily grown plant, it succeeds in any good well-drained garden soil but prefers a light more or less sandy soil in a sunny position or light dappled shade[200]. Plants are hardy to about -15°c[200]. Another report says it is hardy to -20°c[187]. A very ornamental and long-lived plant[1, 233], there are several named forms[238]. It is cultivated, especially in China, as a medicinal plant[61, 238]. This species has brittle roots and strongly resents root disturbance. It should be planted out in its permanent position as soon as possible, and preferably when dormant in the winter[111, 238]. Special Features: Suitable for cut flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 5.2.592 Asclepias quadrifolia

4 tlin 8 cvuc 2 kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Asclepias quadrifolia is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274].

kcakta Edible Parts: Flowers Leaves Oil Oil Seed SeedpodEdible Uses: Gum Oil Oil SweetenerThe following reports refer to other members of this genus and are possibly also appropriate for this species[K]. Unopened flower buds - cooked. They taste somewhat like peas. They are used like broccoli[183]. Flowers and young flower buds - cooked. Used as a flavouring and a thickener in soups etc[55, 102]. The flower clusters can be boiled down to make a sugary syrup[2, 85]. The flowers are harvested in the early morning with the dew still on them[95]. When boiled up it makes a brown sugar[95]. Young shoots - cooked. An asparagus substitute[2, 4, 43, 55, 62, 95, 183]. They should be used when less than 20cm tall[159]. A slightly bitter taste[159]. Tips of older shoots are cooked like spinach[85, 183]. Young seed

for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

nwatta Best grown in partial shade in a moist peaty or woodland soil[1, 175]. A very hardy plant, tolerating temperatures down to about -20°c[187]. Plants spread well by means of creeping rhizomes when they are grown in a leafy soil[187]. This species is closely related to D. smithii[233].

#### 5.2.587 Callirhoe digitata

Finger Poppy Mallow, Winecup 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.9 m hkuc

htut cyutli kyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Callirhoe digitata is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

kcakta Edible Parts: RootEdible Uses: Root - cooked[61. 177]. A pleasant taste[46, 105, 161].

nrakta Central and Southern N. America - Illinois and Missouri to Kansas and Texas ksacta Dry plains and barrens[43].

propta Seed - sow outdoors or in a cold frame. Plants resent root disturbance so the seed is best sown in situ in April[138], though the slugs will have a field day if you do not protect the plants[K]. If seed is in short supply then sow it in pots in a cold frame, putting a few seeds in each pot, and plant the pots out in early summer once the plants have put on at least 15cm of growth. Germination usually takes place within 1 - 6 months at 15°c[138]. Cuttings of young basal shoots in a frame in sand[1, 200]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division[200]. With care since the plant resents root disturbance. We have found that it is best not to disturb this plant and so do not try to divide it, relying instead on taking basal cuttings since these do not disturb the main clump[K].

nwatta Prefers a light rich sandy loam and a sunny position[1, 138]. This species is hardy to about -15c[200]. Plants resent root disturbance and should be planted into their final positions as soon as possible[138]. Slugs are strongly attracted to this plant and can destroy even established plants by eating out all the young shoots in spring[K].

#### **5.2.588** Equisetum pratense

Meadow Horsetail

4 tlin 8 cyuc 2 kcak 2 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli hjonli

drutta Equisetum pratense is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen in April. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista Large quantities of the plant can be toxic. This is because it contains the enzyme thiaminase[172], a substance that can rob the body of the vitamin B complex[65]. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B. though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. The plant also contains equisetic acid see the notes on medicinal uses for more information[213].

kcakta Edible Parts: RootEdible Uses: Roots - raw or cooked[46, 61, 85, 161, 257]. Caution is advised, see the notes above on toxicity. A further report says that the peeled stems, base of the plant, root and tubers were eaten raw by

the N. American Indians, the report went on to say that this may be inadvisable[85].

tcanta Dynamic accumulator

dwatta Horsetails have an unusual chemistry compared to most other plants[238]. They are rich in silica, contain several alkaloids (including nicotine) and various minerals[238].

nrakta Arctic and temperate regions of Europe, including Britain, N. America, central and northern Asia. ksacta Grassy stream banks, up to 900 metres[17]

propta Spores - best collected as soon as they are ripe in the spring and surface-sown immediately on a sterile compost. Keep moist and pot up as soon as the plants are large enough to handle. Very difficult[200]. Division. The plants usually spread very freely when well sited and should not really need any assistance.

nwatta Prefers a moist soil with a pH between 6.5 and 7.5[200]. Plants are hardy to about -30°c[200]. Plants have a deep and penetrating root system and can be invasive. If grown in the garden they are best kept in bounds by planting them in a large container which can be sunk into the ground[2001.

#### 5.2.589 Elsholtzia ciliata

Crested latesummer mint

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Elsholtzia ciliata is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: CondimentYoung leaves - raw or cooked[105, 177]. Finely cut then added to salads or used as a potherb[183]. The leaves can be used as an aromatic condiment for vegetable dishes[183]. The powdered seeds are used as a condiment for flavouring foodstuffs[272]

dwatta Antibacterial Antipyretic Antiviral Astringent Carminative Depurative Diaphoretic Diuretic StomachicThe plant contains an essential oil[283]. It is antibacterial, antipyretic, antiviral, astringent, carminative, diaphoretic, diuretic and stomachic[61, 176, 178, 279]. Its use is said to relieve the effects of excess alcohol[61, 178]. It is used in the treatment of common colds, fevers, headaches, diarrhoea, oedema and oliguria[176, 279]. The plant has a broadspectrum antibacterial action[176]. It is harvested when in flower and dried for later use[283].

nrakta N. Europe. N. America. N. Asia. ksacta Roadsides, old fields etc in Eastern N. America[43], Grassy areas in mountains in Korea[279].

propta Seed - sow late spring in situ[200].

nwatta An easily grown plant, it succeeds in most soils. Cultivated for ornament in N. and E. Europe[50].

#### 5.2.590 Trillium sessile

4 tlin 8 cvuc 2 kcak 0 tcan 1 dwat 0.4 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trillium sessile is a PERENNIAL growing to 0.4m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. The young unfolding leaves are an excellent addition to the salad bowl, tasting somewhat like sunflower seeds[183]. The leaves can also be cooked as a potherb[183].

and stings[238, 244]. It is also used as a wash for sore nipples[244]. The root is harvested in late summer, after the leaves have died down, and is dried for later use[213, 238]. The whole plant is used as a poultice for tumours, inflammations and ulcers[222].

nrakta Eastern N. America - Quebec to Ontario and Michigan, south to Tennessee. ksacta Cool, rich, moist, neutral to acidic soils of upland deciduous forests, mixed deciduous-coniferous forests, coniferous swamp borders at elevations of 200 - 700 metres[270].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 -3 months at 15°c. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Landscape Uses:Border, Ground cover, Woodland garden. Prefers a deep well-drained woodland or humus-rich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open deciduous woodland[1, 90]. Succeeds in a sunny position if the soil does not dry out[42]. Succeeds in deep shade[188]. A very hardy plant. tolerating temperatures down to about -35°c[238]. Plants are long-lived[233]. Any transplanting is best done whilst the plants are in flower[200]. A very variable species[200], it is subject to mutation[90]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238]. The flowers have an unattractive smell rather like putrefied flesh[42, 207, 245]. The white-flowered form, blandum, is almost scentless[245]. Plants can flower in two years from seed[138]. Special Features:Attractive foliage, North American native, Naturalizing, Flowers have an unpleasant odor.

#### 5.2.579 Lycopus virginicus

Bugleweed, Virginia water horehound 4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lycopus virginicus is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

pcista Known to cause the enlargement of the thyroid gland. Avoid in patients with thyroid disease or given concomitantly with thyroid therapy. Avoid during pregnancy

kcakta Edible Parts: RootEdible Uses: Root - cooked[46, 61].

dwatta Antianxiety Antidandruff Astringent Cardiac Hypoglycaemic Narcotic SedativeBugleweed has sedative properties and is used in modern herbalism principally to treat an overactive thyroid gland and the racing heartbeat that often accompanies this condition[254]. The whole plant is used as an astringent, hypoglycaemic, mild narcotic and mild sedative[4, 102, 222, 238]. It also slows and strengthens heart contractions[238]. The plant has been shown to be of value in the treatment of hyperthyroidism[222, 238], it is also used in the treatment of coughs, bleeding from the lungs and consumption, excessive menstruation etc[4, 238]. It should not be prescribed for pregnant women or patients

with hypothyroidism[238]. The plant is harvested as flowering begins and can be use fresh or dried, in an infusion or as a tincture[4, 238]. The root has been chewed, a portion swallowed and the rest applied externally in the treatment of snakebites[257]. Current uses are predominantly for increased activity of the thyroid gland and for premenstrual syndrome symptoms such as breast pain [301]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Lycopus for nervousness and premenstrual syndrome (see [302] for critics of commission E).

nrakta Eastern N. America - New York and Wisconsin south to Georgia and Texas. ksacta Low damp shady ground in rich moist soils[43].

propta Seed - sow spring or autumn in a cold frame[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Tolerates most soil types so long as they are wet. Succeeds in full sun or in partial shade[238], in damp meadows or in wet places by ponds or streams[200].

## 5.2.580 Oxalis exilis

Least Yellow Sorrel. Shady woodsorrel 4 tlin 8 cvuc 2 kcak 0 tcan 2 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Oxalis exilis is a ANNUAL/PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[2, 46, 61, 105]. Added to salads, cooked as a potherb with other milder flavoured greens or used to give a sour flavour to other foods[183]. The leaves are available all year round unless the winter is very cold, they have a pleasantly sour taste[114], but are very small and fiddly to harvest[K]. The leaves contain about 86% water. 2.3% protein, 0.8% fat, 8.2% carbohydrate, 150mg calcium, 78mg phosphorus, 8mg iron, 0.6mg niacin, 78mg vitamin C, 6050µg beta carotene[173]. The leaves contain between 7 - 12% oxalate[218]. Use in moderation, see notes at top of sheet, Flowers - raw. A nice acid flavour and a pleasant addition to the salad bowl[K].

dwatta Urinary Vitamin CThe whole plant is anthelmintic, antiphlogistic, astringent, depurative, diuretic, emmenagogue, febrifuge, lithontripic, stomachic and styptic[147, 178, 218, 240]. It is used in the treatment of influenza, fever, urinary tract infections, enteritis, diarrhoea, traumatic injuries, sprains and poisonous snake bites[147]. An infusion can be used as a wash to rid children of hookworms[257]. The plant is a good source of vitamin C and is used as an antiscorbutic in the treatment of scurvy[240]. The leaves are used as an antidote to poisoning by the seeds of Datura spp. arsenic and mercury[218]. The leaf juice is applied to insect bites, burns and skin eruptions[218]. It has an antibacterial activity[218].

nrakta New Zealand and Tasmania, ksacta Arable land and waste places, it is a common garden weed[9, 17] where it tends to become especially troublesome in pots of plants growing in greenhouses etc[200].

propta Seed - best sown as soon as ripe in a cold frame. This plant does not need any encouragement.

nwatta A very easily grown plant, succeeding in a sandy soil in a warm dry position[1]. It prefers dry open habitats[50]. Spreading rapidly by seed and underground bulbils, this species can quickly become a nuisance, it is a common weed of pot plants in nurseries[200].

#### 5.2.581 Oenothera albicaulis

Whitest Evening Primrose

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Oenothera albicaulis is a ANNUAL/BIENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies), bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves Root Seed SeedpodEdible Uses: Fruit[105,161]. Another report says that the plant has an edible seedpod[213]. The reports for edible fruit probably mean the seedpod[K]. Seed - cooked[257]. They can be used in soups or can be ground into a powder and then used as gravy[257]. Root - cooked. Too small to be a staple food, but useful in an emergency, the roots taste best in late autumn, winter and early spring[213]. Leaves and young shoots - cooked[213].

dwatta AntiphlogisticA poultice of the plant has been used to treat swellings[257]. A decoction of the root has been drunk and used as a lotion on muscle strains[257].

nrakta Western N. America - Arizona to S. Dakota and Montana. ksacta Rather dry grassy and disturbed places, 800 - 2200 metres.

propta Seed - sow in situ from late spring to early summer or in the autumn[200].

nwatta Prefers a dryish well-drained sandy loam and full sun[1, 200]. Heavy clay soils may induce winter rots[200]. Succeeds in poor soils[200]. The flowers open in the evening, they are richly scented and are very attractive to moths.

#### 5.2.582 Uvularia perfoliata

Bellwort, Perfoliate bellwort

4 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.4 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Uvularia perfoliata is a PERENNIAL growing to  $0.4~\mathrm{m}$  (1ft 4in) by  $0.3~\mathrm{m}$  (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[55, 105, 161]. They are a very good substitute for asparagus[2]. Root - cooked[2, 105, 161].

dwatta Miscellany Ophthalmic SalveThe root is used as a poultice or salve in the treatment of boils, wounds and ulcres[207]. A tea made from the roots is used in the treatment of coughs, sore mouths and throats, inflamed gums and snakebites[222, 257]. It is suitable for use by children[257]. An infusion of the crushed roots has been used as a wash to treat sore eves[257].

nrakta Eastern N. America - Quebec to Ontario, south to Florida and Mississippi. ksacta Moist woodland and scrub in acid to circumneutral soils from sea level to 1000 metres[43, 187. 270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[200]. Sow stored seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into

their permanent positions in late spring or early summer, after the last expected frosts. Division after the plants die down in late summer. It is best carried out in early spring before the plants flower[188]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Requires a cool moist shady position and a light sandy soil[1, 42, 111]. Likes plenty of humus in the soil[111]. Grows well in a woodland garden and in the rock garden[200]. Plants grow much taller in rich soils and then succeed in the herbaceous border[222]. A very hardy plant, tolerating temperatures down to about -20°c[187].

#### 5.2.583 Hosta crispula

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hosta crispula is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Leaf stems - raw or cooked[K]. Crisp and sweet but rather fibrous and chewy[K].

tcanta A good ground cover plant[197]. Plants should be spaced about 45cm apart each way[208].

nrakta E. Asia - Japan. ksacta Not known in a truly wild situation, it is probably of garden origin[200].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be [233]. Another report says that the plant should be grown in full shade[251]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Requires some protection from the wind[188, 251]. A very slow-growing plant[251], it is in general fully hardy in Britain, but the young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. This plant is not recognised as a species by some authorities, who see it as a garden hybrid H. 'Crispula' [251]. Especially when grown in less than ideal conditions, this species is easily confused with H. 'Thomas Hogg' and H. fortunei 'Albomarginata'[200]. Hybridizes freely with other members of this genus[200]. There are some named forms selected for their ornamental value[200]. This species is prone to virus disease[188, 251].

# 5.2.584 Polygonatum humile

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum humile is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some members of this genus are believed to have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked. They can be used as an asparagus substitute. Root - cooked[105]. Rich in starch.

dwatta Antiperiodic Antirheumatic Demulcent Refrigerant Sedative Sialagogue TonicThe roots are antiperiodic, antirheumatic, demulcent, refrigerant, sedative, sialagogue and tonic[218].

nrakta E. Asia - N. China, Japan, Korea. ksacta Meadows and thin woods in lowland, C. and N. Japan[58]. Forests and grassy slopes at elevations from 800 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture retentive well-drained soil in cool shade or semi-shade[200]. Plants are intolerant of heat and drought but tolerate most other conditions[200]. This species is hardy to about -20°c[187]. Closely related to P. hirtum[200]. Closely allied to P. odoratum. Plants are often mistakenly grown as P. falcatum[187]. The rhizomes are slender and creeping, the plant forming spreading colonies[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Young shoots are very attractive to slugs. Hybridizes with other members of this genus[200].

# 5.2.585 Viola tricolor

Heartsease, Johnny jumpup, Field Pansy, 4 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Viola tricolor is a ANNUAL/PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to September, and the seeds ripen from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[105]. When added to soup they thicken it in much the same way as okra[85, 159]. A tea can be made from the leaves[85]. The small attractive flowers are added to salads or used as a garnish[183].

tcanta Dye LitmusYellow, green and blue-green dyes are obtained from the flowers[168]. The leaves can be used in place of litmus in testing for acids and alkalis[4].

dwatta Anodyne Antiasthmatic Antiinflammatory Antiseborrheic Antispasmodic Cardiac Demulcent Depurative Diaphoretic Diuretic Eczema Emetic Emollient Epilepsy Expectorant Homeopathy Laxative Vulnerary Heartsease has a long history of herbal use and was at one time in high repute as a treatment for epilepsy, asthma, skin diseases and a wide range of other complaints[4]. In modern herbalism it is seen as a purifying herb and is taken internally in the treatment of skin complaints such as eczema[254]. The herb is anodyne. antiasthmatic, anti-inflammatory, cardiac, demulcent, depurative, diaphoretic, diuretic, emollient, expectorant, laxative and vulnerary[4, 7, 9, 13, 21, 46, 165]. Being expectorant, it is used in the treatment of various chest complaints such as bronchitis and whooping cough, whilst its diuretic action makes it useful for treating rheumatism, cystitis and difficulty in passing urine[254]. It is also used as an ointment for treating eczema and other skin complaints and is also useful in cases of rheumatism, bed-wetting etc[4, 9]. The plant is harvested from June to August and dried for later use[4]. The root is emetic[7]. A homeopathic remedy is made from the entire plant[4]. It is used in the treatment of cutaneous eruptions[4].

nrakta Europe, including Britain, from Scandanavia south and east to Corsica, W. Asia, Siberia, Caucasus. ksacta Cultivated and waste ground, short grassland etc, mainly on acid and neutral soils[17].

propta Seed - best sown in the autumn in a cold frame. Division in the autumn or just after flowering. The plant is a short-lived perennial and division is not that worthwhile.

nwatta Landscape Uses:Alpine garden, Border, Container, Massing, Rock garden. Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds[31, 53]. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high[200]. Prefers a pH between 6 and 6.5[200]. A very variable species[4]. It is normally an annual plant, but it is sometimes a short-lived perennial[187]. A good bee plant[24]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159]. Special Features:Not North American native, Naturalizing, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Fragrant flowers.

# 5.2.586 Disporum trachycarpum

Fairvbells

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.5 m hkuc

peimhmim cyutli teup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Disporum trachycarpum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 161, 177, 257]. A sweet flavour[212]. The fruit is up to 10mm in diameter and is leathery rather than pulov[235].

dwatta Ophthalmic PoulticeThe seed has been used to clear foreign objects from the eye. A fresh seed was inserted and the eye closed then rubbed until the seed was watered out with the foreign object clinging to it[257]. The seeds were also placed in the eye overnight and an infusion of the bark used as an eyewash to treat snow-blindness[257]. An infusion of the leaves has been used as a wash for wounds whilst a poultice of the dampened bruised leaves has been applied to bleeding wounds[257].

nrakta Western N. America - British Columbia to N.E. Oregon and south along the Rockies. ksacta Wooded slopes, often by streams, or in aspen groves, to 3000 metres[60].

propta Seed - best sown in a cold frame as soon as it is ripe[175]. Use a lime-free compost and keep it moist[175]. Stored seed requires 6 weeks cold stratification and should be sown as early in the year as possible[175]. Germination usually takes place within 3 - 6 months or more at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse

has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: FruitEdible Uses: TeaFruit -cooked. It is used as a flavouring in soups etc[177]. The fruit is about 6mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Leaves are used as a tea substitute[105, 177]. Some caution is advised, see the notes above on toxicity.

tcanta Dye Hair Ink RepellentA blue dye and an ink are obtained from the fruit[13, 46, 61, 115]. The root juice is used to dye hair black[4]. The leaves are said to repel mice and moles[4, 115]. Plants make a dense ground cover when spaced about 1 metre apart each way[208]. They are best used in large areas, roadsides etc[208]. Our experience to date (1995) is that the plants spread vigorously but do not form a dense cover and so do not exclude other plants[K].

dwatta Antiphlogistic Antirheumatic Appetite Suppressant Cholagogue Diaphoretic Diuretic Expectorant Homeopathy Poultice PurgativeThe leaves are antiphlogistic, cholagogue, diaphoretic, diuretic, expectorant and laxative[4, 7, 9, 13, 21, 240]. The fruit is also sometimes used, but it is less active than the leaves[4]. The herb is commonly used in the treatment of liver and kidney complaints[4]. When bruised and laid on boils and scalds, they have a healing effect[4]. They can be made into a poultice for treating swellings and contusions[4]. The leaves are harvested in the summer and can be dried for later use[7]. The root is diaphoretic, mildly diuretic and a drastic purgative[4, 7, 9]. Dried, then powdered and made into a tea, it is considered to be one of the best remedies for dropsy[4, 240]. It should only be used with expert supervision because it can cause nausea and vertigo[9]. A homeopathic remedy is made from the fresh berries or the bark[9]. It is used in the treatment of dropsy[9]

nrakta Europe, including Britain, from the Netherlands south and east to the Mediterranean and Himalayas. ksacta Waste ground, woods, hedgerows and scrub. especially on calcareous soils[7, 13].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first(78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Division of suckers in spring or autumn. Very easy.

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy classoils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. A very invasive plant, sending up new shoots a metre or more away[K]. It can be used for naturalising in the rougher parts of the garden[233], growing well on rough banks etc[1]. The whole plant, when bruised, emits a most unpleasant fur-like smell[245]. The bark, in particular, smells like stale perspiration[245].

# 5.2.737 Festuca pratensis

Meadow fescue

4 tlin 10 cyuc 1 kcak 3 tcan 0 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli hjonli

drutta Festuca pratensis is an evergreen Perennial growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It cannot tolerate atmospheric pollution.

pcista None Known kcakta Possible edible seeds [1-4]

tcanta FodderF, pratensis has been valued for centuries as a pasture grass in temperate regions. It is more cold tolerant than Festuca arundinacea, although it is not as productive. Animal feed, fodder, forage. Environmental: Erosion control or dune stabilization. Genetic importance: Gene source. An ornamental grass [1-8]. Faunal Associations: Insects that feed on Fescue grasses (Festuca spp.) include caterpillars of the skipper Atalopedes campestris (Sachem), larvae of the moth Pediasia trisecta (Larger Sod Webworm), Camnula pellucida (Clear-winged Grasshopper), Oulema melanopus (Cereal Leaf Beetle), Sphenophorus parvulus (Bluegrass Billbug). Blissus leucopterus hirtus (Hairy Chinch Bug), Metopolophium dirhodum (Rose-Grass Aphid), Rhopalosiphum oxyacanthae (Apple-Grass Aphid), Tetraneura ulmi (Elm and Grass Root Aphid), and other aphids. Horses, cattle, and other hoofed farm animals graze on the foliage of Meadow Fescue. The seeds of Meadow Fescue are eaten by the Greater Prairie Chicken. Meadow Fescue collapses into sprawling mats of vegetation during the winter, which probably provides good cover for voles and other small rodents [1-6].

dwatta None Known

nrakta Native to northern Europe east to Central Asia and south to Caucasus and Asia Minor. Introduced to North America from England (Reed, 1976). ksacta Meadows, roadsides, old pastures, and riversides on moist, rich soils, especially on loamy and heavy soils.

propta Slow to establish, this grass requires a clean sedhed. Propagated from sown at a rate of 11?28 kg/ha. Optimum temperature for germination, 20?30?C. In mixtures with clovers sown 9?13 kg/ha; with alfalfa, 3 kg/ha. Combines well with clovers, Lotus corniculatus, alfalfa and grasses, as Phleum pratense and Dactylis glomerata, producing a large proportion of leafy bottom growth (Reed. 1976).

nwatta A perennial grass growing 30-120cm high. It can be erect or spreading [1-4]. Ranging from Boreal Moist to Rain through Subtropical Dry Forest Life Zones, meadow fescue is reported to tolerate annual precipitation of 3.2 to 13.6 dm, annual temperature of 4.3 to 21.17C, and pH of 4.5 to 8.2 (Duke, 1978, 1979). Adapted to cool climates as a coolseason turfgrass. Thrives in deep rich soil, but also grows well on calcareous or sandy soils provided they are moist. In native areas, found in meadows, forest margins, thin forests (Reed, 1976). In Pakistan it grows at about 2,000 m altitude. In Sichuan and Yunnan [1-4]. Flowering from June until August in the Northern Hemisphere. US Forest Service (2016) records that it is tolerant of acid soils but may also occur in calcareous soils. Although it survives regular mowing, this grass prefers unmowed or little-mowed areas [1-6].

#### 5.2.738 Berberis sieboldii

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Berberis sieboldii is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177].

tcanta DveA vellow dve is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - C. Japan. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification

for later use[238]. They should not be stored for longer than 12 months[238]. The whole herb is used to make a lotion for external application in the treatment of toothache, earache, neuralgia etc[4]. The essential oil is used in aromatherapy. Its keyword is 'Soothing'[210]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Chamaemelum nobile for coughs and bronchitis, fevers and colds, inflammations of the skin, inflammation of the mouth and pharynx, tendency to infection - improve immunity, wounds and burns (see [302] for critics of commission E).

nrakta Western Europe, including Britain, from Belgium south to N. Africa and the Azores. ksacta Sandy commons, pastures and grassy roadsides[17].

propta Seed - sow March in a cold frame. Only just cover the seed and do not let the compost dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. Basal cuttings in spring. Harvest the shoots when they are about 5cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Tolerates most well-drained soils, preferring a dry sandy soil and a sunny position[4, 37, 200]. Tolerates partial shade[16]. Established plants are drought tolerant[190]. Can be grown in grass[54]. Tolerates a pH in the range of 6.8 to 8. Plants are hardy to at least -15°c[200]. They often deteriorate in very wet or cold winters, but usually recover quickly in the spring and early summer[238]. Chamomile is commonly grown in the domestic herb garden, it is also cultivated commercially for its flowers which are used in herb teas and medicinally. The double-flowered form is highly regarded for its medicinal virtues[165]. Plants can be invasive when growing in good conditions[188], though they are easy to control[K]. There is some confusion between this plant (which is a perennial) and the annual chamomile (Matricaria chamomilla) as to which is the genuine medicinal chamomile. Some reports say that this plant is the most effective herbally[4], whilst others say that Matricaria is more potent[9]. Both plants seem to have very similar properties and either can probably be used guite successfully. Camomile is a very good companion plant, promoting the health of plants it is growing close to, it is especially good for growing near cabbages, onions and, in small quantities, wheat[4, 14, 20, 54, 201, 238]. The cultivar 'Treneague' is a low-growing non-flowering form that makes an excellent ground cover[197]. Fairly tolerant of being walked on, it is sometimes used instead of grass for making a lawn though it is more difficult to maintain and can become weed-infested, especially in its early stages[200]. It also tends to become bare in places[208]. The whole plant has a pungent aroma, this being especially noticeable on hot days or when the plant is bruised. Suitable for temperate areas; in subtropical areas, it requires partial shade and will be short-lived; it is unlikely to grow in tropical areas. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

# 5.2.641 Bellis perennis

Daisy, Lawndaisy, English Daisy 4 tlin 8 cyuc 2 kcak 1 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Bellis perennis is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower all year, and the seeds ripen from May to October. The species is hermaphrodite (has both male and female organs) and is polinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[2, 7, 52, 115]. The flavour is somewhat acrid[4]. A pleasant sour flavour according to another report[238] whilst a third says that they are mild and agreeable and are used in salads[217]. The daisy is occasionally used as a potherb[183]. Flower buds and petals - raw[144, 183]. Eaten in sandwiches, soups and salads[183].

tcanta RepellentAn insect repellent spray can be made from an infusion of the leaves[57]. Daisies have traditionally been used for making daisy chains in children's games.

dwatta Anodyne Antidiarrhoeal Antispasmodic Antitussive Cancer Demulcent Digestive Eczema Emollient Expectorant Laxative Ophthalmic Purgative Tonic Daisies are a popular domestic remedy with a wide range of applications[7]. They are a traditional wound herb[238] and are also said to be especially useful in treating delicate and listless children[7]. Recent research (1994) has been looking at the possibility of using the plant in HIV therapy[238]. The herb is mildly anodyne, antispasmodic, antitussive, demulcent, digestive, emollient, expectorant, laxative, ophthalmic, purgative and tonic[7, 9, 21]. The fresh or dried flowering heads are normally used[9]. An infusion is used in the treatment of catarrh, rheumatism, arthritis, liver and kidney disorders, as a blood purifier etc[9]. The daisy once had a great reputation as a cure for fresh wounds[4]. An ointment made from the leaves is applied externally to wounds, bruises etc[4, 232] whilst a distilled water is used internally to treat inflammatory disorders of the liver[4]. Chewing the fresh leaves is said to be a cure for mouth ulcers[244]. Daisies also have a reputation for effectiveness in treating breast cancers[7]. The flowers and leaves are normally used fresh in decoctions, ointments and poultices[238]. A strong decoction of the roots has been recommended for the treatment of scorbutic complaints and eczema, though it needs to be taken for some time before its effect becomes obvious[244]. A mild decoction may ease complaints of the respiratory tract, rheumatic pains and painful or heavy menstruation[244]. The plant, harvested when in flower, is used as a homeopathic remedy[232]. Its use is especially indicated in the treatment of bruising etc[232].

nrakta Most of Europe, including Britain, to W. Asia. ksacta A common plant of meadows, lawns and other grassy areas, it is very frequently found growing in lawns[17].

propta Seed - sow as soon as the seed is ripe in June. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late summer[200]. Division after flowering[200]. Very easy, it can be done at almost any time of the year, though spring and early summer are best[K]. The divisions can be planted straight out into their permanent positions.

nwatta Landscape Üses:Alpine garden, Border, Container, Ground cover, Rock garden. Succeeds in most well-drained soils in sun or semi-shade[188, 200]. The daisy is commonly found growing in many lawns, some varieties have been developed for the flower garden[1]. It is a good plant for the spring meadow[24]. The plants have a very long flowering season, they will even produce a few flowers in the middle of mild winters[K]. Special Features: Edible, Not North American native, Naturalizing, Attracts butterflies, Suitable for dried flowers. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to

over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.642 Hypochoeris radicata

Cat's Ear

4tlin 8 cyuc2kcak 0 tcan 1 dwat $0.3\,\mathrm{m}$ hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hypochoeris radicata is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies lepidoptera. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked like spinach[5, 52, 53, 183]. A winter salad[100], it is rather bitter[K]. Young leaves are mild and agreeable[217].

dwatta PectoralPectoral[100].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and western Asia. ksacta Meadws and dry pastures, grassy dunes, waysides and open woods[5, 17]

propta Seed - sow spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can be sown outdoors in situ in the spring.

nwatta Requires a well-drained soil and a sunny position or light shade. Another report says that it dislikes shade. A common lawn weed[24].

#### 5.2.643 Orchis laxiflora

Marsh Orchis

4tlin8cyuc2kcak0tcan2dwat0.8~mhkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis

htut cyutii teupija/n nwicii nrasjiutnyik npa/tii natprikiwis hpa7tmwatli xre7t hjonli drutta Orchis laxiflora is a BULB growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK

(2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: DrinkRoot cooked[2, 4, 46]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Antiflatulent Astringent Cancer Demulcent Expectorant NutritiveUsed in the treatment of cancer[148]. Salep (see above for more details) is very nutritive, astringent, expectorant and demulcent[4, 240]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to

fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Southern Europe, including Britain, from Belgium south and east to N. Africa and W. Asia. ksacta Wet marshes and wet meadows in the Channel Islands[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Requires a deep rich soil[1]. Plants can succeed in drier areas of bog gardens[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate. though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. Plants can succeed in a lawn in various parts of the country. The lawn should not be mown early in the year before or immediately after flowering[200]. Plant out bulbs whilst the plant is dormant, preferably in the autumn[200]. Bulbs can also be transplanted with a large ball of soil around the roots when they are in leaf, they are impatient of root disturbance[1]. Plants seem to be immune to the predations of rabbits[233]. Cultivated plants are very susceptible to the predation of slugs and snails[230].

#### 5.2.644 Hosta longissima

Swamp Hosta

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hosta longissima is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105, 177].

nrakta E. Asia - Japan. ksacta Swampy grassland and other wet places, often exposed to full sun in the spring but then shaded in the summer by the long grasses it grows amongst[251].

176, 178, 218, 240]. It is used in the treatment of sore throats, jaundice, oedema, acute urinary tract infection and morbid crying of babies [176].

nrakta Throughout the northern temperate zone, including Britain, east and south Africa, Australasia. ksacta Wet pastures, bogs, damp woods etc, usually on acid soils[17].

propta Seed - surface sow in pots in a cold frame in early spring and keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown sufficiently, otherwise in late spring of the following year. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in a moist soil, bog garden or shallow water[1, 200]. Prefers a heavy soil in sun or light shade[200].

# 5.2.733 Meconopsis grandis

Blue Poppy

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Meconopsis grandis is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - roasted and pickled[272].

nrakta E. Asia - Himalayas to China, Nepal and Tibet. ksacta Shady places amongst shrubs at elevations of 3000 -5000 metres in Nepal (272).

propta Seed - best sown in a cold frame as soon as it is ripe in late summer. Spring sown seed is slower to germinate[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Some growers prefer to divide the plant immediately after flowering[200].

nwatta Grows best in a woodland soil in partial shade[1, 200]. The soil should be lime-free, moist, well-drained and moderately rich[200]. Dislikes full sun and windy positions[200]. Plants are best divided every three years in order to maintain their vigour[200].

#### 5.2.734 Veronica longifolia

Garden Speedwell, Long-Leaf Speedwell 4 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Veronica longifolia is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - raw or cooked. A famine food, they are only used when all else fails[179].

nrakta N. E. and C. Europe to S.W. Asia, Mongolia, Korea and N. China. ksacta Steppes, grassy mountain slopes, meadows at forest edges and birch forests below 1500 metres in northwest China[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in autumn or spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing

away well. Plant them out in the summer or the following spring.

nwatta Landscape Uses:Border, Massing. Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. A number of cultivars have been selected for their ornamental value[200]. Special Features:Attractive foliage, Naturalizing, Suitable for cut flowers, Extended bloom season in Zones 9A and above.

# 5.2.735 Sanguisorba canadensis

American Great Burnet, Canadian burnet 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sanguisorba canadensis is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardness. It is hardy to UK zone 4. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Edible Uses: Leaves - boiled, washed in water to remove the bitterness and then eaten with salt and miso[177, 183].

nrakta North-eastern N. America - Newfoundland to Michigan and south to Georgia. ksacta Wet meadows and swamps[187]. Peaty or boggy soils[43].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring[188].

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Succeeds in the flower border or in moist grass[1], plants can become invasive when they are grown by water[200]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.736 Sambucus ebulus

Dwarf Elder, Dwarf elderberry

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sambucus ebulus is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of this species

kcakta Edible Parts: OilEdible Uses: Condiment OilThe powdered seeds are used as a condiment for flavouring food-stuffs[272]. An edible oil is obtained from the seed[272].

tcanta Incense Miscellany Oil Pot-pourriThe highly aromatic foliage is used in pot-pourri[200]. The powdered plant is used for incense[272].

dwatta Anodyne MiscellanyOne report says that the plant is used medicinally, but gives no more information[266]. The juice of the roots is used to relieve headaches[272].

nrakta E. Asia - China, Nepal. ksacta Grasslands, open hills, valleys; 1200-3200 m. Gansu, Guangxi, Guizhou, Hubei, Sichuan, Xizang, Yunnan[266].

propta Seed - sow spring in a greenhouse or cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Grows well on woodland margins[200]. This species is a sub-shrub, the woody stems often dying back to the base in severe winters[200].

# 5.2.731 Cimicifuga racemosa (Actaea racemosa)

Black Cohosh, Black Snakeroot, Bugbane 4 tlin 10 cyuc 1 kcak 0 tcan 4 dwat 1.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cimicifuga racemosa (Actaea racemosa) is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The plant is poisonous in large doses[7]. Large doses irritate nerve centres and may cause abortion[268]. Gastrointestinal disturbances, hypotension, nausea, headaches. Not recommended during pregnancy or while breastfeeding. Do not take concomitantly with iron [301].

kcakta Leaves - cooked[105]. Some caution is advised, see the notes above on toxicity.

tcanta Both the growing and the dried plant can be used to repel bugs and fleas [211].

dwatta Black cohosh is a traditional remedy of the North American Indians where it was used mainly to treat women's problems, especially painful periods and problems associated with the menopause[254]. A popular and widely used herbal remedy, it is effective in the treatment of a range of diseases[4]. The root is alterative, antidote, antirheumatic, antispasmodic, astringent, cardiotonic, diaphoretic, diuretic, emmenagogue, expectorant, hypnotic, sedative, tonic and vasodilator[4, 7, 21, 46, 57, 165, 192, 222]. It is harvested in the autumn as the leaves die down, then cut into pieces and dried[4]. The root is toxic in overdose, it should be used with caution and be completely avoided by pregnant women[222]. See also the notes above on toxicity. The medically active ingredients are not soluble in water so a tincture of the root is normally used[222]. It is used in the treatment of rheumatism, as a sedative and an emmenagoque[213]. It is traditionally important in the treatment of women's complaints, acting specifically on the uterus it eases uterine cramps and has been used to help in childbirth[222, 268]. Research has shown that the root has oestrogenic activity and is thought to reduce levels of pituitary luteinizing hormone, thereby decreasing the ovaries production of progesterone[222, 254]. The root is also hypoglycaemic, sedative and anti-inflammatory[222]. Used in conjunction with St. John's Wort (Hypericum perforatum) it is 78% effective in treating hot flushes and other menopausal problems[254]. An extract of the root has been shown to strengthen the male reproductive organ in rats[222]. The root contains salicylic acid, which makes it of value in the treatment of various rheumatic problems - it is particularly effective in the acute

stage of rheumatoid arthritis, sciatica and chorea[268]. Its sedative action makes it useful for treating a range of other complaints including tinnitus and high blood pressure[254]. The roots are used to make a homeopathic remedy[232]. This is used mainly for women, especially during pregnancy[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Cimicifuga racemosa (Actaea racemosa) for climacteric (menopause) complaints, Premenstrual syndrome. (see [302] for critics of commission E).

nrakta Eastern N. America - Massachusetts to Ontario, south to Georgia and Tennessee. ksacta Moist, mixed deciduous forests, wooded slopes, ravines, creek margins, thickets, moist meadowlands, forest margins, and especially mountainous terrain from sea level to 1500 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 12 months or even longer at 15°c[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°c and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Landscape Uses:Border, Container, Woodland garden. Prefers a moist humus rich soil and some shade[1,11, 200]. Grows well in dappled shade[28, 31, 88]. Succeeds in ordinary garden soil[1] and tolerates drier soils[233]. Plants are hardy to at least -20°c[187]. A very oramental species[233]. The flowers have an unusual, slightly unpleasant smell[188] which is thought to repel insects[213]. Plants grow and flower well in Britain, though they seldom if ever ripen their seed[4]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features: Attractive foliage, North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

#### 5.2.732 Juncus effusus

Soft Rush, Common rush, Lamp rush, Pacific rush 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Juncus effusus is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water. The plant can tolerates strong winds but not maritime exposure.

pcista Possibly toxic to mammals[76].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - raw[118, 257]. Some caution is advised, see the notes above on toxicity.

tcanta Basketry Lighting Paper Strewing String Thatching WeavingStems are used in basket making, thatching, weaving mats etc[23, 46, 66, 99, 115, 171]. The stems can also be dried then twisted or braided into ropes for tying or binding[257]. Stems can be peeled (except for a small spine which is left to keep them upright) and soaked in oil then used as a candle[6, 46, 61, 115]. A fibre obtained from the stems is used for making paper[189]. The stems are harvested in late summer or autumn, they are split and cut into usable pieces and then soaked for 24 hours in clear water. They are then cooked for 2 hours with Iye and beaten in a blender. The fibres make an off-white paper[189]. When mixed with mulberry fibres they can be used for making stencil paper[189]. The whole plant was formerly used as a strewing herb[1, 66, 115]

dwatta Antiphlogistic Depurative Diuretic Febrifuge Lenitive Lithontripic Pectoral Sedative UrinaryThe pith of the stem is antiphlogistic, depurative, discutient, diuretic, febrifuge, lenitive, lithontripic, pectoral and sedative[147, propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at  $10^{\circ} c.$  Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. A plant of boggy places, it is flood tolerant[187]. Does well in the semi-shade of a woodland[200] also succeeding in deeper shade[187]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. The rhizome creeps extensively[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. A polymorphic species, it hybridizes freely with other members of this genus[200].

# 5.2.645 Dianthus superbus

Fringed Pink

4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Dianthus superbus is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The plant contains saponins but apparently in quantities too low to cause harm[179]. Although fairly toxic, saponins are poorly absorbed by the body and most pass straight through without harm. Saponins are found in many foods, such as beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Leaves NectarEdible Uses: The leaves, stems and tops are boiled, steeped in water and eaten as a potherb[105, 177, 179, 183]. Young plants are also eaten[183]. One report says that they contain saponins but that the leaves are apparently not toxic[179]. Probably this is because the content of saponins is too low to be harmful[K]. Children suck the flowers for their sweet edible nectar[105, 177, 183].

dwatta Abortifacient Antibacterial Astringent Contraceptive Diuretic Emmenagogue Febrifuge Haemostatic Ophthalmic Resolvent Tonic Urinary VulneraryThe fringed pink, called Qu Mai in Chinese herbalism, has been used in Chinese herbal medicine for over 2,000 years. The whole plant is a bitter tonic herb that stimulates the digestive and urinary system, and also the bowels[238]. It also lowers blood pressure, reduces fevers and controls bacterial infections[218, 238]. Little used on its own, it is often taken with Dan Shen (Salvia multiorrhiza) to induce menstruation[254]. The closely related D. chinensis has the same uses as Qu Mai and

is more commonly used[238]. The plant is abortifacient, contraceptive, diuretic, emmenagogue, ophthalmic, tonic and vulnerary[147, 176, 178, 218]. It is said to promote hair growth[147, 176, 178]. It is ranked 9th in a list of 250 potential antifertility Chinese plants[218]. The plant is taken internally in the treatment of acute urinary tract infections (especially cystitis), urinary stones, constipation and failure to menstruate[238]. Externally, it is applied to skin inflammations and swellings[238]. The leaves are used in the treatment of haemorrhoids, lumbricoid worms, venereal sores etc[218]. The flowers are astringent, diuretic, haemostatic, resolvent and vulnerary[218]. Research has shown that the flowers are the most markedly diuretic part of the plant[254]. nrakta Europe to N. Asia. ksacta Woody hills and dry

nrakta Europe to N. Asia. ksacta Woody hills and dry meadows[100]. propta Seed - sow April/June in a greenhouse and only

propta Seed - sow April/June in a greenhouse and only just cover the seed. Germination usually takes place within 1-3 weeks at 20°c. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the autumn.

nwatta Prefers an alkaline soil but tolerates slightly acid soils[200]. Succeeds in any well-drained peaty soil in sun or light shade[187]. Plants succeed when grown on the top of a broad or retaining wall[219]. A very hardy plant, tolerating temperatures down to about -20°c[187]. The flowers have a soft sweet perfume[245].

#### 5.2.646 Uvularia sessilifolia

Bellwort, Sessileleaf bellwort

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Uvularia sessilifolia is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[2, 61, 105, 161, 257]. The shoots are harvested when they are still tender enough to be broken off with a fingernail and are used as an asparagus substitute[46, 183]. Root - cooked[22, 46, 61, 105, 183] or used in diet drinks[183, 207].

dwatta Blood tonic PoulticeA tea made from the roots is a blood purifier and is used in the treatment of diarrhoea[222, 257]. It is taken internally to aid in healing broken bones[222]. A poultice of the roots is applied to broken bones, boils etc[222, 257].

nrakta Eastern and southeastern N. America - New Brunswick to Ontario, south to Georgia and Arkansas. ksacta Moist hardwood coves, alluvial bottomlands, thickets and xeric woods northwards from sea level to 1000 metres[43, 187, 270]

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[200]. Sow stored seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division after the plants die down in late summer. It is best carried out in early spring before the plants flower[188]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Requires a cool moist shady position and a light sandy soil[1, 42, 111]. Likes plenty of humus in the soil[111]. Grows well in a deciduous woodland garden[42, 200] and in the rock garden[200]. Plants grow much taller in rich soils and then succeed in the herbaceous border[222]. They can spread quite quickly when in a suitable position[233]. A very hardy plant, tolerating temperatures down to about -20°c[187]. This species is closely related to U. caroliniana[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above)

information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.647 Chimaphila umbellata

4 tlin 8 cyuc 2 kcak 2 tcan 3 dwat 0.4 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Chimaphila umbellata is an evergreen Shrub growing to 0.4 m (1ft 4in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Weak skin sensitizing effects. May cause diarrhoea, nausea and vomiting. Not suitable for long term use. Reduces mineral absorption from gut [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaThe leaves are nibbled[177], brewed into a tea or used as a flavouring in root beer[183]. They have a delicious scent and flavour. An extract of the leaves is used to flavour candy and soft drinks[177, 183]. In Mexico the herb is used in the preparation of 'navaitai', an alcoholic beverage produced from sprouted maize[183]. A tea can be made from an infusion of the stems and roots[161, 177, 212].

tcanta Disinfectant EssentialThe plant's stoloniferous root system, and dwarf spreading habit make it a god ground cover, though it is a difficult plant to establish and grow well[245]. The plant is used in perfumery because of its delicate scent[9]

dwatta Alterative Antibacterial Astringent Disinfectant Diuretic Rubefacient Stimulant Tonic UrinaryPipsissewa was much used by many tribes of native North American Indians to induce sweating and treat fevers, including typhus[254, 257]. The plant contains hydroguinones which have a pronounced disinfectant effect within the urinary tract and modern day herbalism mainly employs the plant to treat urinary problems such as cystitis and urethritis[254]. The whole plant is alterative, antibacterial, astringent, diaphoretic, diuretic, rubefacient, stimulant and tonic[4, 9, 14, 21, 46, 165, 213, 207, 222]. An infusion is used in the treatment of various problems related to the urinary system, it is also prescribed for more serious conditions such as kidney stones and gonorrhoea[254]. A decoction is very efficacious in the treatment of skin diseases[4]. Used externally, the fresh leaves are rubefacient and internally they are of great use in cardiac and kidney diseases, chronic rheumatism and scrofula[4, 238]. Only the leaves are officinal, though the whole plant is often used[4]. The plant is loaded with the biologically active compounds arbutin, sitosterol and ursolic acid[222]. Arbutin hydrolyzes to the toxic urinary antiseptic hydroquinone[222]. The plant contains glycosides and an essential oil that are used as an astringent and tonic[212]. The plant is harvested when in flower, and the leaves on their own can be harvested during the growing season. They are dried for later use[238]. A homeopathic remedy is made from the leaves[9]. It is used in the treatment of inflammations of the urinary system[9].

nrakta N. Europe, N. America, E. Asia. ksacta Dry coniferous woods in Europe[9]. Moist woods, particularly coniferous stands, and along mountain streams from the lower hills to about 2,500 metres in Western N. America[212].

propta Seed - this is very difficult to germinate, see the notes above in cultivation details. It is best sown in a shady area of the greenhouse on moist sphagnum peat as soon as it is ripe. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Rather difficult because the plant is very sensitive to root disturbance. It is best attempted in the spring as the plant comes into growth[200]. Cuttings of softwood, June in a frame. Use some soil from around an established plant[14].

nwatta Requires a light moist but well-drained lime-free soil and shade from direct sunlight[1]. This species is difficult to propagate and grow in cultivation, mainly because it has certain mycorrhizal associations in the wild and these are necessary if the plant is to thrive[200]. It is best to use some soil collected from around an established plant when sowing seed or planting out into a new position[200]. The plant has wide-spreading fibrous feeding roots and will often die or fail to increase in size if these are disturbed. The flowers have a sweet but refreshing perfume[245]. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.648 Polygonum aviculare

Knotweed, Prostrate knotweed 4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonum aviculare is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: TeaYoung leaves and plants - raw or cooked[105, 177]. Used as a potherb[183], they are very rich in zinc[179]. A nutritional analysis is available[218]. Seed - raw or cooked. Rather small and fiddly to utilize, they can be used in all the ways that buckwheat (Fagopyrum esculentum) is used, either whole or dried and ground into a powder for use in pancakes, biscuits and piñole[4, 55, 106, 161, 183]. The leaves are a tea substitute[183].

tcanta DyeYields a blue dye that is not much inferior to indigo[115]. The part used is not specified, but it is likely to be the leaves. Yellow and green dyes are obtained from the whole plant [168]. The roots contain tannins, but the quantity was not given[223].

dwatta Anthelmintic Antiphlogistic Astringent Cardiotonic Cholagogue Diuretic Dysentery Emetic Emollient Expectorant Febrifuge Haemostatic Lithontripic Purgative TB Vasoconstrictor Vulnerary Knotweed is a safe and effective astringent and digretic herb that is used mainly in the treatment of complaints such as dysentery and haemorrhoids. It is also taken in the treatment of pulmonary complaints because the silicic acid it contains strengthens connective tisthe soil is well-drained[233]. Individual flowers only live for that follow hot summers[200]. Plants in this genus are noone day, but the plant produces a succession of blooms over tably resistant to honey fungus[200]. a period of several weeks[238]. Slugs really love this plant and can destroy even quite large clumps as they come into growth in the spring[K]. Special Features:Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or

#### 5.2.727 Lolium temulentum

Darnel

4 tlin 8 cvuc 1 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lolium temulentum is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed is not poisonous but it is often infected by a fungus which is very toxic. It is probably safer not to eat the seed because of the risk involved[114].

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. Used as a piñole or ground into a flour and used to make bread etc[213, 257]. It is very nutritious, like oats, but it is not advisable to eat the seed due to the risk of fungal infection[114]. This fungal infection, called ergot, causes hallucinations in small doses but can cause severe damage to the nervous system in larger quantities.

dwatta Anodyne SedativeThe seed is anodyne and sedative[4]. It is not actually the seed, but a fungus that is often found on the seed that has the medicinal properties[K].

nrakta Europe - Mediterranean. An introduced casual in Britain. ksacta Cultivated fields and waste ground in Britain[17].

propta Seed - sow spring in situ. nwatta Succeeds in ordinary garden soil[1].

# 5.2.728 Staphylea bumalda

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Staphylea bumalda is a deciduous Tree growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[105, 177, 179].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and by streams in lowland and hilly areas to 1300 metres, all over Japan[58]

propta Seed - this can be very slow to germinate, sometimes taking 18 months or more. It is best sown as soon as it is ripe in a cold frame[200], and some of it at least should then germinate in the spring. Stored seed should be sown as early in the year as possible and given cold stratification - it might not germinate until spring of the following year. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first winter. Plant them out early the following summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Fair to good percentage[78]. Layering in July/August. Takes 15 months. Good percentage[78].

nwatta Tolerant of a wide range of soils so long as they are not too dry[182, 200], it prefers a rich loamy soil in full sun or semi-shade[1, 11, 200]. The Japanese form of this species is rather tender in Britain[11], but in general plants are hardy to about -25°c[184]. The plants flower best in years

#### 5.2.729 Rumex obtusifolius

Round-Leaved Dock, Bitter dock

4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Rumex obtusifolius is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers welldrained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities. the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves Seed StemEdible Uses: Young leaves - cooked[8, 22, 46, 61]. A bitter taste, especially if the older leaves are used[105, 183]. The leaves are usually cooked in at least one change of water in order to reduce the bitterness[183]. Leaves can also be dried for later use[12]. The leaves have a much milder flavour when they are first produced in early spring[K]. Young stems - cooked[257]. Seed - raw or cooked[102, 172]. The seed can also be ground into a powder and used to make a gruel or added to cereal flours when making bread etc[102]. It is rather small and fiddly to harvest.

tcanta DveYellow, dark green to brown and dark grev dyes can be obtained from the roots of this plant[14, 168]. They do not need a mordant[168].

dwatta Astringent Blood purifier Contraceptive SalveThe leaves are often applied externally as a rustic remedy in the treatment of blisters, burns and scalds[4, 14]. The root contains tannin and is astringent and blood purifier[257]. A tea made from the roots has been used in the treatment of jaundice, whooping cough, boils and bleeding[4, 257]. An infusion of the root has been used as a wash, especially for children, to treat skin eruptions[257]. One report says that the root has been used as a contraceptive to stop menstruation[257]. The root is harvested in early spring and dried for later use[4].

nrakta Western Europe, including Britain, from Scandanavia south and east to Spain, Germany and Hungary, ksacta Waste ground, hedgerows and field margins[17], A common weed of cultivated land on acid or calcareous soils[12].

propta Seed - sow spring in situ. Division in spring.

nwatta Requires a good soil[4]. Plants are occasionally cultivated for their edible leaves[61]. A very important food plant for the caterpillars of many species of butterfly[30]. This species is an alternative host of the turnip fly[4].

# 5.2.730 Elsholtzia fruticosa

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Elsholtzia fruticosa is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

anthelmintic, antiseptic, cholagogue, deobstruent, emmenagogue, stomachic and tonic[4, 7, 165]. The main use of this herb is as an emmenagogue, though it is also a good stimulant tonic and has some nervine principle[4]. It is sometimes given to young children in order to expel parasitic worms and externally it is applied to small wounds in order to stop them bleeding and help them to heal[7]. The herb is also used externally in aromatic bathes and as a poultice to treat skin conditions[268]. Southernwood should be used internally with caution, see the notes above on toxicity. It should not be prescribed for pregnant women, especially in the first trimester of pregnancy, since it can encourage menstrual flow[238].

nrakta S. Europe? The original habitat is obscure. ks-acta Not known in a truly wild situation.

propta Seed - surface sow from late winter to early summer in a greenhouse. The seed usually germinates in 1-2 months at  $15^{\circ}$ c[134]. When large enough to handle, prick the seedlings out into individual pots. Once the seedlings are more than 15cm tall, plant them out into their permanent positions in late spring or summer. Cuttings of young wood 8cm long, May in a frame[169]. Cuttings of half-ripe wood with a heel, July/August in a frame[11].

nwatta Succeeds in most soils, preferring a well-drained one that is not too rich[1, 11]. Easily grown in a welldrained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Tolerates a pH in the range 6.3 to 7.6. Established plants are drought tolerant. Plants succeed in maritime gardens[233]. Southernwood is often grown in the herb garden, the leaves are very aromatic[182]. It is best to cut the plant back fairly hard every spring in order to keep it compact and encourage plenty of new growth[233, 268]. The plant rarely produces flowers in British gardens[11]. A good companion plant for cabbages[14, 18, 20]. It is also a good plant to grow in the orchard, where it can help to reduce insect pests[201]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.725 Potentilla reptans

Cinquefoil, Creeping cinquefoil 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla reptans is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw[7]. A useful addition to salads[7].

tcanta CosmeticThe plant is an ingredient in many anti-wrinkle cosmetic preparations for the skin[7].

dwatta Antidiarrhoeal Antispasmodic Astringent Febrifuge OdontalgicBoth the roots and the herb are antispasmodic, astringent and febrifuge[4, 7, 9, 54, 240]. An infusion of the dried herb is used in the treatment of diarrhoea etc, it is also used as a gargle for sore throats and is used externally as an astringent lotion[4]. A concentrated decoction of the root relieves toothache[7].

nrakta Europe, including Britain, from Norway south and east to the Mediterranean, Siberia, Himalayas. ksacta Dry sunny locations in meadows, pastures and waste ground[4, 9], usually on basic or neutral soils[17].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame un-

til they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a dry position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. The plant spreads vigorously by means of runners and can be invasive with new runners up to 1.5 metres long being produced each year[1, 4]. Members of this genus are rarely if ever troubled by browsing deer[233]. The flowers are partially closed in dull weather and close completely of a night time[4]. When closing, self-fertilisation is affected because the anthers are caused to touch the stigmas[4].

# 5.2.726 Belamcanda chinensis

Leopard Lily, Blackberry lily, Leopard Flower 4 tlin 10 cyuc 1 kcak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Belamcanda chinensis is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant is slightly toxic[147].

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105, 177]. Caution is advised, see the notes above on toxicity.

tcanta TanninThe root contains tannin[272].

dwatta Abortifacient Analgesic Antibacterial Antidote Antifungal Antiinflammatory Depurative Expectorant Febrifuge Hepatic Pectoral Purgative Stomachic TonicThe leopard lily has a very long history of use in traditional Chinese medicine. It is a bitter cooling herb that acts mainly on the lungs and the liver, lowering fevers and reducing inflammation[238]. It is effective against a number of bacterial, fungal and viral organisms[238] and has also been used as an antidote to snakebites[240]. The root contains several medically active constituents including flavonoids and isoflavonoids[279]. It also contains the glucosides belamcandin, tectoridin, shekanin and iridin[283]. It is analgesic, antibacterial, antifungal, anti-inflammatory, depurative, expectorant, febrifuge, pectoral, purgative, stomachic and tonic[46, 61, 147, 176, 178, 218, 238, 279, 283]. It is used in the treatment of acute larvngitis, acute tonsillitis. oedema of the glottis and cough with profuse sputum[176, 279]. The juice of the root is used in Nepal to treat liver complaints, where it has the added benefit of improving the appetite[272]. This juice is also used to abort a foetus during the first trimester of pregnancy[272]. The root should not be prescribed for pregnant women[238]. The root is harvested in the summer and autumn, and dried for later use[238].

nrakta E. Asia - China, Japan, Himalayas. ksacta Shrubberies and banks at the edge of cultivation in rich damp soils in the Himalayas[51, 147].

propta Seed - best sown as soon as it is ripe in a cold frame. Pre-chill stored seed for 7 days and sow spring in a cold frame. The seed germinates in 2 - 8 weeks at 20°c(134). Prick out the seedlings into individual pots as soon as they are large enough to handle. They can be planted out in early autumn and should flower in the following year[200]. Division in spring or early autumn[200]. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Landscape Uses:Border, Container, Massing, Woodland garden. Requires a fairly rich sandy or loamy soil in a bright sunny position or light shade. Succeeds in most soils[187]. Requires a position that stays moist in the summer[187]. Plants grow best in areas with long hot summers[238]. A fairly hardy plant, tolerating temperatures down to about -15°c[187] if given a deep dry mulch over the winter. A short lived plant, the bulbs are usually lifted in the autumn and stored in a cool but frost-free place over the winter, replanting them in the spring[233]. They can be left in the ground in the milder areas of the country so long as

sue in the lungs[254]. The whole plant is anthelmintic, astringent, cardiotonic, cholagogue, diuretic, febrifuge, haemostatic, lithontripic and vulnerary[4, 7, 9, 21, 53, 147, 172, 176, 178]. It was formerly widely used as an astringent both internally and externally in the treatment of wounds, bleeding, piles and diarrhoea[4]. Its diuretic properties make it useful in removing stones[4]. An alcohol-based preparation has been used with success to treat varicose veins of recent origin[7]. The plant is harvested in the summer and early autumn and is dried for later use[9]. The leaves are anthelmintic, diuretic and emollient[218]. The whole plant is anthelmintic, antiphlogistic and diuretic[218]. The juice of the plant is weakly diuretic, expectorant and vasoconstrictor[218]. Applied externally, it is an excellent remedy to stay bleeding of the nose and to treat sores[4]. The seeds are emetic and purgative[4, 240]. Recent research has shown that the plant is a useful medicine for bacterial dysentery. Of 108 people with this disease, 104 recovered within 5 days when treated internally with a paste of knotweed[254].

nrakta Throughout Europe, including Britain, to Temperate Asia. ksacta Waste places, roadsides, railway embankments and the coast[9]. A common garden weed[1].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment, in good soils the plant will cover an area up to a metre in diameter[1, 4]. Prefers an acid soil[20]. Dislikes shade. Knotweed is a common and invasive weed of cultivated ground[7]. It is an important food plant for the caterpillars of many species of butterflies[30]. It also produces an abundance of seeds and these are a favourite food for many species of birds[4]. Plants seem to be immune to the predations of rabbits[233] The flowers have little or no scent or honey and are rarely visited by pollinating insects. Self-fertilization is the usual method of reproduction, though cross-fertilization by insects does sometimes occur[4]. The plant also produces cleistogomous flowers - these never open and therefore are always self-fertilized[4]. The plant is very variable and is seen by most botanists as an aggregate species of 4 very variable species, viz. - P. aviculare. L.; P. boreale. (Lange.) Small.; P. rurivacum. Jord. ex Box.; and P. arenastrum. Box[17].

# 5.2.649 Viola glabella

Stream Violet, Pioneer violet 4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Viola glåbella is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[105]. When added to soup they thicken it in much the same way as okra[85, 159]. Some caution is advised, the yellow flowers of this species can cause diarrhoea if eaten in large quantities[62]. A tea can be made from the leaves[85].

nrakta E. Asia. Western N. America. ksacta Fairly moist woods or by streams[60].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted

out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5[200]. All members of this genus have more or less edible leaves and flower buds, though those species, such as this one, with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159].

#### 5.2.650 Cardamine impatiens

Narrowleaf bittercress

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine impatiens is a ANNUAL/BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist or wet soil

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - raw or cooked[105, 177]. Used as a vegetable[272].

dwatta Antirheumatic Diuretic StimulantThe plants is antirheumatic, diuretic and stimulant[145, 240].

nrakta Europe, including Britain, from Sweden to C. Spain, eastwards through Asia to Japan. ksacta Very local in shady woods, especially ash, and on moist limestone rocks and cliffs, especially in the west[17].

propta Seed - sow spring or autumn in situ.

nwatta Succeeds in most soils[1]. Prefers a moist humus rich soil in shade or semi-shade[200].

#### 5.2.651 Rumex crispus

Curled Dock, Curly dock

4 tlin 8 cyuc 2 kcak 2 tcan 3 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rumex crispus is a PERENNIAL growing to  $0.6\,\mathrm{m}$  (2ft) by  $0.3\,\mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238]. Avoid during pregnancy and breast feeding.

kcakta Edible Parts: Leaves SeedEdible Uses: Coffee-Leaves - raw or cooked[5, 85, 159]. They can also be dried for later use[12]. The leaves can be added to salads, cooked as a potherb or added to soups[183]. Only the very young leaves should be used, preferably before the stems have developed, and even these are likely to be bitter[12, 95, 257]. If used in early spring and in the autumn they can often be fairly pleasant tasting[85, 159, K]. The leaves are very rich in vitamins and minerals, especially iron and the vitamins A and

C[183, 244]. A nutritional analysis is available[218]. Stems raw or cooked[257]. They are best peeled and the inner portion eaten[257]. Seed - raw or cooked[172, 257]. It can be used as a piñole or can be ground into a powder and used as a flour for making pancakes etc[85, 102, 183, 257]. The seed is very fiddly to harvest and prepare[62]. The roasted seed has been used as a coffee substitute[207].

tcanta Compost DyeYellow, dark green to brown and dark grey dyes can be obtained from the roots. They do not need a mordant[168]. An alternative ingredient of 'QR' herbal compost activator[32]. (is it the flowers?) This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K].

dwatta Alterative Antiscorbutic Astringent Cancer Cholagogue Depurative Homeopathy Laxative Poultice Salve TonicCurled dock has a long history of domestic herbal use. It is a gentle and safe laxative, less powerful than rhubarb in its action so it is particularly useful in the treatment of mild constipation[254]. The plant has valuable cleansing properties and is useful for treating a wide range of skin problems[254]. All parts of the plant can be used, though the root is most active medicinally. The root is alterative, antiscorbutic, astringent, cholagogue, depurative, laxative and mildly tonic[4, 21, 46, 94, 165]. It used to be sold as a tonic and laxative[212]. It can cause or relieve diarrhoea according to the dose, harvest time and relative concentrations of tannin(astringent) and anthraquinones (laxative) that are present[222]. It is used internally in the treatment of constipation, diarrhoea. piles, bleeding of the lungs, various blood complaints and also chronic skin diseases[4, 238, 257]. Externally, the root can be mashed and used as a poultice and salve, or dried and used as a dusting powder, on sores, ulcers, wounds and various other skin problems[257]. The root has been used with positive effect to restrain the inroads made by cancer, being used as an alterative and tonic[4]. The root is harvested in early spring and dried for later use[4]. Some caution is advised in its use since excess doses can cause gastric disturbance, nausea and dermatitis[222, 238]. The seed is used in the treatment of diarrhoea[4, 218]. A homeopathic remedy is made from the fresh root, harvested in the autumn before frost has touched the plant[232]. It is only used in the treatment of a specific type of cough[232].

nrakta Most of Europe, including Britain, to N. Africa. ksacta Growing almost anywhere[5], it is found especially in grassy places, waste ground, roadsides and near sand dunes and is a serious weed of agriculture[17, 244].

propta Seed - this plant does not require any help in its propagation.

nwatta Succeeds in most soils, preferring a moist moderately fertile well-drained soil in a sunny position[200]. The plant does not need any help in growing, it is doing very nicely in Britain where it is a serious weed of agriculture. A very important food plant for the caterpillars of many species of butterfly[30]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 5.2.652 Petasites albus

Butterbu

4 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Petasites albus is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: StemEdible Uses: The small fleshy petioles (leaf stems) are very palatable when cooked and

eaten like asparagus[7].

tcanta A good ground cover for the wilder areas of the garden[200]. It is too invasive to be used in small gardens and is only suitable for covering large areas[208]. The leaves were at one time used by peasants as a head covering[7].

dwatta Antitussive Emmenagogue Homeopathy Hypnotic Sedative VulneraryThe root is emmenagogue, hypnotic, sedative and vulneraryTh. 172]. The ground or finely chopped rhizome has a healing effect when applied to slow-healing or weak ulcers, or to suppurating wounds[7]. An infusion of the leaves is a specific remedy for coughs[7]. A homeopathic remedy is made from the roots[7]. It is used in the treatment of wounds, ulcers etc[7].

nrakta N. and C. Europe. Naturalized in Britain. ksacta Waste ground, roadsides, plantations and woods[17], often in damp soils[1].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Prefers partial shade[31]. Prefers a heavy soil[208]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Dioecious, male and female plants must be grown if seed is required.

# 5.2.653 Lewisia brachycalyx

Shortsepal lewisia

4 tlin 8 cvuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lewisia brachycalyx is a PERENNIAL growing to 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from September to July, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: RootEdible Uses: Root - cooked. Steeped and boiled[177]. Said to be extremely nutritious. It is easiest to use when the plant is in flower because the outer layer of the root (which is very bitter) slips off easily at this time of the year[85]. The root has a good taste though a decided bitter flavour develops afterwards[105, 161].

nrakta Southwestern N. America - California, Utah, Arizona and Baja California. ksacta Wet meadows, 1300 - 2200 metres in California[71]. Montane meadows in sandy soil at elevations of 1300 - 2400 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame in a very freely draining soil[129]. Sow stored seed as soon as possible in a cold frame. One months cold stratification should improve germination, though this is still likely to be very slow. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first two winters. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March/April. Very difficult.

nwatta Requires a very well-drained gritty humus-rich desposil in a sunny position[1, 200]. Prefers a neutral to acid soil[188]. This species is not reliably hardy in Britain[1]. It can withstand consistently very cold weather but does not like alternating periods of mild and cold conditions, nor does it like winter wet[1]. The plant is very susceptible to rotting at the neck in a damp soil[200]. Plants die down after flowering and start growing again in the autumn[188]. Very apt to hybridize with other members of this genus[1].

and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

dwatta Emetic MalariaThe plant is emetic[218]. It is used in the treatment of malaria and fever[218].

nrakta E. Asia - E. China, Korea, Taiwan. ksacta Sunny hillsides to 1500 metres[184]. Stony and barren places in C. and S. Korea[151].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Hardy to about ~20°c[184]. Hybridizes freely with other members of this genus[11]. Flowers are produced on the previous seasons growth and any pruning is best done imediately after flowering in order to promote new growth and plenty of flowers in the following year[182]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Blooms are very showy.

# 5.2.723 Kerria japonica

Bachelor's Button, Japanese rose, Jew's Mallow, Japanese Kerria

4 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Kerria japonica is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) da a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain small quantities of hydrogen cyanide (prussic acid). In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit LeavesEdible Uses: Young leaves -cooked[105, 177]. The leaves contain a small amount (0.002%) of hydrogen cyanide and are also a rich source of vitamin C (200mg per 100g)[218]. Some caution is advised, see the notes above on toxicity. Fruit[177]. No more details are given, but this report is somewhat suspect, the plant does not produce a fleshy fruit and the seed case certainly does not look edible[K]. The fruit is a dry, somewhat plump achene about 5mm in diameter[200].

dwatta Vitamin C Women's complaintsA decoction of the flowering shoots is used in the treatment of coughs and women's complaints[178, 218].

nrakta E. Asia - China, Japan. A rare garden escape in Britain. ksacta By rivers and on rocks in gorges in the mountains[184]. Thickets on mountain slopes at elevations of 200 - 3000 metres[266].

propta Seed - we have no details on this species but suggest sowing the seed as soon as it is ripe in a cold frame. Sow stored seed as soon as possible in a cold frame, it is likely to

require a period of cold stratification. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers, removed with care from established plants during the dormant season[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings of young shoots. Young basal shoots in early summer work quite well. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering.

nwatta Landscape Uses:Container, Foundation, Pest tolerant, Massing, Specimen. Succeeds in most aspects in any good loamy soil[1]. Succeeds in very poor soils[202]. Grows well in heavy clay soils. Prefers a moist well-drained soil in a sunny position with shade from the midday sun[200]. Hardy to about -20°c[184]. Plants are moderately fast growing[202]. They sucker freely and can be invasive[202]. Some named forms have been developed for their ornamental value[182]. This species is notably resistant to honey fungus[200]. The flowers are said to be usually unisexual but we do not know if the plants are dioecious or monoecious. Special Features: Not North American native, Attractive flowers or blooms.

### 5.2.724 Artemisia abrotanum

Southernwood

4tlin 8 cyuc 1 kcak 0 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Artemisia abrotanum is a deciduous Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from March to November, in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222]. Safety during pregnancy is not known.

kcakta Edible Parts: Edible Uses: Condiment TeaThe young shoots have a bitter, lemony flavour and are used in small quantities as a flavouring in cakes, salads and vinegars[1, 4, 7, 183, 244]. A tea is made from the young bitter shoots[183].

tcanta Dye Essential Hair Hedge Hedge Incense Potpourri RepellentInsect repellent. The growing plant repels fruit tree moths when growing in an orchard[6, 14, 18, 20]. The fresh plant can also be rubbed onto the skin to deter insects[7]. The shoots can be dried for indoor use, they remain effective for 6 - 12 months[169]. They are also said to repel ants[201]. Shoots can be burnt in the fireplace to remove cooking odours from the house[201]. The leaves have a refreshing lemon-like fragrance and are used in potpourri[245]. An essential oil from the leaves and flowering shoots is used in perfumery in order to add certain subtle tones[7]. A yellow dye is obtained from the branches[14, 268]. Plants can be grown as a low hedge, they tolerate quite hard clipping[200, 201]. An infusion of the plant is used as a hair tonic or conditioner[201].

dwatta Anthelmintic Antiseptic Cholagogue Deobstruent Emmenagogue Stomachic TonicSouthernwood has a long history of domestic herbal use, though it is now used infrequently in herbal medicine[254]. It is a strongly aromatic bitter herb that improves digestion and liver function by increasing secretions in the stomach and intestines, it stimulates the uterus and encourages menstrual flow, lowers fevers, relaxes spasms and destroys intestinal worms[238, 254]. The herb, and especially the young flowering shoots, is

for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 7cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

mwatta Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil. A very ornamental plant[11], it is hardy to about -25°c[184]. A slow growing plant, though it makes a large shrub in time[182].

#### 5.2.719 Euonymus alatus

Winged Spindle Tree, Burningbush, Corky spindletree 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 2 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euonymus alatus is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaYoung leaves, boiled[105, 177]. The fruit may be edible[105, 177]. No further details are given, though we would recommend caution in eating any member of this genus[K]. The fruit is about 8mm in diameter[200]. The seed contains 20.5% protein, 44.4% fat and 3.9% ash[218]. These reports of edibility should be treated with some caution, see the notes above on toxicity. The flowers are a tea substitute[178, 218].

tcanta Hedge HedgeThis species can be grown as a hedge, the var. compactus is normally used[29].

dwatta Anodyne Anthelmintic Antiphlogistic Antipruritic Astringent Blood tonic Cancer Carminative Emmenagogue Hypoglycaemic The stem and branches are alterative, analgesic, anodyne, anthelmintic, anticoagulant, antiphlogistic, antipruritic, astringent blood tonic, carminative, emmenagogue, hypoglycaemic, and purgative[147, 178, 218, 279]. It is used in Korea to treat intestinal worms, suppressed menstruation and cancer[279]. A decoction is used in China in the treatment of 'cold' headache, general body aches, pruritis, irregular menstruation and other gynaecological diseases[147]. Plants contain the anticancer compound dulcitol[218].

nrakta E. Asia - Japan. ksacta Thickets and woods in lowland and mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Landscape Uses:Border, Erosion control, Foundation, Hedge, Massing, Screen, Standard, Specimen. Thrives in almost any soil, including chalk[200], it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. A very ornamental and cold-tolerant plant[1], it tolerate temperatures down to about -25°c[184]. There are some named varieties developed for their ornamental value[182]. 'Compactus' is a more dense growing form for small gardens[182]. Special Features:Not North American native, Invasive, All or parts of this plant are poisonous, Inconspicuous flowers or blooms.

# 5.2.720 Sanguisorba stipulata

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sanguisorba stipulata is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked. They are not choice[172].

dwatta AstringentBoth the roots and the leaves are astringent[172].

nrakta Western N. America - Alaska to Oregon. ksacta Bogs, swamps and streambanks[60].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring.

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Very closely related to S. canadensis[60], and considered to be no more than part of that species by some botanists[200].

# 5.2.721 Senecio cannabifolius

Aleutian ragwort

4 tlin 8 cvuc 1 kcak 0 tcan 2 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Senecio cannabifolius is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, it belongs to a genus that contains a number of plants with a cumulative poisonous effect on the liver[65]. Some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems - cooked[46, 61, 105]. A bitter taste should be removed by leaching the leaves or cooking them in more than one change of water[177]. Some caution is advised, see the notes above on toxicity.

dwatta Anodyne Antirheumatic Contraceptive SkinThe plant (though the part used is not specified) is anodyne, antirheumatic, contraceptive and used in the treatment of skin complaints. It stimulates the circulation[147, 178]. A decoction is used in the treatment of amenorrhoea, abdominal distension and cramps, traumatic injuries, bruises and swellings[147].

nrakta E. Asia - China, Japan, Siberia. ksacta Mountains of N. Japan.

propta Seed - sow spring in a greenhouse and only just cover the seed. Make sure the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer if they have grown sufficiently. Otherwise, grow them on in the greenhouse or cold frame for their first winter and plant them out the following year after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta Succeeds in a sunny position in most moderately fertile well-drained soils[200].

#### 5.2.722 Spiraea prunifolia

Bridalwreath Spiraea

4tlin 8 cyuc 1 kcak 0 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Spiraea prunifolia is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male

# 5.2.654 Epimedium grandiflorum

Barrenwort, Bishop's Hat, Longspur Epimedium 4 tlin 8 cyuc 2 kcak 0 tcan 3 dwat 0.4 m hkuc hmim cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli dyatxre7t hjonli

drutta Epimedium grandiflorum is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant and young leaves - cooked[105, 179]. Soaked and then boiled[177]. (This suggests that the leaves are bitter and need to be soaked in order to remove the bitterness.)

tcanta A good ground cover plant[200].

dwatta Antiasthmatic Antibacterial Antirheumatic Antitussive Aphrodisiac Hypoglycaemic Tonic VasodilatorThe aerial parts of the plant are antiasthmatic, antibacterial, antirheumatic, antitussive, aphrodisiac, hypoglycaemic, tonic and vasodilator. Its use lowers blood sugar levels[116, 176]. It is used in the treatment of impotence, seminal emissions, lumbago, arthritis, numbness and weakness of the limbs, hypertension and chronic bronchitis[176]. It has an action on the genitals similar to the male sex hormone and can increase the weight of the prostate gland and seminal vesicle, it has increased copulation in animals and increases the secretion of semens[176]. The leaves are used as an aphrodisiac[218]. Administered orally, the leaf extract increases the frequency of copulation in animals[218].

nrakta E. Asia - Japan, Manchuria. ksacta Moist deciduous woodlands in the hills[187, 280]. Calcareous rocks in moist woodland[58]. (This entry refers to sub-species E. grandiflorum higoense. Shimau.)

propta Seed - best sown in a cold frame as soon as it is ripe in late summer[200, 280]. Sow stored seed as early as possible in the year in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the cold frame or greenhouse for at least their first winter[K]. Plant them out in mid to late summer[K]. Division, best carried out in August to September according to one report[280], in late spring according to another[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings in late summer[200].

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Woodland garden. Succeeds in any fertile humus-rich soil[200], preferring a moist but well-drained peaty loam[1, 280]. Requires a lime-free soil[280]. Grows best in the light dappled shade of a woodland[200, 280]. Plants can succeed in the dry shade of trees[233]. A shallowrooting plant, the rhizomes creeping just below the soil and the finer roots occupying the top 30cm of the soil[280]. A clump-forming species, the rhizomes making only short new growth each year, it needs to be divided every 3 - 4 years in order to maintain vigour[280]. Plants are hardy to about -20°c[187], though the flowers in spring can be damaged by late frosts[233]. A very ornamental plant[1], there are several named varieties[187]. It grows well in the rock garden or wild garden[1]. Plants are self-sterile and so more than one clone is required for cross-fertilization in order for seed to be produced. Plants will often hybridise with other species growing nearby[280]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Naturalizing,

#### 5.2.655 Cardamine fauriei

4 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine fauriei is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August, and the seeds ripen from May to September. The species is hermaphrodite (has

both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Édible Parts: Leaves RootEdible Uses: Leaves - raw[105, 177]. Added to salads. A hot, watercress flavour. Root[105, 177]. No further details are given.

nrakta E. Asia - N. Japan. ksacta Streams and ravines in mountains[58].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Prefers a moist humus rich soil in shade or semi-shade[200] but succeeds in most soils that are not dry[1].

# 5.2.656 Populus trichocarpa

Western Balsam Poplar, Black cottonwood 4 tiin 8 cyuc 1 kcak 4 tcan 3 dwat 40 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Populus trichocarpa is a deciduous Tree growing to 40 m (131ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK Zone 5. It is in flower from April to May, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Inner bark SapEdible Uses: Inner bark - raw or dried. It is usually ground into a powder and used as a flour, this is normally mixed with other flours for making bread etc[172, 177]. It is best used in the spring[172]. The inner bark is mucilaginous[257] and extremely sweet, but it sours or ferments rapidly and so, unlike most inner barks, it cannot be dried for winter use, though it can be sun-dried for more immediate use[256]. Catkins - raw or cooked. A bitter flavour[172]. Sap - used for food[257].

tcanta Adhesive Basketry Containers Cork Dye Fuel Insulation Paint Rooting hormone Scourer Soap Soap making String Stuffing Waterproofing WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A yellow dye is obtained from the leaf buds[257]. The bark of large trees is thick and corky. It is made into containers for carrying and storing food, also as a lining for underground food stores[99]. The inner bark has been shredded, spun together with red or yellow cedar inner bark (Thuja plicata, Juniperus spp and Chamaecyparis nootkatensis) and used as a twine[257]. A glue is made from the aromatic gum on the spring buds[99, 226, 257]. Very strong, it can also be used as a waterproofing for wood etc[99]. When mixed with pigment it can be used as a paint[99]. A string is made from the roots[99]. The supple young branches have been used as lashings or tying thongs[257]. The seed fluff is used as a stuffing material for pillows etc[99]. The wood ashes are a soap substitute[99], they can also be mixed with oil to make a soap[99]. The white inner bark is also a soap substitute, it can be dried and stored for later use[99]. The inner bark has also been used as a scouring pad[257]. The roots have been used for making baskets[257]. Wood - soft, moderately strong, easily worked, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion. Used in making crates, packing material the staves of barreks, woodenware and for pulp[11, 82, 99, 229]. It makes an excellent fuel[99].

dwatta Anodyne Antiinflammatory Antiscorbutic Antiseptic Balsamic Diuretic Expectorant Febrifuge Stimulant TonicWestern balsam poplar has a long history of herbal use. It was commonly used by many native North American Indian tribes who valued it especially for its antiseptic and expectorant properties, using it to treat lung complaints, wounds, skin conditions etc[257]. It is still commonly employed in modern herbalism with much the same uses. The leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[213]. They also contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213]. The buds are antiscorbutic, antiseptic, balsamic, diuretic, expectorant, stimulant and tonic[4, 226, 2381. They are taken internally in the treatment of bronchitis and upper respiratory tract infections. They should not be prescribed to patients who are sensitive to aspirin[238]. Externally, the buds are used to treat colds, sinusitis, arthritis, rheumatism, muscular pain and dry skin conditions[238]. They can be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The buds are harvested in the spring before they open and are dried for later use[238]. Although no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta Western N. America - Alaska to Oregon. ksacta Moist woods, ravines, shores, prairies and park lands[204].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in travs in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta Industrial Crop: Biomass Management: Coppice Management: Standard Minor Global Crop Other Systems: Irreg. Intercrop Other Systems: SRC Other Systems: Strip intercropA very easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11] but this species is more tolerant of acid soils than other members of the genus[11]. It dislikes shade and is intolerant of root or branch competition[11, 200]. Plants are reasonably wind resistant, but they do not grow well in exposed upland sites[11]. Many forms of this species are susceptible to bacterial canker, the female clone 'Fritzi Pauley' is resistant[11, 200]. A very fast growing[11] and ornamental tree[1], it does well in western Britain where trees have reached 25 metres tall in 20 years[11]. The leaf buds, as they swell in the spring, and the young leaves have a pleasing fragrance of balsam[245]. The fragrance is especially pronounced as the leaves unfold[245]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required.

#### 5.2.657 Liriodendron tulipifera

Tulip Tree, Tulip Poplar, Yellow Poplar, Canary Whitewood 4 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 30 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Liriodendron tulipifera is a deciduous Tree growing to 30 m (98th) by 12 m (39th) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe root is used as a lemon-like flavouring in spruce beer, where it also serves to correct the bitterness of the beer[2]. The bark of the root and branches have a pleasant rather pungent scent[11].

tcanta Dye WoodA gold-coloured dye is obtained from the bark[106]. Wood - fine grained, soft, light, easily worked, durable, brittle, not strong but does not split. A valuable timber, it weighs 26lb per cubic foot and is much used for interior finishes, furniture, construction and plywood[11, 46, 61, 171, 229, 235]. Native north americans used the tree for making canoes[270].

dwatta Anthelmintic Aphrodisiac Cardiac Diuretic Dysentery Nervine Poultice TonicThe intensely acrid bitter inner bark, especially of the roots, is used domestically as a diuretic, tonic and stimulant[82, 213]. The raw green bark is also chewed as an aphrodisiac[222, 257]. The bark contains 'tulipiferine', which is said to exert powerful effects on the heart and nervous system[46, 61, 213]. A tea is used in the treatment of indigestion, dysentery, rheumatism, coughs, fevers etc[222, 257]. Externally, the tea is used as a wash and a poultice on wounds and boils[257]. The root bark and the seeds have both been used to expel worms from the body[213, 257].

nrakta Eastern N. America - Nova Scotia to Florida. ksacta Deep rich rather moist soils on mountain slopes and by streams[82]. Rich woodlands, bluffs, low mountains, and hills from sea level to 1500 metres[270].

propta Seed - best sown as soon as it is ripe in a shady place in a cold frame[80, 113, 200]. Stored seed requires 3 weeks warm then 12 weeks cold stratification[80, 113]. Germination is usually poor, only about 1% of the seed is viable[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts[78]. Layering in spring. Do not sever from the parent plant for 2 years[200].

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible, Pollard, Specimen. Requires a deep rich soil[11, 43, 200] and a sheltered but not overshadowed position[1]. Prefers a slightly acid soil[188]. Succeeds in sun or semi-shade[188]. A very ornamental plant[1], it is fastgrowing and moderately long-lived in its native range[229]. Flowers are first produced when the tree is about 15 - 20 vears old[229]. Liriodendron tulipifera is the state tree of both Indiana and Tennessee[270]. Intolerant of root disturbance, plants are best grown in pots and placed into their final positions as soon as possible. Any transplanting is best done in May[11]. Trees flower best in regions with long hot summers[200]. Plants are particularly susceptible to attacks by rabbits and hares[200]. The flowers produce considerable nectar, making this a good bee plant[21, 229]. Cultivated for its wood in Europe50]. Special Features:North American native, Attracts butterflies, Fragrant flowers, Attractive flowers or blooms

#### 5.2.658 Platanus occidentalis

Buttonwood, American sycamore, American Planetree, Sycamore, American Sycamore

4 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 30 m hkuc

htut cyutli hgattcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Platanus occidentalis is a deciduous Tree growing to 30 m (98ft) by 30 m (98ft) at a fast rate. See above for

#### 5.2.716 Rhododendron japonicum

Japanese azalea

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Rhododendron japonicum is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention of toxicity has been seen for this species, it belongs to a genus where many members have poisonous leaves. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities [183].

kcakta Edible Parts: LeavesEdible Uses: Leaves[177]. No more details are given but some caution is advised, see the notes above on toxicity.

dwatta Diuretic TonicDiuretic, tonic[174].

nrakta E. Asia - Japan. ksacta Dense woods in mountains in C. and S. Japan, to 1800 metres[11, 58].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in a most humus-rich lime-free soils except those of a dry arid nature or those that are heavy or clayey[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires[200]. A pH between 4.5 and 5.5 is ideal[1]. This species is closely related to R. molle and perhaps not distinct from it[200]. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. Plants form a root ball and are very tolerant of being transplanted, even when guite large, so long as the root ball is kept intact[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.717 Rhododendron periclymenoides

Pink azalea, Pinxter flower

4 tlin 8 cyuc 1 kcak 2 tcan 0 dwat 2 m hkuc

pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli hjonli

drutta Rhododendron periclymenoides is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Birds, Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it belongs to a genus where many members have poisonous leaves. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities [183].

kcakta An irregular growth on the twigs is eaten as a thirst quencher. It can be sliced and mixed with tossed salads. It is also pickled in spiced vinegar [1-4]. Rhododendron periclymenoides is highly toxic and all parts of the plant are poisonous and could be fatal if ingested. Honey which is made by bees who collect pollen from genus Rhododendron spp. is referred to as "mad honey". Humans who ingest this honey begin exhibiting symptoms including saliva-

tion abdominal pain, diarrhea, vomiting, difficulty breathing, paralysis and coma. as well as hypotension and other irregularities of cardiac rhythm.

tcanta Rhododendron periclymenoides has been used in horticulture as an ornamental plant. Common landscape uses for the plant are as a foundation plant and as shrub borders. Other locations are shrub borders, mixed borders, woodland gardens and shade gardens. Also effective in foundation plantings or as a hedge.

nrakta Eastern United States, from southern New York south to Georgia, with isolated populations in Midwestern states. ksacta Swamp margins, moist woods and open areas with full to partial sunlight or high, open shade.

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta A Perennial shrub. Sun Requirements: Full Sun to Full Shade. Water Preferences: Mesic/moist. It is relatively tolerant of dry sites. Soils in which R. periclymenoides grows best are typically acidic, rich in hummus and retain moisture but should still have some drainage. Soil pH Preferences: Very strongly acid (4.5 - 5.0) to Slightly acid (6.1 -6.5). Fruiting Time: Late summer or early fall. Fruit: Edible to birds. Flowers: Showy. Fragrant. Flower Color: Pink, White. Flower Time: Spring. Suitable Locations: Bog gardening. Uses: Windbreak or Hedge. Cut Flower. Will Naturalize. Wildlife Attractant: Bees, Birds, Butterflies. Many animals and birds utilize shrubs like R. periclymenoides for cover on the forest floor. The roots also provide erosion control and protection for watersheds. Since lack of proper drainage can lead to root rot, North Carolina State University advises the use of raised beds if the plant is going to be grown in soil that contains a lot of clay. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]

# 5.2.718 Euonymus oxyphyllus

4tlin8cyuc1kcak0tcan1dwat $2.5\ m$ hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Euonymus oxyphyllus is a deciduous Tree grow-

drutta Euonymus oxyphyllus is a deciduous Tree growing to 2.5 m (8ft) by 2.5 m (8ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177]. Some caution is advised, see the notes above regarding possible toxicity.

tcanta WoodWood - hard, elastic, very fine grained. Used for stamps, printing blocks, mosaics etc[46, 61].

dwatta Women's complaintsThe plant is used in gynae-cological applications[218].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and woods in low mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[121]. Stored seed requires 3 months cold stratification, so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse

dwatta Alterative Cardiac Cathartic Cholagogue Diuretic Eczema Emetic Expectorant Hepatic Malaria TonicWahoo was used in various ways by the North American Indians, for example as an eye lotion, as a poultice for facial sores and for gynaecological conditions[254]. In current herbalism it is considered to be a gallbladder remedy with laxative and diuretic properties[254]. The bark, however, is toxic and should only be used under professional supervision, it should not be given to pregnant women or nursing mothers[254]. The stem and root bark is alterative, cardiac, cathartic, cholagogue, diuretic, expectorant, hepatic, laxative, stimulant and tonic[4, 21, 46, 61, 222]. The root bark is the part normally used, though bark from the stems is sometimes employed as a substitute[4]. In small doses it stimulates the appetite, in larger doses it irritates the intestines[4]. The bark is especially useful in the treatment of biliousness and liver disorders which follow or accompany fevers[4, 254] and for treating various skin disorders such as eczema which could arise from poor liver and gallbladder function[254]. It is also used as a tea in the treatment of malaria, liver congestion, constination etc[222]. The powdered bark, applied to the scalp, was believed to eliminate dandruff[222]. The bark and the root contain digitoxin and have a digitalis-like effect on the heart[213, 222]. They have been used in the treatment of heart conditions[254]. The bark, which has a sweetish taste, is gathered in the autumn and can be dried for later use[213]. A tea made from the roots is used in cases of uterine prolapse, vomiting of blood, painful urination and stomach-aches[222]. The seed is emetic and strongly laxative[222].

nrakta Eastern N. America - Ontario to Florida, Montana, Oklahoma and Nebraska. ksacta Rich woods and thickets[43], the best specimens are found in deep rich humus soils[229]. Limstone soils, stream bottoms and woods in Texas[274].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Thrives in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. Requires shade from the midday sun[1, 11]. A moderately fast-growing but short-lived tree in the wild[229].

#### 5.2.714 Rhododendron kaempferi

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 2.5 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli yra7t hionli

drutta Rhododendron kaempferi is an evergreen Shrub growing to 2.5 m (8ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil

pcista Although no specific mention of toxicity has been seen for this species, it belongs to a genus where many members have poisonous leaves. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities [183].

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw or cooked[105, 177, 183]. Some caution is advised, see the notes above on toxicity. Leaves - boiled[105, 177, 183]. Some caution is advised, see the notes above on toxicity.

tcanta Plants can be grown as ground cover when spaced about 1 metre apart each way[208].

nrakta E. Asia - Japan. ksacta Open woods and scrub, sunny grassy hillsides and mountainsides to 1600 metres, all over Japan [58].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively

sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in a most humus-rich lime-free soils except those of a dry arid nature or those that are heavy or clayev[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires[200]. A pH between 4.5 and 5.5 is ideal[1]. Plants are hardy to about -20°c[184], but are deciduous in cold climates. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. Plants form a root ball and are very tolerant of being transplanted, even when guite large, so long as the root ball is kept intact[200]. This species is closely related to R. indicum[200]. Plants in this genus are notably susceptible to honey fun-

#### 5.2.715 Convolvulus arvensis

Field Bindweed

4 tlin 8 cyuc 1 kcak 1 tcan 2 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Convolvulus arvensis is a PERENNIAL CLIMBER growing to 2 m (6ft 7im). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is polinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe plant has been used as a flavouring in a liqueur called 'Noyeau'[2]. No details are given as to which part of the plant is used[K].

tcanta Dye StringThe stem is used as a twine for tying up plants etc[6, 99]. It is fairly flexible and strong but not longlasting. A green dye is obtained from the whole plant[168].

dwatta Cholagogue Diuretic Laxative Purgative Stings Women's complaintsThe root, and also a resin made from the root, is cholagogue, diuretic, laxative and strongly purgative[4, 7. 9. 13, 240]. The dried root contains 4.9% resin[240]. The juice of the root is used in the treatment of fevers[272]. A tea made from the flowers is laxative and is also used in the treatment of fevers and wounds[222]. A cold tea made from the leaves is laxative and is also used as a wash for spider bites or taken internally to reduce excessive menstrual flow[222, 257].

nrakta Throughout the temperate regions of both Hemishperes, including Britain. ksacta Hedgerows, fields, waste places, fences etc[7, 100], it can be a troublesome weed of arriculture.

propta Seed - best sown in situ as soon as it is ripe, it germinates in the autumn[164]. This species can become a real pest in the garden so it is unwise to encourage it.

nwatta Prefers a lighter basic soil[17] of low to medium fertility[200]. Bindweed is a very deep-rooting plant with a vigorous root system that extends to a considerable distance and is very hard to eradicate from the soil. Even a small piece of the root will grow into a new plant if it is left in the ground. Once established this plant soon becomes a pernicious weed[1, 4]. It is a climbing plant that supports itself by twining around any support it can find and can soon swamp and strangle other plants[4]. The flowers close at night and also during rainy weather[4]. Although visited by numerous insects, the flowers seldom set fertile seed[4]. On sunny days the flowers diffuse a scent of heliotrope[245]. The plant harbours tobacco mosaic virus of the Solanaceae[13] and so should not be grown near potatoes, tomatoes and other members of that family.

USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from October to March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution

pcista In hot dry climates the hairs of the fruits and leaves are believed to cause an effect similar to hay fever[11, 2001]

kcakta Edible Parts: SapEdible Uses: SweetenerThe sweet sap is tapped in the spring and used in the preparation of syrup and sugar[105, 177, 183].

tcanta Shelterbelt WoodA fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Wood - coarse-grained, tough, strong, very durable, difficult to split[46, 61, 171]. Rather weak according to other reports[227, 229]. It weighs 35lb per cubic foot[235], and is used for furniture, chopping boards etc[46, 61, 171, 229]. Trunks of wild trees can be up to 4.5 metres in diameter and these were at one time hollowed out to make barges capable of carrying several tons of goods[226].

dwatta Antirheumatic Astringent Diuretic Dysentery Emetic Laxative Poultice SalveThe inner bark is astringent, diuretic, emetic and laxative[222]. It has been used as a tea in the treatment of dysentery, coughs, colds, lung ailments, haemorrhages, measles, milky and difficult urination etc and also as a blood tonic[222, 257]. Externally, it has been used as a wash on wounds[257]. An infusion of the bark and roots has been used as a foot soak for treating rheumatism[257]. The bark ooze has been used as a wash on infected sores and an infusion has been given in the treatment of infant rash[257]. An infusion of the bark, mixed with honey locust bark (Gleditsia triacanthos), has been used as a gargle to treat hoarseness and sore throat[257].

nrakta Eastern N. America - New England to Florida, west to Texas and Nebraska. ksacta Rich soils on the borders of streams and lakes[43, 82]. Often abundant on alluvial soils near streams and lakes and in moist ravines, sometimes on uplands, sometimes on limestone soils[270].

propta Seed - two months cold stratification improves germination[113]. Sow spring in a cold frame in light shade[78, 98]. Home grown seed is often of poor quality and low viability. It is best to harvest the seed in late winter or spring and then sow it immediately in a cold frame[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood of the current years growth, 20 - 30 cm with a heel, autumn in a cold frame[1]. Easy[200]. Layering of stools in spring or autumn. Takes 12 months[78].

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Seashore, Specimen, Street tree. Prefers a deep moist loam[1], though it tolerates very wet, poorly drained soils[229]. Requires full sun[200]. Tolerates atmospheric pollution and compacted soils[200]. Established plants are drought tolerant[200]. Fairly wind-resistant[200]. A fast-growing and long-lived tree[200, 229], but it is of no value in Britain, being very susceptible to attack by parasitic fungi[11]. Fairly slow-growing according to another report, which also says that the tree is long-lived in the wild[227]. This species does not do well north of Central France, it requires long hot summers to fully ripen its wood[200]. Special Features:Attracts birds, North American native, Inconspicusus flowers or blooms

# 5.2.659 Abies amabilis

Red Fir,Pacific silver fir 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 30 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli hjonli

drutta Abies amabilis is an evergreen Tree growing to 30 m (98ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can

be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. The plant is not wind tolerant. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Inner barkEdible Uses: Gum TeaYoung shoot tips are used as a substitute for tea[177, 183]. The pitch obtained from the bark can be hardened (probably by immersing it in cold water[K]) and used as a chewing gum[257]. Inner bark[257]. No further information is given, but inner bark can be dried, ground into a powder and then used with grain flours etc to make bread and other preparations[257].

tcanta Gum WoodThe boughs are fragrant and can be hung in the home as an air freshener [257]. Wood - hard, light, not strong, close grained, not very durable. It is used for framing small buildings but is not strong enough for larger buildings. It is also used for crates, pulp etc[46, 61, 82, 226, 2291. This tree yields the resin 'Canadian Balsam'[226]. The report does not mention the uses of this balsam, but the following are the ways that it is used when obtained from A. balsamea:- The balsamic resin 'Balm of Gilead'[11, 46] or 'Canada Balsam' according to other reports[64, 226, 238] is obtained during July and August from blisters in the bark or by cutting pockets in the wood[222]. Another report says that it is a turpentine[171]. It is used medicinally and in dentistry, also in the manufacture of glues, candles and as a cement for microscopes and slides - it has a high refractive index resembling that of glass[11, 46, 64, 82, 222, 226, 238]. The average yield is about 8 - 10 oz per tree[171]. The resin is also a fixative in soaps and perfumery[171, 238].

dwatta This plant was used quite widely by native North American Indians. An infusion of the bark was used as a tonic and to treat stomach ailments. TB, haemorrhoids and various minor complaints[257]. The pitch, or resin, was also used to treat colds, sore throats etc[257]. The bark of this tree contains blisters that are filled with a resin called 'Canadian Balsam'[226]. Although the report does not mention the uses of this resin it can almost certainly be used in the same ways as the resin of A. balsamea, as detailed below:- The resin obtained from this tree (see 'Uses notes' below) has been used throughout the world and is a very effective antiseptic and healing agent. It is used as a healing and analgesic protective covering for burns, bruises, wounds and sores[213, 222, 226]. It is also used to treat sore nipples[213] and is said to be one of the best curatives for a sore throat[245]. The resin is also antiscorbutic, diuretic, stimulant and tonic[4, 171, 222]. It is used internally in propriety mixtures to treat coughs and diarrhoea, though taken in excess it is purgative[238]. A warm liquid of the gummy sap was drunk as a treatment for gonorrhoea[212]. A tea made from the leaves is antiscorbutic[4, 171]. It is used in the treatment of coughs, colds and fevers[222]. The leaves and young shoots are best harvested in the spring and dried for later use[238].

nrakta North-western N. America - Alaska to Oregon. ksacta High mountain slopes and benches, going down to sea-level in the north of its range[82]. The best specimens grow in deep moist soils and cool wet air conditions such as fog belts[229].

propta Seed - sow early February in a greenhouse or outdoors in March[78]. Germination is often poor, usually taking about 6 - 8 weeks[78]. Stratification is said to produce a more even germination so it is probably best to sow the seed in a cold frame as soon as it is ripe in the autumn[80, 113]. The seed remains viable for up to 5 years if it is well stored[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in pots. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Alternatively, if you have sufficient seed, it is possible to sow in an outdoor seedbed. One report says that it is best to grow the seedlings on in the shade at a density of about 550 plants per square metre[78] whilst another report says that they are best grown on in a sunny position[80].

nwatta Requires a good moist but not water-logged soil in a sheltered position[1]. Grows well in heavy clay soils. Plants are very shade tolerant[11, 81] but growth is slower in dense shade[81]. Intolerant of atmospheric pollution[1]. Prefers slightly acid conditions down to a pH of about 5[200]. Prefers growing on a north-facing slope[200]. Trees are

somewhat shallow rooted and are therefore susceptible to strong winds[229]. Grows best in the Perthshire valleys of Scotland[11]. It does very well on glacial moraines in Scotland[81]. When grown in an open position, the tree clothes itself to the ground with gracefully drooping branches, though on the whole, this species does not grow well in Britain[11]. Trees have been of variable growth in this country and seem to be short-lived[185]. The best and fastest growing specimens are to be found in the north and far west of the country[185]. Growth in girth can be very quick, 1.8 metres in 35 years has been recorded[185]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm in height. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. The crushed leaves have an odour like orange peel[11]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. This species is often confused with A. nordmanniana[11]. A very ornamental plant[1]. Trees are sometimes grown as 'Christmas trees'[200]. Plants are susceptible to injury by aphis[11].

#### 5.2.660 Ulmus villosa

Cherry Bark Elm

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 25 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulmus villosa is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked.

tcanta WoodWood - hard, somewhat scented. Used for furniture[146].

nrakta E. Asia - Himalayas. ksacta Found at altitudes up to 3500 metres in the Himalayas[146].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as its well drained[1]. Susceptible to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200].

#### 5.2.661 Fraxinus americana

White Ash

4 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 25 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli drutta Fraxinus americana is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from April to May, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Edible Uses: DrinkA bitter tasting syrup is drawn from the tree[226]. The report gives no more details and does not directly say that the syrup was used as food. It was quite possibly only used medicinally[K].

tcanta Dye Repellent Shelterbelt WoodThe leaves are said to repel rattlesnakes and have been worn on the feet of people travelling in rattlesnake country[213]. There are some doubts over the efficacy of this[213]. A yellow dye is obtained from the bark[226]. Wood - strong, hard, heavy, tough, elastic, close grained, moderately durable[46, 82, 227]. It weighs 41lb per cubic foot, seasons well, takes a good polish and is shock resistant[227]. One of the most valuable of the North American timbers[82, 226], it is much used for tool handles, hockey sticks, baseball bats, the interior of buildings, musical instruments, furniture, woodenware etc[46, 82, 227, 274]. As a fuel it is comparable in quality to such excellent species as oak (Quercus spp) and hickory (Carva spp)[226].

dwatta Aphrodisiac Astringent Bitter Stings TonicThe bark is astringent, emmenagogue and a bitter tonic[46, 61, 254, 257]. An infusion is used to promote menstruation[257]. It has also been used as a wash to treat skin sores, itches and vermin on the scalp[213, 257]. The inner bark is diaphoretic, diuretic, emetic and strongly laxative[222]. It is used as a tea to remove bile from the intestines, as a tonic after child-birth and to relieve stomach cramps and fevers[222, 257]. It is chewed and applied as a poultice to sores[222]. The leaves are used to soothe the itching caused by mosquito bites and bee stings[229]. The seeds are thought to be aphrodisiac[222]

nrakta Eastern N. America - Nova Scotia to Florida, west to Nebraska and Texas. ksacta Rich upland to lowland woods[43, 82]. Usually found in association with other hardwood trees in well-drained soils on slopes[227].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Landscape Uses:Firewood, Aggressive surface roots possible, Pollard, Street tree. Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[200]. Succeeds in exposed positions[200] and in alkaline soils[11]. Tolerates atmospheric pollution[200]. Young plants tolerate forest shade[226]. One of the most valuable hardwood timber trees in N. America[226], saplings grow slowly at first, but the growth rate speeds up over the next 50 years[229]. This species is planted on a small scale, mainly in E. Europe. as a timber tree[50]. It has the potential as a forestry tree in Britain, succeeding under conditions that are too dry or frosty for the native ash. F. excelsior[11]. A very ornamental tree[1], it is often confused in cultivation with F. pennsylvanica[50]. Dioecious. Male and female plants must be grown if seed is required. Male trees usually flower heavily each year, but female trees only flower heavily every 2 -3 years[229]. Special Features: North American native, Attracts butterflies, Inconspicuous flowers or blooms.

pcista This species is said to be purgative[173], some caution is advised.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[105, 177, 179]. Said to be purgative[179]. Young shoots - cooked[105, 177, 179].

dwatta Demulcent Diuretic Poultice TonicThe flowers are diuretic, they are helpful in cases of diabetes[218]. The plant is demulcent, diuretic and tonic[218]. It is also used as a tonic to correct broken bones and tendons[218].

nrakta E. Asia - China, Japan, Korea. ksacta Sunny grassy places and thickets in lowland all over Japan[58].

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary garden soil in a sunny position, but plants are apt to become invasive[1, 200]. Nearly all taxa in Calystegia intergrade geographically into neighboring taxa with the exception of the widespread coastal species, C. soldanella (Linnaeus) R. Brown. It is impossible to draw clearly defined specific limits, and intermediate forms are always found where two taxa approximate geographically[266].

# 5.2.711 Tamus communis

Black Bryony

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 3.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Tamus communis is a PERENNIAL CLIMBER growing to 3.5 m (11ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to July, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, flies. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The whole plant is poisonous due to its saponin content[7]. Although toxic, saponins are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The toxic effect of this plant is not caused by saponins, but by calcium oxalate crystals which are found mainly in the fruit[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[2, 4, 61, 65]. A decidedly bitter flavour[7]. An asparagus substitute, it is best if the water is changed once whilst cooking[115]. See notes at top of the page regarding possible toxicity.

dwatta Antiecchymotic Antirheumatic Cathartic Diuretic Emetic Haemolytic Poultice RubefacientThe root is antiecchymotic, diuretic, emetic, haemolytic and rubefacient[4, 7, 9]. Use with caution, the plant is rich in saponins, has a very powerful cathartic affect and ranks as a dangerous irritant poison[4, 7]. It is not normally used internally, but the macerated root is applied externally as a poultice to bruises, rheumatic joints etc[4, 7]. This should not be done without expert advice since it can cause painful blisters[9]. The root is used fresh[9] or can be harvested in the autumn and dried for later use[7].

nrakta Europe, south and east from Britain and Belgium to N. Africa, Hungary, E. Mediterranean, W. Asia. ksacta Hedgerows, scrub, woodland edges and copses, avoiding acid soils[1, 9]. propta Seed - sow in a cold frame in early spring or as soon as the seed is ripe in the autumn. Prick out the seedlings into individual pots once they are large enough to handle, and plant out in the summer or in late spring of the following year.

nwatta Requires a moist well-drained fertile soil[17]. A climbing plant, the weak stems support themselves by twining around other plants and are capable of growing quite high up into shrubs and trees[4]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.712 Rhamnus japonica

Japanese buckthorn

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rhamnus japonica is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been found for this species, there is the suggestion that some members of this genus could be mildly poisonous[65].

kcakta Edible Parts: LeavesEdible Uses: Leaves[105, 177]. No more details but some caution is advised, see the notes above on toxicity.

tcanta Dye WoodA green dye is obtained from the branches[178]. Wood - close grained. Used for furniture[46, 61]

dwatta Emetic Febrifuge Laxative SkinFebrifuge, laxative, skin[46, 61, 178]. The fruit and the bark are emetic and laxative[218].

nrakta E. Asia - Japan. ksacta Found all over Japan[58]. propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at about 5° and should be sown as early in the year as possible in a cold frame or outdoor seedbed[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[41].

nwatta Succeeds in any reasonably good soil[11]. A polymorphic species[58]. The species in this genus are notably resistant to honey fungus[200].

### 5.2.713 Euonymus atropurpureus

Wahoo-Indian Arrow Wood - Burning Bush, Eastern wahoo 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euonymus atropurpureus is a deciduous Shrub growing to 2.5 m (8ft 2in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

pcista The fruits, seed and bark are considered to be poisonous[222]. Adverse effects include diarrhoea, vomiting, chills, seizures, syncope and weakness. Toxic in excessive doses [301].

kcakta Edible Parts: FruitEdible Uses: Although the fruit has sometimes been eaten, it is considered to be poisonous by some writers and so should definitely be avoided[213]. The fruit is about 15mm in diameter[200].

tcanta WoodWood - heavy, hard, tough, very close grained[82, 227]. It weighs 41lb per cubic foot[227], but is too small to be of commercial value[229].

to one report[184], this conflicts with another report that says it only succeeds outdoors in Britain from Sussex and westwards[11]. A third report says that the plant is generally hardy but sometimes fails in very cold districts of Britain[182]. The new growth in spring is very susceptible to damage by late frosts[49]. The flowers are fragrant[245]. Plants in this genus are notably resistant to honey fungus[200].

#### 5.2.707 Holodiscus discolor

Creambush, Oceanspray

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Holodiscus discolor is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[106, 177, 183]. Small and dry[161, 183].

tcanta WoodWood - very hard. Used for making small tools, roasting tongs etc[118]. It does not burn easily[118].

dwatta Blood purifier Ophthalmic Poultice Skin Tonic-The seeds are a blood purifier[257]. An infusion has been used in the treatment of smallpox, black measles and chick-enpox[257]. The blossoms have been used in the treatment of diarrhoea[257]. The inner bark is tonic[257]. An infusion has been used as an eyewash[257]. The bark can be dried, powdered and then used with oil as a dressing on burns[257]. A poultice of the leaves has been applied to sore lips and sore feet[257]. A powder of the dried leaves has been used as a dressing on sores[257]. A decoction of the leaves has been used in the treatment of influenza[257].

nrakta Western N. America. ksacta Woods and rocky places in California[71]. Streambanks and moist woods, canyons and hills from valleys to around 2,100 metres[212].

propta The seed requires 4 months stratification at  $4^{\circ}$ C. It is best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood with a heel, July/August in a frame. Can be difficult[200]. Layering in spring. Easy[200].

nwatta Succeeds in a good loamy soil that does not become too dry in summer, in full sun or light shade[200]. fast-growing plant[188], it thrives in thin woodland[11]. A very ornamental plant[1, 11], when fully dormant it is hardy to about -15°c[200], though the young growth in spring can be damaged by late frosts[K]. The flowers emit a perfume similar to meadowsweet[245].

# 5.2.708 Calystegia subvolubilis

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calystegia subvolubilis is a PERENNIAL CLIMBER growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, at least some, if not all members of this genus are purgative[173], some caution is advised.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[105]. Some caution is advised, see the notes above

on toxicity. Young shoots - cooked[105]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - Japan. ksacta A hybrid, C. pellita x C. sepium, it is not known in a truly wild situation.

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary garden soil in a sunny position, but plants are apt to become invasive[1, 200]. Nearly all taxa in Calystegia intergrade geographically into neighboring taxa with the exception of the widespread coastal species, C. soldanella (Linnaeus) R. Brown. It is impossible to draw clearly defined specific limits, and intermediate forms are always found where two taxa approximate geographically[266].

# 5.2.709 Pyrularia pubera

Oil Nut, Buffalo nut

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 3.5 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Pyrularia pubera is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The whole plant, especially the fruit, contains an acrid poisonous oil[43].

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit[2, 46 fl]. Caution is advised since the fruit is said to be permeated with an acrid oil[1, 43]. The pear-shaped fruit is about 25mm long[200]. An edible oil is obtained from the seed[105]. Is this different from the acrid poisonous oil of the fruit?[K]

dwatta Emetic SalveThe plant has been used as a salve on old sores[257]. The seed has been chewed to cause vomiting in the treatment of colic[257].

nrakta Eastern N. America - W. Vancouver to Alabama. ksacta Rich woods[235], where it is parasitic on the roots of deciduous trees and shrubs[43], most commonly on Tsuga carolina[11.

propta Seed - best sown in a cold frame as soon as it is ripe into a pot containing a small host tree. Stored seed will require 3 months cold stratification before it is sown[200]. Grow on in a cold frame until the plant is large enough to plant out and then plant it close to a mature host tree. Remove the small host tree once the plant is well established[200].

nwatta Parasitic on the roots of a range of trees and shrubs, but most commonly Tsuga carolina, this plant needs to grow close to a host tree. It requires a well-drained but moisture retentive lime-free soil[200].

#### 5.2.710 Calystegia pubescens

Japanese Bindweed

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Calystegia pubescens is a PERENNIAL CLIMBER growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

# 5.2.662 Tsuga canadensis

Canadian Hemlock, Eastern hemlock 4 tlin 7 cyuc 1 kcak 0 tcan 3 dwat 20 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hionli

drutta Tsuga canadensis is an evergreen Tree growing to 20 m (65ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in May, and the seeds ripen from November to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: milldly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Inner barkEdible Uses: Condiment TeaInner bark - raw or cooked[213]. Usually harvested in the spring[2], it can be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[2, 46, 161]. An emergency food, it is only used when all else fails[183]. The leaves and twigs yield 'spruce oil', used commercially to flavour chewing gum, soft drinks, ice cream etc[183]. A herbal tea is made from the young shoot tips[2, 62, 95, 159, 183, 257]. These tips are also an ingredient of 'spruce beer'[183].

tcanta Basketry Dye Hedge Hedge Resin Rust Tannin WoodYields a resin similar to Abies balsamea, it is gathered by incisions in the trunk or by boiling the wood[46, 61, 64]. A pitch (called hemlock pitch), is obtained by distillation of the young branches[46]. 'Oil of Hemlock' is distilled from the young branches according to another report[82]. The bark contains 8 - 14% tannin[46, 171, 223]. The inner bark is used according to one report[82]. The inner bark has been used in making baskets[257]. A red to brown dye is obtained from the bark[21, 46, 257]. A red dye is obtained from the inner bark according to another report[226]. A little rock dust has been added to act as a mordant when boiling the bark[257]. The boiled bark has been used to make a wash to clean rust off iron and steel, and to prevent further rusting[257]. Tolerant of light trimming, plants can be grown as a hedge[81]. This species does not make a good hedge in Britain[200]. Some cultivars can be grown as a ground cover when planted about 1 metre apart each way[208]. 'Pendula' is slow-growing but makes a very good cover[208]. Wood - coarse-grained, light, soft, not strong, brittle, not durable outdoors[21, 46, 61, 82, 171, 229]. Difficult to work because it splits easily[226]. The wood weighs 26lb per cubic foot[235]. The trees do not self-prune and so the wood contains numerous remarkably hard knots that can quickly dull the blade of an axe[226]. A coarse lumber, it is used occasionally for the outside of buildings[21, 46, 61, 82, 171, 229]. It should be used with caution as a fuel for outdoor fires because it can project embers and burning wood several metres from the fire[226].

dwatta Antidiarrhoeal Antipruritic Astringent Diaphoretic Diuretic Dysentery Eczema Skin StypticCanadian hemlock was commonly employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is still sometimes used in modern herbalism where it is valued for its astringent and antiseptic properties. The bark is rich in tannin and is astringent and antiseptic[222, 254]. A decoction is used in the treatment of diarrhoea, colitis, diverticulitis and cystitis[254]. Externally, it is used as a poultice to cleanse and tighten bleeding wounds, as a douche to treat excessive vaginal discharge, thrush and a prolapsed uterus, and as a mouthwash and gargle for gingivitis and sore throats[222, 254]. The poultice has also been applied to the armpits to treat itchiness there [257]. The inner bark is diaphoretic and styptic[21, 213, 257]. An infusion is used in the treatment of colds and abdominal pains[21, 213, 257]. A decoction of the inner bark has been applied externally in the treatment of eczema and other skin conditions[257]. The pulverized inner bark has been applied to cuts and wounds to stop the bleeding[257]. A tea made from the leafy twig tips is used in the treatment of dysentery, kidney ailments, colds and rheumatism[21, 222, 257]. Externally, it is used in steam baths for treating colds, rheumatism and to induce sweating[222]. A decoction of the branches has been boiled down

to a syrup or thick paste and used as a poultice on arthritic joints[257]. A poultice of the crushed branch tips has been used to treat infections on an infants navel[257]. Hemlock pitch has been used externally as a counter-irritant in the treatment of rheumatism[213].

nrakta Eastern N. America - Nova Scotia to Georgia, west to Alberta and Minnesota. ksacta Woods and swampy areas on cool moist sites[21], also in upland forests, often covering the north side of ridges[82].

propta Seed - it germinates better if given a short cold stratification[80, 113] and so is best sown in a cold frame in autumn to late winter. It can also be sown in early spring, though it might not germinate until after the next winter. If there is sufficient seed, an outdoor sowing can be made in spring[78]. Pot-grown seedlings are best potted up into individual pots once they are large enough to handle - grow them on in a cold frame and plant them out in early summer of the following year. Trees transplant well when they are up to 80cm tall, but they are best put in their final positions when they are about 30 - 45 cm or less tall, this is usually when they are about 5 - 8 years old[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

nwatta Landscape Uses:Firewood, Hedge, Aggressive surface roots possible, Massing, Screen, Specimen, Woodland garden. An easily grown plant, it thrives best when growing in a deep well-drained soil in the western parts of Britain where it appreciates the higher rainfall[11]. However, it succeeds in most soils and positions, being especially good on acidic sandy soils[81] but also tolerating some lime[11] so long as there is plenty of humus in the soil[208]. Plants are very shade tolerant when young, but need more sunlight as they grow older[81, 200]. Plants are thin and poor when grown in dry or exposed places[200]. A slow-growing but long-lived species in the wild, with specimens nearly 1000 years old recorded[229]. It is occasionally planted as a timber tree in Germany[50]. It is very slow growing in cultivation for the first few years, it then grows more rapidly with annual shoots up to 60cm long. This rate of growth soon slows as the tree loses apical dominance and it becomes slow growing again[185]. Seed production commences around the age of 20 - 40 years, with good crops produced every 3 - 4 years[229]. The crushed foliage has a sweet lemony scent[185]. Another report says that it emits the unpleasant smell of hemlock[245]. Many named forms have been selected for their ornamental value[185]. Almost all of them are dwarf forms[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

#### 5.2.663 Populus sieboldii

Jananese Aspe

4 tlin 8 cyuc 1 kcak 2 tcan 1 dwat 20 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Populus sieboldii is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and young shoots - cooked[105, 177].

tcanta Rooting hormone WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11].

dwatta Anodyne Antiinflammatory FebrifugeAlthough no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, antinflammatory and febrifuge. It is used especially in treating

rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta E. Asia - Japan. ksacta Mountains all over Japan[58].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circum-neutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the buildings's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200].

# 5.2.664 Parthenocissus tricuspidata

Boston Ivy, Japanese Ivy, Japanese Creeper 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 18 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Parthenocissus tricuspidata is a deciduous Climber growing to 18 m (59ft 1in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: SapEdible Uses: SweetenerSap-sweet[177]. The sap flows quite freely when it is harvested in the spring, as the plant comes into new growth, and can be used as a sugar substitute[105].

tcanta This species can be grown as a ground cover plant in a sunny position[188]. Plants should be spaced about 2.5 metres apart each way[208]. They are very vigorous, however, and would soon swamp smaller plants[K].

nrakta E. Asia - China, Japan, Korea. A garden escape in Britain. ksacta Thickets and woods in hills and mountains[58]. Climbing over rocks or shrubs on hillsides at elevations of 100 - 1200 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires stratifying for 6 weeks at  $5^{\circ}c$  and should be sown as early in the year as possible[200]. Germination is variable. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10 cm taken at a node (ensure that it has at least 2 true buds), July/August in a frame[78]. Easy to root but they do not always survive the first winter[182]. Basal hardwood cuttings of current seasons growth, 10 - 12 cm long, autumn in a frame[200]. Layering[200].

nwatta Landscape Üses:Arbor, Woodland garden. Requires a well-drained moisture retentive fertile soil[200]. Succeeds in any fertile soil in sun or part shade[202]. Dormant plants are hardy to about -15°c[200], though the young

growth in spring can be damaged by late frosts. A very ornamental plant[1], there are several named varieties[182]. The flowers are only produced on mature stems[202] and plants usually only fruit after a long hot summer[219]. A rampant climbing plant, clinging by means of round pad-like suckers on the tendrils[11]. It can become a bit of a nuisance by growing into gutters[182]. Plants are very tolerant of trimming and can be cut right back to within 1 metre of the base if required to rejuvenate the plant[202]. Any pruning is best carried out in the spring[219]. Dislikes transplanting[11], plants often put on very little growth in the year after planting out, though they are then fast growing[202]. Plants often hybridize and so do not always come true from seed[200]. Special Features: Not North American native, Invasive, Inconspicuous flowers or blooms.

# 5.2.665 Salix fragilis

Crack Willow

4 tlin 8 cyuc 1 kcak 3 tcan 3 dwat 15 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhien hionli

drutta Salix fragilis is a deciduous Tree growing to 15 m (49ft) by 49ft (49ft) by 49ft (49ft) by 49ft (49ft) by 49ft (49ft) by 49ft) by 49ft (49ft) by 49ft ( $49\text{ft$ 

pcista Gastrointestinal bleeding and kidney damage possible. Avoid concurrent administration with other aspirin-like drugs. Avoid during pregnancy. Drug interactions associated with salicylates applicable [301].

kcakta Edible Parts: Inner bark LeavesEdible Uses: SweetenerInner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172]. A saccharine exudation is obtained from the leaves and young branches[2, 105]. Used as a food[183].

tcanta Basketry Charcoal Tannin WoodStems are very flexible and are used in basket making[46, 61]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The bark contains around 10% tannin[223]. Wood - tough, withstands friction. Used for floors, bases of carts etc[11]. A good quality charcoal is obtained from the wood[61]. Dynamic accumulator.

dwatta Anodyne Astringent Dysentery Febrifuge Poultice StypticThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne, astringent and febrifuge[9, 226]. The bark of this species is used interchangeably with S. alba. It is taken internally in the treatment of rheumatism, arthritis, gout, inflammatory stages of auto-immune diseases, diarrhoea, dysentery, feverish illnesses, neuralgia and headache[238]. A poultice of the bark has been applied to sores as a styptic and healing agent[257]. The bark is removed during the summer and dried for later use[238]. The leaves are used internally in the treatment of minor feverish illnesses and colic[238]. The leaves can be harvested throughout the growing season and are used fresh or dried[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Salix / Willow for diseases accompanied by fever, rheumatic ailments, headaches (see [302] for critics of commission E).

nrakta Europe, including Britain, from Sweden south and east to Spain, Serbia and Iran. ksacta Streamsides, marshes, fens and wet woods[17].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current site the plant in a position shaded from the early morning sun[238]. A good bee plant[108]. The flowers are sweetly scented[245]. Plants are best left unpruned[49]. Another report says that the previous year's flowering shoots should be cut back in early spring[238]. This species is notably susceptible to honey fungus[200]. Special Features:North American native, Suitable for cut flowers, Suitable for dried flowers, Blooms are very showy.

#### 5.2.704 Salix commutata

undergreen willow

4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix commutata is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Édible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172].

tcanta Soil reclamationA pioneer plant for difficult sites[200]. Dynamic accumulator.

dwatta Ánodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta Western N. America - Alaska to California. ksacta Wet places at moderate to rather high elevations[204].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood. June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.705 Cornus amomum

Silky Dogwood

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cornus amomum is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 177]. Said to be very good to eat[2]. The fruit is 8mm in diameter[235].

tcanta TeethThe powdered bark is used as a toothpowder[61].

dwatta Antiperiodic Astringent Diuretic Poultrice Stimulant Stomachic VDThe dried root-bark is antiperiodic, astringent, stimulant (mild), tonic[4]. The flowers are said to have similar properties[4]. A tea or tincture of the astringent root bark has been used as a quinine substitute and also in the treatment of chronic diarrhoea[4]. It has also been employed in the treatment of painful urination, chest congestion etc[257]. The bark was also used as a poultice on external ulcers and as a wash for gonorrhoea sores[4, 257]. The glycoside 'cornin' found in the bark has astringent properties[4]. The fruits are used as a bitter digestive tonic. A tincture of them has been used to restore tone to the stomach in cases of alcoholism[4].

nrakta Eastern N. America - Newfoundland to Ontario, south to Florida and Texas. ksacta Swamps and damp thickets[43]. Low woods and along the sides of streams[235].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80. 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Lavering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Border, Massing, Specimen, Woodland garden. An easily grown plant that thrives in Britain, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[181]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, Attractive foliage, Not North American native, Naturalizing, Wetlands plant, Attracts butterflies, Attractive flowers or blooms.

# 5.2.706 Clethra barbinervis

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Clethra barbinervis is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[46, 61, 105, 179]. Eaten with rice dishes[177].

nrakta E. Asia - China, Japan. ksacta Wooded hills and mountains all over Japan[58, 200]. In sunny deciduous forests on mountains, more or less stony and dry places at elevations of 1000 - 1500 metres[275].

propta Seed - sow early spring in a greenhouse[113]. Only just cover the seed and keep the pot moist. Germination usually takes place within 1 - 3 months at 13°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out once they are more than 20cm tall in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[11, 113]. Very easy[113]. Root cuttings in December/January[113]. Suckers in the dormant season[113]. They can be planted out direct into their permanent positions if required. Layering of current years growth in late autumn. Takes 18 months. Can also be done in early spring[200].

nwatta Requires a moist well-drained lime-free peaty soil[1, 11, 184] succeeding in a sunny position or partial shade[164]. Plants are hardy to about -20°c according

nrakta E. Asia - Northern China, eastern Siberia and Korea. ksacta Shrubberies and other bushy places[273].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. Very closely related to C. fusca, differing mainly in its short-stalked flowers with small bracts and the more violet coloured flowers[273]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants flower on the current season's new shoots. They can usually be left unpruned, though weak or dead shoots can be removed and main shoots can be cut back by up to two thirds of their length if they are outgrowing their allotted area[273]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

# 5.2.702 Symplocos paniculata

Asiatic Sweetleaf, Sapphire-berry 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 4 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli dyatxre7t hjonli

drutta Symplocos paniculata is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit -cooked[177]. Used in jams, jellies and sauce[183]. The fruit is about 8mm in diameter[200].

tcanta Dye Mordant WoodA yellow or red dye is obtained from the leaves and bark[51, 146, 158, 272]. We have no specific information for this species but many species in this genus contain alum and can be used as mordants when dyeing[168]. Wood - white, soft to moderately hard. close grained, liable to twist and split when seasoning. Of possible use in turnery[146, 158].

dwatta Ástringent Ophthalmic TonicThe bark is astringent, cooling and tonic[240]. It is useful in the treatment of menorrhagia, bowel complaints, eye diseases and ulcers[240]. It is also used as a gargle for giving firmness to spongy and bleeding gums[240]. The juice of the bark is applied externally to sprains and muscular swellings[272].

nrakta E. Asia - China, Japan, Korea, Himalayas. ksacta Forests and shrubberies at elevations of 1000 - 2700 metres, Pakistan to S. W. China and Burma[51]. Slopes in mixed forests at elevations of 800 - 2500 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Stored seed requires stratification and is best sown in a cold frame in late winter, it can take 12 months to germinate[11]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, 7 - 10cm with a

heel, July/August in individual pots in a cold frame[78, 200]. Roots are formed in about 4 weeks. Good percentage[78].

nwatta Requires an acid soil and a sunny position. Succeeds in a sunny position in any well-drained fertile neutral to acid soil[182, 200]. One report says that plants are hardy to about -10°c, though it is also said that they can survive quite harsh winters outdoors in Britain but that they need a warm, sunny protected position and a hot summer if they are to fruit well[11, 200]. The fruits are sometimes spoiled by frosts[200]. The flowers are sweetly fragrant[200, 245]. Self-sterile, it needs cross-pollination with a different plant in the same species if seed and fruit are to be produced[11, 182]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.703 Hydrangea arborescens

Seven Barks, Wild hydrangea, Ashy Hydrangea, Snowhill Hydrangea, Smooth Hydrangea

4 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Hydrangea arborescens is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Dizziness, chest pain, gastrointestinal distress. Weak potential for sensitization [301].

kcakta Edible Parts: StemEdible Uses: The peeled branches and twigs have been used to make a tea[257]. The new growth of young twigs has been peeled, boiled thoroudhly then fried and eaten[257].

dwatta Anthelmintic Cathartic Diaphoretic Diuretic Sialagogue TonicSeven barks was used by the North American Indians as a remedy for kidney and bladder stones and is still used for these purposes in modern herbalism[254]. It is considered to both encourage the expulsion of stones and to help dissolve those that remain[254]. The roots are anthelmintic, cathartic, diaphoretic, diuretic, emetic and tonic[4, 21, 46, 165, 222, 2381. They are used in the treatment of kidney stones, mucous irritations of the bladder, cystitis, nephritis, enlarged prostate and bronchial afflictions[222, 238, 254]. Excessive doses can cause dizziness and bronchial congestion[238]. The fresh roots are very succulent and can be easily cut, when dry they become very tough and resistant[4]. They are harvested in the autumn and it is best to cut them into short sections before drying them[4, 254]. The scraped bark is used as a poultice on wounds, burns, sore muscles, sprains etc[222]. The bark is chewed in the treatment of stomach and heart ailments[222]. The leaves are cathartic. diuretic, sialagogue and tonic[4].

nrakta Eastern N. America - New York to Florida, west to Ohio, Oklahoma and Indiana. ksacta Rich woods, banks of streams and calcareous rocky slopes[43].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Thick growths make the best cuttings, but these should be placed in individual pots[78]. Good percentage[113]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Division of suckers in late winter[113]. They can be planted out direct into their permanent positions. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses:Border, Foundation, Massing, Specimen. Tolerates most soils[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Requires partial shade[11]. Does well on very acid soils with a pH around 4.5[200]. In frosty areas it is best to

year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils,[1] but prefers a deep damp, heavy soil in a sunny position[11, 200]. Rarely thrives on chalk[200]. Succeeds in an exposed position[186]. Closely allied to S. alba, with which it freely hybridizes[11], though it tolerates poorer soils than that species[186]. A very important food plant for the caterpillars of many butterfly species[30] and a good bee plant, providing an early source of nectar and pollen[11]. The cultivar 'Basfordiana' is used for basket making[131]. Best if planted into its permanent position as soon as possible. The root system is rather aggressive and can cause problems with drains[200]. Plants in this genus are notably susceptible to honey fungus[200]. Plants are very amenable to coppicing or pollarding and can be cut back annually if required[186]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.666 Maclura pomifera

Osage Orange, Bois D'Arc 4 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 15 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien bionli

drutta Maclura pomifera is a deciduous Tree growing to  $5\ m$  (49ft) by  $12\ m$  (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone  $5\ and$  is not frost tender. It is in flower from May to June, and the seeds ripen from September to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The milky sap can cause dermatitis in some people[200]. An extract and the juice of the fruit is toxic, though a 10% aqueous infusion and extract diluted 1:1 are not toxic[240].

kcakta One report suggests that the fruit is edible[74] but this is surely a mistake - although very large, the fruit is harsh, hard, dry and astringent. The fruit does, however, contain an anti-oxidant which can be used as a food preservative, especially for oils[61]. The heartwood and the root yield a non-toxic antibiotic that is useful as a food preservative[240].

tcanta Dye Fodder Fuel Hedge Hedge Preservative Repellent Shelterbelt Tannin WoodA yellow dye is obtained from the bark of the root and the wood[46, 57, 95, 149, 169, 257]. Green and orange can also be obtained from it[168]. The sap of the fruit is used as an insect repellent[95]. It is said to be effective against cockroaches[222]. The bark is a source of tannin[82, 149]. The plant is often grown as a hedge in N. America and Europe[1, 20, 50], it is very tolerant of severe pruning[200], makes an effective stock-proof barrier[200] and succeeds in maritime exposure[K]. A hedge in a very exposed position at Rosewarne in N. Cornwall has grown well (1989), though it is very bare in winter[K]. This species is also used in shelterbelt plantings[200]. Wood - coarse-grained, exceedingly hard, heavy, flexible, very strong, very durable, silky, lustrous. It weighs 48lb per cubic foot. One of the most durable woods in N. America, it is seldom used commercially, but is used locally for fence posts, piers, bows etc and makes an excellent fuel[46, 82, 95, 171, 200, 227, 229, 274].

dwatta Cardiac OphthalmicA tea made from the roots has been used as a wash for sore eyes[222, 257]. The inedible fruits contain antioxidant and fungicidal compounds[222]. A 10% aqueous infusion and an extract diluted 1:1 have cardiovascular potentialities[240].

nrakta Southeastern N. America - Arkansas to Texas. ksacta Woods, fields and thickets in rich bottom lands[73, 83], propta Seed - best sown as soon as it is ripe in pots in a cold frame. Pre-soak stored seed for 48 hours in warm water and stratify for 2 months at 4°c then sow in a cold frame[113, 200]. Germination is normally good. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed stores for 3 years[113]. If growing larger quantities of plants, it is probably best to sow the seed in an open seed bed[200]. Grow the plants on for a couple of years in the seed bed before planting them out into their permanent positions. Cuttings of half-ripe wood, July/August in a frame[200]. Cuttings of mature wood, November to January in a frame[113]. Layering in summer[200]. Root cuttings 4cm long in December. Plant horizontally in pots in a greenhouse and plant out as soon as possible. Good percentage[78].

nwatta Agroforestry Services: Living fence Fodder: Insect Industrial Crop: Biomass Industrial Crop: Starch Management: Dye Industrial Crop: pice Management: Standard Regional Crop Staple Crop: Protein-oilLandscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible. Prefers a well-drained soil in full sun[200]. Succeeds in poor soils and also in dry ones[20]. Plants are fairly tolerant of maritime exposure[K]. They dislike waterlogged soils[188]. Dormant mature plants are hardy to about -20°c though the young growth in spring can be cut back by late frosts[200] and young plants can be damaged in cold winters[188]. Plants require hot summers to fully ripen their wood if they are to thrive in areas with cold winters[188]. Plants are tolerant of severe pruning[200]. This species is notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: North American native. All or parts of this plant are poisonous, Inconspicuous flowers or

# 5.2.667 Stewartia pseudocamellia

Japanese Stewartia 4 tlin 7 cyuc 1 kcak 2 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik

hpa7tmwatli xre7t hjonli

drutta Stewartia pseudocamellia is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177].

tcanta Landscape Uses: Espalier, Pest tolerant, Standard, Specimen, Street tree.

nrakta E. Asia - C. and S. Japan. ksacta Semi-shaded habitats in moist woodland in mountains[58, 200].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoor seedbed if there is sufficient seed[78]. Stored seed is best soaked for 3 days in warm water and then given 3 - 5 months warm stratification followed by 3 months cold stratification at 5°c, it can take 18 months to germinate[78]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of short side branches, 8cm with a heel, July/August in a frame[1, 200]. One report says it is best to keep the cuttings growing through the winter if possible[1] whilst another says they should be allowed to become dormant once they have rooted[200]. Layering.

nwatta Requires a deep humus-rich moist but not boggy soil[200]. Dislikes limey soils, preferring peaty conditions[11, 200]. Prefers a position with some shade, at least from the midday sun[200]. Another report says that it prefers a sunny sheltered position[11]. Hardy to about -20°c[200]. Resents root disturbance, plants should be put in their permanent positions as soon as possible[11, 200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Attractive flowers or blooms.

#### 5.2.668 Abies fraseri

She Balsam, Fraser fir, Southern Balsam Fir 4 tlin 7 cyuc 1 kcak 0 tcan 3 dwat 15 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tlmwatli hjonli

drutta Abies fraseri is an evergreen Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower in May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. The plant is not wind tolerant.

pcista The oleoresin (Canada balsam) can cause dermatitis in some people[222].

kcakta Edible Parts: Inner barkEdible Uses: Condiment Gum TeaThe following uses are for the closely related A. balsamea. Since this species also has blisters of resin in the bark[81], the uses quite probably also apply here. Inner bark - cooked. It is usually dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 177]. An emergency food, it is only used when all else fails[183]. An aromatic resinous pitch is found in blisters in the bark[64]. When eaten raw it is delicious and chewy[101, 183]. An oleoresin from the pitch is used as a flavouring in sweets, baked goods, ice cream and drinks[183]. Tips of young shoots are used as a tea substitute[177, 183].

tcanta Adhesive Gum Microscope Repellent Resin Stuffing WoodWood - light, soft, coarse grained, not strong[82]. It is occasionally manufactured into lumber[82]. The following uses are for the closely related A. balsamea. Since this species also has blisters of resin in the bark[81], the uses quite probably also apply here. The balsamic resin 'Balm of Gilead'[11, 46] or 'Canada Balsam' according to other reports[64, 226] is obtained during July and August from blisters in the bark or by cutting pockets in the wood[222].. Another report says that it is a turpentine[171]. It is used medicinally, also in the manufacture of glues, candles and as a cement for microscopes and slides - it has a high refractive index resembling that of glass[11, 46, 64, 82, 222, 226]. The average yield is about 8-10 oz per tree[171]. The resin is also a fixative in soaps and perfumery[171]. Leaves are a stuffing material for pillows etc - they impart a pleasant scent[46, 61] and also repel moths[169]

dwatta Analgesic Antiscorbutic Antiseptic Diuretic Poultice Stimulant Tonic VDThe following uses are for the closely related A. balsamea. Since this species also has blisters of resin in the bark[81], the uses quite probably also apply here. The resin obtained from the balsam fir (see 'Uses notes' below) has been used throughout the world and is a very effective antiseptic and healing agent. It is used as a healing and analgesic protective covering for burns, bruises, wounds and sores[213, 222, 226]. It is also used to treat sore nipples[213] and is said to be one of the best curatives for a sore throat[245]. The buds, resin, and/or sap are used in folk remedies for treating cancers, corns, and warts[269]. The resin is also antiscorbutic, diaphoretic, diuretic, stimulant and tonic[4, 171, 222]. It is used internally in propriety mixtures to treat coughs and diarrhoea, though taken in excess it is purgative[238]. A warm liquid of the gummy sap was drunk as a treatment for gonorrhoea[212]. A tea made from the leaves is antiscorbutic[4, 171]. It is used in the treatment of coughs, colds and fevers[222]. The leaves and young shoots are best harvested in the spring and dried for later use[238]. This plant was widely used medicinally by various North American Indian tribes[257]. The resin was used as an antiseptic healing agent applied externally to wounds, sores, bites etc., it was used as an inhalant to treat headaches and was also taken internally to treat colds, sore throats and various other complaints[257].

nrakta South-eastern N. America - Virginia and West Virginia to North Carolina and Tennessee. ksacta Mountains, often forming forests of considerable extent at elevations of 1200 - 1800 metres[11, 82].

propta Seed - sow early February in a greenhouse or outdoors in March[78]. Germination is often poor, usually taking about 6 - 8 weeks[78]. Stratification is said to produce a more even germination so it is probably best to sow the seed in a cold frame as soon as it is ripe in the autumn[80, 113]. The seed remains viable for up to 5 years if it is well stored[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in pots. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Alternatively, if you have sufficient seed, it is possible to sow in an outdoor seedbed. One report says that it is best to grow the seedlings on in the shade at a density of about 550 plants per square metre[78] whilst another report says that they are best grown on in a sunny position[80]. Trees often self-layer in the wild[226], so this might be a means of increasing named varieties in cultivation[K].

nwatta Landscape Uses:Christmas tree, Screen, Specimen. Prefers a good moist but not water-logged soil[1]. Grows well in heavy clay soils. Very shade tolerant, especially when young[81, 126], but growth is slower in dense shade[81]. Intolerant of atmospheric pollution[1]. Prefers slightly acid conditions down to a pH of about5[200]. Prefers growing on a north-facing slope[200]. A shallow-rooted plant, making it vulnerable to high winds[229]. A fastgrowing but short-lived species[200]. Trees are very cold hardy but are often excited into premature growth in mild winters and this new growth is susceptible to damage by late frosts[11]. No other member of this genus has proved to be of as little value, or so short-lived as this species; there is scarcely a good tree in the country, though it is attractive when young[11]. Usually short-lived in cultivation, though bearing its interesting cones whilst still young[81]. Young trees can be handsome and vigorous, one grew 120cm in two years, but growth soon slows[185]. Trees are known to have lived more than 60 years[185]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm in height. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Trees have a thin bark and are therefore susceptible to forest fires[229]. This species is closely related to A. balsamea and is seen as no moer than a form of that species by some botanists[11, 229, 270]. There are some named forms selected for their ornamental value[200]. Trees can produce cones when only 2 metres tall[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus [200]. The cones break up on the tree and if seed is required it should be harvested before the cones break up in early autumn[80]. Special Features: North American native. There are no flowers or blooms

#### 5.2.669 Clematis vitalba

Traveller's Joy, Evergreen clematis
4 tlin 8 cyuc 1 kcak 1 tcan 2 dwat 15 m hkuc
hmimbut cyutli tcun hwicli brasilutnyik hpa7tli

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Clematis vitalba is a deciduous Climber growing to 15 m (49ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from October to January. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[7], the toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked and used like hop shoots (Humulus lupulus)[7, 46, 61]. Caution is advised due to reports of toxicity[7].

tcanta BasketryThe stems are used in basketry[100, 115].

dwatta Analgesic Bach Diuretic Homeopathy Rubefacient SkinThe leaves are analgesic, diuretic and rubefacient[7, 61]. The boiled roots and stems are used as a cure for the itch[4]. When applied in the nostrils, the plant juice has been used to relieve migraine attacks, but it can also destroy the mucous membranes[7]. The plant should not be

Foundation, Ground cover, Rock garden, Seashore, Specimen. Prefers a deep fertile loamy soil that does not dry out in summer[200] but succeeds in any ordinary soil that is not too dry[1, 162], in sun or light shade[200]. Fully dormant plants are hardy to about -20°c[187], though the young growth in spring can be damaged by late frosts. Often grown as an ornamental plant, there are many named varieties[162]. Many forms do not get enough summer heat to flower freely when they are grown in Britain, 'Silberfeder' (syn 'Silver Feather') is the most free-flowering in cooler climates [187]. Plants can be grown as a focal point in lawns, they also succeed in quite coarse grass[233]. The leaves have saw-toothed edges that can cut the unwary gardener, it is best to wear gloves when working with the plant[200]. Plants seem to be immune to the predations of rabbits[233]. Special Features: Attracts birds, Attractive foliage, Not North American native, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms.

#### 5.2.699 Holodiscus dumosus

Rock Spiraea

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 4.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Holodiscus dumosus is a deciduous Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[105, 177]. Small and dry[161]. The leaves can be steeped in water to make a tea[257].

dwatta Antiseptic Astringent StomachicA decoction of the root has been used in the treatment of diarrhoea and stomach disorders[257]. A decoction of the stems has been used in the treatment of colds and stomach disorders[257]. A decoction of the flowers, leaves and stems has been used as an antiseptic wash[257].

nrakta Western N. America - Wyoming to Texas, Arizona and New Mexico. ksacta Dry rocky desert valleys and hill-sides well up into the mountains[60].

propta The seed requires 4 months stratification at 4°c. It is best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood with a heel, July/August in a frame. Can be difficult[200]. Layering in spring. Easy[200].

nwatta Succeeds in a good loamy soil that does not become too dry in summer[1] in full sun or light shade[200]. Plants are hardy to about -15c[200].

# 5.2.700 Tamarix gallica

Manna Plant, French tamarisk 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 4 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslinhsom hpa7tmwatli xre7t hionli

drutta Tamarix gallica is a deciduous Shrub growing to 4 m (13ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: MannaEdible Uses: A manna is produced by the plants in response to insect damage to the

stems[2, 105]. It is sweet and mucilaginous[105]. There is some confusion over whether the manna is produced by the plant, or whether it is an exudation from the insects[4]. The insects in question live in the deserts around Israel, it is not known if the manna can be produced in Britain[K].

tcanta Dye Fuel Hedge Hedge Soil stabilization Tannin WoodVery tolerant of maritime exposure, it makes a good shelter hedge in coastal gardens[7, 11, 49, 75]. It dislikes being trimmed[75]. The plant has a rather open habit, however, and so is not tremendously effective at reducing wind speeds[K]. The extensive root system of this plant makes it suitable for use in erosion control in sandy soils[149]. The plant contains a high level of tannin[7]. Galls produced on the plant as a result of insect damage contain up to 40% tannin[240]. The tannin can be used as a dyestuff for fabrics[7]. (No details are given about the colour, though it is likely to be some shade of brown.) Wood - fairly hard, not strong, close grained, takes a high polish, it is often twisted or knotty[61, 149, 227]. Used for general construction, poles, turnery[61, 1491. It makes a good fuel, burning well even when green due to the wax content of the wood[74].

dwatta Astringent Detergent Diuretic Dysentery Expectorant LaxativeThe branchlets and the leaves are astringent and diuretic[7]. An external compress is applied to wounds to stop the bleeding[7]. The manna produced on the plant is detergent, expectorant and laxative[240]. Galls produced on the plant as a result of insect damage are astringent[240]. They are used in the treatment of diarrhoea and dysentery[240].

nrakta W. Europe - France. Naturalized in Britain[17]. ksacta Damp ground near the coast[17, 100].

propta Seed. Sow spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy[200]. Cuttings of mature wood of the current seasons growth, 15 - 25cm long, planted outdoors in late autumn in a nursery bed or straight into their permanent position. High percentage[11, 200].

nwatta An easily grown plant, succeeding in most soils and tolerant of saline conditions[11]. Grows well in heavy clay soils as well as in sands and even shingle[182]. Usually found near the coast, it succeeds inland if given a fairly good deep loam and a sunny position[11, 200]. Tolerant of maritime winds and dry soils when grown near the coast[11], plants require a moister soil and shelter from cold drying winds when they are grown inland in non-saline soils because they use the soil salts that are found in saline soils to help them reduce transpiration[200]. This species flowers on the current year's growth[227]. Any pruning is best carried out in spring, hedges are also best trimmed at this time[188]. Plants are tolerant of severe pruning, sprouting freely from old wood[K]. The very closely related T. anglica is often included in this species. A good bee plant[74]. This species is notably resistant to honey fungus[88, 200].

#### 5.2.701 Clematis ianthina

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Clematis ianthina is a deciduous Climber growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

nrakta Europe, including Britain, from Belgium south and east to N. Africa, temperate Asia to Japan. ksacta Wet places in lowland areas[13, 17], preferring neutral or alkaline soils[186].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Agroforestry Services: Windbreak Fodder: Bank Industrial Crop: Biomass Management: Coppice Other Systems: SRC Regional CropSucceeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Plants prefer an alkaline or neutral soil, rarely doing well in acid conditions[186]. Said to prefer a sandy soil[23, 199], plants are tolerant of dryish soils[11]. Plants are tolerant of salt water[199]. A very ornamental plant[1], it is cultivated for its branches which are used in basket making[11], there are some named varieties[131]. Plants are coppiced annually for this purpose[186] A very important food plant for the caterpillars of many butterfly species[30] and a good bee plant, providing an early source of nectar and pollen[11]. Plants in this genus are notably susceptible to honey fungus[200]. Plants should be put into their permanent positions as soon as possible[11]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.697 Lonicera periclymenum

Honeysuckle, European honeysuckle 4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 4.5 m hkuc pcimhmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Lonicera periclymenum is a deciduous Climber growing to 4.5 m (14ft 9in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista Poisonous in large doses[10]. It only has a very mild action[65]

kcakta Edible Parts: Flowers NectarEdible Uses: Children (of all ages) suck the base of the flowers to extract the nectar[66].

tcanta A climbing plant, it can be allowed to scramble on the ground where it makes a good ground cover[208]. Plants should be spaced about 1.2 metres apart each way[208]. A very good moth and butterfly plant[30], it is also an important food for many caterpillars including the larvae of the rare white admiral butterfly[186]. The dense growth of the plant offers good nesting possibilities for birds[186].

dwatta Antispasmodic Astringent Cathartic Depurative Diaphoretic Diuretic Emetic Expectorant Febrifuge Laxative Mouthwash Skin VulneraryThe plant has expectorant and laxative properties[4]. A syrup made from the flowers has been used in the treatment of respiratory diseases whilst a decoction of the leaves is considered beneficial in treating diseases of the liver and spleen[4]. It is used as a mouthwash for ulcers[66] and is considered to be a good ingredient in gargles[4]. The flowers are antispasmodic, astringent, diuretic, expectorant, febrifuge and sudorific[240]. The fruit is emetic and cathartic[4]. The herbage is used as a cutaneous and mucous tonic and as a vulnerary[4]. It is also diaphoretic[4]. The leaves are laxative and slightly astringent[240]. The seed is diuretic[4]. The bark is anticatarrhal, depurative, diuretic and sudorific[240].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and Greece. ksacta Woods, hedgerows, scrub and shady places, avoiding calcareous soils[17].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Succeeds in most soils from acid to baserich[186]. Prefers its roots in the shade with its shoots climbing up into the sun[200]. Plants succeed even in quite deep shade[219]. Established plants are fairly drought tolerant[190]. Plants are hardy to about -20°c[184]. A very ornamental plant[1], there are a number of named varieties[184]. The flowers are very fragrant, especially in the evening when it attracts pollinating moths[186, 245]. New leaves often start to open in January with well-grown leaves in April [186]. The leaves fall in November[186]. Twining plants, they can bind themselves so tightly round young trees that they can prevent the trunk from being able to expand[186]. A very good moth and butterfly plant[30], it is also an important food for many caterpillars including the larvae of the rare white admiral butterfly[186]. The dense growth of the plant offers good nesting possibilities for birds[186]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down

## 5.2.698 Miscanthus sinensis

Eulalia, Chinese silvergrass, Silver Feather, Eulalia Grass, Japanese Silver Grass, Ornamental Grass 4 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Miscanthus sinensis is a PERENNIAL growing to 4 m (13ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: StemEdible Uses: Immature flowering spike[105, 177]. No further details are given.

tcanta BiomassBeing increasingly grown as a source of biomass, trials are currently (1992) taking place on its potential in Britain[K]. Plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200].

dwatta Anticoagulant Diuretic FebrifugeThe juice of young stems is used to disperse poisons, dissolve blood clots, dissipate extravasated blood and remove inflammation[218]. The plant is diuretic and refrigerant[147, 218].

nrakta E. Asia - China, Japan, Korea. ksacta Moist meadows on slopes in lowland and mountains all over Japan[58, 2001.

propta Seed - surface sow in spring in a greenhouse and keep moist. Germination should take place within a couple of weeks. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or early autumn[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Industrial Crop: Biomass Management: Hay Minor Global CropLandscape Uses:Border, Container, taken internally because it is poisonous[7]. A homeopathic remedy is made from the plant. It is used in the treatment of rheumatism and skin eruptions[238]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Indifference', 'Dreaminess', 'Inattention' and 'Unconsciousness' [209]. It is also one of the five ingredients in the 'Rescue remedy' [209].

nrakta Europe, including Britain, from the Netherlands south and east to N. Africa and the Caucasus. ksacta Hedgerows and wood margins, usually on calcareous soils[7, 17]

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, taken between nodes, July/August in a frame[1]. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Dislikes acid soils below a pH of 6.0[186]. Succeeds in acid as well as alkaline soils[200]. Plants are hardy to about -18°c[202]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[186, 212]. It is capable of growing 2 metres in a year and can easily smother small trees and shrubs[186]. Another report says that it can grow 5 metres in a year [202]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. The flowers are almond-scented[202]. They are produced on the current season's growth[219]. The plant is very amenable to pruning and can be cut back severely if required. This is best done in early spring[202]. A greedy plant, inhibiting growth of nearby plants, especially legumes[54]. Plants seem to be immune to the predations of rabbits[233]. This species is notably resistant to honey fungus[88, 200].

#### 5.2.670 Tsuga caroliniana

Carolina Hemlock

4 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 15 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Tsuga caroliniana is an evergreen Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner barkEdible Uses: TeaInner bark - raw or dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[2, 46, 161]. The leaves and twigs yield 'spruce oil', which is used commercially to flavour chewing gum, soft drinks, ice cream etc[183]. A herbal tea is made from the young shoot tips[2, 62, 95, 159, 183]. These tips are also an incredient of 'spruce beer'[183].

tcanta Dye Hedge Hedge Resin Rust Tannin WoodThe inner bark has been used to make baskets[257]. A rosy-tan dye can be obtained from the bark[257]. The bark is a source

uses of T. canadensis and reports in [46, 61, 82] that this species has similar uses. Yields a resin similar to Abies balsamea, it is gathered by incisions in the trunk or by boiling the wood[46, 61, 64]. A pitch (called hemlock pitch), is obtained by distillation of the young branches [46]. 'Oil of Hemlock' is distilled from the young branches according to another report[82]. The boiled bark has been used to make a wash to clean rust off iron and steel, and to prevent further rusting[257]. Tolerant of light trimming, plants can be grown as a hedge[81]. This species does not make a good hedge in Britain[200]. Some cultivars can be grown as a ground cover when planted about 1 metre apart each way[208]. 'Pendula' is slow-growing but makes a very good cover[208]. Wood - coarse-grained, light, soft, not strong, brittle, not durable outdoors[21, 46, 61, 82, 171, 229]. Difficult to work because it splits easily[226]. The wood weighs 26lb per cubic foot[235]. The trees do not self-prune and so the wood contains numerous remarkably hard knots that can quickly dull the blade of an axe[226]. A coarse lumber, it is used occasionally for the outside of buildings[21, 46, 61, 82, 171, 229]. It should be used with caution as a fuel for outdoor fires because it can project embers and burning wood several metres from the fire[226].

dwatta Antipruritic Astringent Birthing aid Diaphoretic Diuretic KidneyThe bark is astringent, diaphoretic and diuretic[21]. A tea made from the inner bark or twigs is helpful in the treatment of kidney or bladder problems, and also makes a good enema for treating diarrhoea[21]. It can also be used as a gargle or mouthwash for mouth and throat problems or externally to wash sores and ulcers[21]. A poultice of the bark has been used to treat itchy armpits[257]. The powdered bark can be put into shoes for tender or sweaty feet or for foot odour[21]. An infusion of the stem tips has been used to treat kidney problems[257]. A decoction of the roots has been used as a birthing aid to help expel the afterbirth[257]. The roots have been chewed in order to treat diarrhoea[257].

nrakta South-eastern N. America - W. Virginia to Georgia. ksacta Usually found growing singly or in small scattered groves of a few individuals on the rocky banks of streams at elevations of 750 - 1200 metres[82].

propta Seed - it germinates better if given a short cold straffication[80, 113] and so is best sown in a cold frame in autumn to late winter. It can also be sown in early spring, though it might not germinate until after the next winter. If there is sufficient seed, an outdoor sowing can be made in spring[78]. Pot-grown seedlings are best potted up into individual pots once they are large enough to handle - grow them on in a cold frame and plant them out in early summer of the following year. Trees transplant well when they are up to 80cm tall, but they are best put in their final positions when they are about 30 - 45 cm or less tall, this is usually when they are about 5 - 8 years old[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

nwatta Landscape Uses:Hedge, Aggressive surface roots possible, Screen, Specimen. An easily grown plant, it thrives best when growing in a deep well-drained soil in the western parts of Britain where it appreciates the higher rainfall[11]. However, it succeeds in most soils and positions, being especially good on acidic sandy soils[81] but also tolerating some lime[11] so long as there is plenty of humus in the soil[208]. Plants are very shade tolerant when young, but need more sunlight as they grow older[81, 200]. Plants are thin and poor when grown in dry or exposed places[200]. This species is more tolerant of atmospheric pollution than T. canadensis[11]. A slow growing tree in Britain, it requires hot humid summers[200]. It is probably less slow in the far west and in Ireland[185]. Trees have not done well in this country even though they are very cold-tolerant[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

# 5.2.671 Sorbus alnifolia

Korean Mountain Ash 4 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus alnifolia is a deciduous Tree growing to Forest edges in China[147]. 15 m (49ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[74, 105]. The fruit is about the size of a pea, up to 14mm long[266], and is produced in fairly large bunches making it easy to harvest[200]. The flavour is reasonably mild and somewhat mealy[K].

tcanta WoodWood - even grained. Used for rulers[74]. nrakta E. Asia - China, Japan, Korea. ksacta Slopes of shady mountain forests of stone pine and deciduous trees on stony and humus rich soils[74]. Slopes, gullies, mixed forests and shrubby thickets at elevations of 500 - 2400 metres [266].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Landscape Uses:Specimen. Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. Special Features: Not North American native, Attractive flowers or blooms.

# 5.2.672 Celastrus orbiculatus

Oriental Bittersweet

4 tlin 8 cvuc 1 kcak 1 tcan 2 dwat 12 m hkuc pcimhmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli nyanhien hionli

drutta Celastrus orbiculatus is a deciduous Climber growing to 12 m (39ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from November to February. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[105, 177].

tcanta Hedge HedgeUsed as a hedge[58]. Ornamental. dwatta Antiphlogistic Antirheumatic Cancer Depurative TonicThe roots, stems and leaves are antiphlogistic, antirheumatic, depurative and tonic[147, 218]. A decoction of the roots and stems is used internally whilst the crushed fresh leaves are used for external applications[147]. The plant is used in the treatment of paralysis, numbness of the four extremities, headache, toothache, spontaneous abscess formation and snake bites[147]. Many plants in this genus contain compounds of interest for their antitumour activ-

nrakta N.E. Asia - China, Japan, Korea. ksacta Thickets on grassy slopes in lowland and mountains all over Japan [58].

propta Seed - gather when ripe, store in dry sand and sow February in a warm greenhouse[78]. Three months cold stratification leads to a higher germination rate[113]. Remove the flesh of the fruit since this inhibits germination[113]. Germination rates are usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[188]. Layering in August of the current seasons growth. Takes 12 months[78]. Root cuttings, 6mm thick 25mm long in December. Plant horizontally in pots in a frame[78].

nwatta Prefers a deep loamy soil[1] but succeeds in most soils so long as they are not too shallow[202]. Succeeds in full or partial shade[188]. Plants flower more freely if their top-growth is in the sun[182]. Requires a humus-rich soil if it is to be at its best[219]. A very ornamental plant[1], it is hardy to about -25°c[200]. A rampant climber, it requires ample space and is best grown into an old tree[1, 200. It climbs by means of twining and also by the young stems having prickles[182]. Plants do not normally require pruning[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants are usually dioecious, in which case male and female plants must be grown if seed is required, but hermaphrodite forms are in cultivation[11, 182, 200].

#### 5.2.673 Eucommia ulmoides

4 tlin 8 cvuc 1 kcak 0 tcan 3 dwat 12 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Eucommia ulmoides is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves[178]. No further details are given.

tcanta Latex WoodA rubber is obtained from the sap, but not in commercially viable quantities[11, 46, 61]. The leaves contain 3% dry weight of gutta-percha, a non-elastic rubber, used for insulation of electrical wires etc[74]. The gutta-percha is found in all parts of the tree and is extracted by alcohol[61, 174]. The wood is used for making Pattens (a type of shoe with raised soles)[178].

dwatta Analgesic Anticholesterolemic Aphrodisiac Astringent Depurative Diuretic Hepatic Hypotensive Sedative Tonic VasodilatorGutta-percha, known as Du Zhong in China, is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. It is considered to be an excellent tonic for the kidneys and liver. and is thought to act specifically on the lower part of the body[254]. Much interest has been aroused by Du Zhong's ability to reduce high blood pressure. In a clinical trial involving 119 people, 46% of those treated with the herb showed a significant reduction in blood pressure[254]. However, it seems to have little effect in cases of severe hypertension[254]. The stem bark is analgesic, anticholesterolemic, aphrodisiac, depurative, diuretic, hepatic, hypotensive, sedative, tonic and vasodilator[11, 46, 147, 176, 178, 218, 279]. Its use lowers blood pressure (the stir-fried bark is stronger than raw and a decoction is stronger than a tincture) and reduces the absorption of cholesterol[176]. It is used in the treatment of impotence, frequent urination, lumbago, weakness of the lower part of the body, aching back and knees. hypertension and threatened abortion[176, 254]. The flowers and the fruit are astringent[218].

nrakta E. Asia - China, ksacta Mountainous regions[74]. Lower mountains, valleys or sparsely forests at elevations of 300 - 500 metres in Gansu, Guizhou, Henan, Hubei, Hunan, Shaanxi, Sichuan, Yunnan and Zhejiang provinces[266].

any time of the year, the bark is peeled from them and is Lift the following autumn and plant in their permanent pothen dried for later use[238].

nrakta Eastern N. America - Florida and Texas north to New Jersey, Ohio and Missouri. ksacta Rich moist soils by the edges of streams and in damp woods and scrub[43, 55,

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Germination is usually good. Stored seed can be sown in February or March in a warm greenhouse according to one report[78] but germination can them take 18 months at 15 - 20°c[113]. Alternatively the stored seed can be pre-soaked for 2 - 3 hours in warm water and then given 3 months warm stratification followed by 3 months at 2 - 4°c[113]. Germination can then be fairly rapid. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a greenhouse or cold frame. Plant them out into their permanent positions the following spring or early summer. Layering in early summer as soon as new growth is long enough. Takes 15 months[78]. Layering can also be carried out in spring or autumn[200].

nwatta Landscape Uses:Border, Pest tolerant, Specimen, Woodland garden. Prefers a good loamy neutral to acid soil in full sun[1, 11, 182, 200]. Succeeds in partial shade but does not fruit so well in such a position[200]. Plants flower more freely in areas with hotter summers[188] and are slow-growing in areas with cool summers[238]. A very ornamental plant[1, 11], it is hardy to about -25°c[184]. A fast-growing but short-lived tree in the wild, where it is remarkably free from diseases or insect pests[229]. Plants begin to flower and bear fruit when they are 5 - 8 years old[227]. The flowers have a delicate sweet perfume[245]. Dioecious, male and female plants must be grown if seed and fruit is required. This species transplants easily[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds. North American native. Fragrant flowers, Blooms are very showy.

# 5.2.695 Photinia villosa

Oriental photinia

4 tlin 8 cvuc 1 kcak 0 tcan 0 dwat 5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Photinia villosa is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit[177]. No more details are given. The fruit is about 8mm in diameter[200], though occasionally forms with fruits up to 16mm are seen[266]. Leaves - cooked. A famine food, it is only used when all else fails[179].

tcanta WoodThe wood is hard and heavy, suitable for making furniture and other small articles[266].

nrakta E. Asia - China, Japan, Korea. ksacta Woods in W. Hupeh[109]. Low mountains and hills all over Japan[58]. Slopes, forests, thickets, streamsides, roadsides and waste places at elevations 100 - 1600 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn. Stored seed will probably require stratification and should be sown as early in the year as possible[78]. Germination is usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in a frame[200]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[11, 78]. They take about 2 months to root and should be overwintered in a greenhouse, planting out in late spring[78]. Fair to good percentage[78]. Cuttings of almost ripe side shoots, 7 - 12cm with a heel, October/November in a cold frame[78].

sitions[78]. Layering in autumn. Partially sever the layer about 12 months later and lift in the following spring. High percentage[200]

nwatta Requires a well-drained fertile soil in a sheltered position in sun or light shade[1, 200]. Prefers a warm soil that is not too heavy or close[11]. Dislikes calcareous soils[11, 182, 200]. A very ornamental[1] and polymorphic species[58], there are a number of sub-species[200]. P. villosa sinica. Rehd. and Wils. is a taller growing form, to 8 metres, and has larger fruits than the type, up to 12mm in diameter[200]. Plants are susceptible to fireblight[200]. The flowers have a hawthorn-like scent[245]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.696 Salix purpurea

Purple Osier, purpleosier willow 4 tlin 8 cvuc 1 kcak 4 tcan 3 dwat 5 m hkuc htut cyutli kyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwishsom hpa7tmwatli nyanhjen hjonli

drutta Salix purpurea is a deciduous Tree growing to 5 m (16ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to April, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not selffertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry moist or wet soil.

pcista Gastrointestinal bleeding and kidney damage possible. Avoid concurrent administration with other aspirin-like drugs. Avoid during pregnancy. Drug interactions associated with salicylates applicable [301].

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172].

tcanta Basketry Fodder Hedge Hedge Repellent Soil reclamation Soil stabilization TanninThe stems are very tough and flexible and are used in basket making[11, 13, 23] 115]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The bark is much disliked by rabbits, so a closely woven fence of this plant can be used as a protective barrier[115]. The bark contains about 10% tannin[223]. Plants can be grown as a hedge[29], the var. 'Gracilis' is suitable for a small hedge on damp sites[182, 200]. It can be kept dense by annual clipping[11]. The plant has an extensive root system and is used in soil reclamation and stabilization projects along estuaries[199]. Dynamic accumulator.

dwatta Anodyne Antiinflammatory Antiperiodic Antiseptic Astringent Diaphoretic Diuretic Dysentery Febrifuge Hypnotic Sedative TonicThe bark is anodyne, anti-inflammatory, antiperiodic, antiseptic, astringent, diaphoretic, diuretic, febrifuge, hypnotic, sedative and tonic[4, 9, 21]. It is a very rich source of salicin, which is used in making aspirin[199]. The bark of this species is used interchangeably with S. alba. It is taken internally in the treatment of rheumatism, arthritis, gout, inflammatory stages of auto-immune diseases, diarrhoea, dysentery, feverish illnesses, neuralgia and headache[238]. The bark is removed during the summer and dried for later use[238]. The leaves are used internally in the treatment of minor feverish illnesses and colic[238], cancerous sores and chronic dysentery[218]. The leaves can be harvested throughout the growing season and are used fresh or dried[238]. The twigs are used in the treatment of cancer. dysentery and ulcers[218]. The bark of the stem and roots is anodyne and styptic[218]. It is used in the treatment of rheumatism[218]. The German Commission E Monographs. a therapeutic guide to herbal medicine, approve Salix / Willow for diseases accompanied by fever, rheumatic ailments, headaches (see [302] for critics of commission E).

soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It cannot tolerate atmospheric pollution.

pcista Large quantities of the fruit can cause vomiting and diarrhoea[10, 65]. The fruit is of very low or zero toxicity, it only causes mild upsets when eaten unripe or in large quantities[76].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A famine food, it is only used when all else fails[177]. The oblong fruit is about 8mm long and contains a single large seed[200].

tcanta Rootstock StringThe young stems can be used as a twine[6]. This species is used as a rootstock for all forms of viburnums that require grafting[202].

nrakta Europe, İncluding Britain, from Belgium south and east to Spain, Greece and W. Asia. ksacta Open woodland and woodland edges, especially on calcareous soils[10, 17].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. Unlike most members of the genus, this species succeeds on dry soils[186]. It prefers a deep rich moist loamy soil in sun or semi-shade[11, 200], growing well on chalk and on chalky clays[98]. Intolerant of water-logged soils[186]. Best if given shade from the early morning sun in spring[200]. Dislikes atmospheric pollution[186]. Plants regenerate well after cutting[186]. This plant is a good indicator of limy soils[186]. Tolerates light shade in a woodland [186]. One report says the plant is self-sterile[11], another that it is self-fertile[17]. It would be wise to grow at least two genetically distinct plants of the same species in order to make sure that fruit and seed is produced. Special Features: Not North American native, Naturalizing, Fragrant flowers, Blooms are very showy.

#### 5.2.693 Magnolia stellata

Star Magnolia

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Magnolia stellata is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked. A famine food, it is only used when all else fails[177].

nrakta E. Asia - Japan. ksacta Woods in mountains. Found only in the mountains to the north-east of Nagoya[11].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200]. Cuttings of half-ripe wood, early summer in a frame[202].

nwatta Landscape Uses:Border, Firewood, Pest tolerant, Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Succeeds in acid or neutral soils in sun or part shade[184]. Tolerates alkaline soils so long as they are deep and rich in humus[188]. Prefers plenty of humus in the soil[11]. The branches are brittle so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. Dormant plants are hardy to about -15°c[184]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. A very ornamental plant, the flowers start to be produced when the plant is only 2 years old and have a delicate sweet perfume [245], though they are easily damaged by frost or wind[1]. A number of cultivars have been developed for their ornamental value[200]. Plants are slow-growing[202]. Very closely related to M. kobus and possibly no more than a geographical form of that species[182]. Special Features: Not North American native, Fragrant flowers. Blooms are very showy.

# 5.2.694 Chionanthus virginicus

Fringe Tree, White fringetree, Old Man's Beard, Fringe Tree 4 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli nvanhien hionli

drutta Chionanthus virginicus is a deciduous Shrub growing to 5 m (16ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is diocious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - used as a pickle like olives[55, 177, 183]. The fruit is up to 18mm long, it has a thin pulp and contains 1 - 3 rounded seeds[227].

tcanta WoodWood - hard, heavy, close grained, weighing about 39lb per cubic foot[82, 227]. Of no commercial value because of the small size of the tree[229].

dwatta Alterative Aperient Cholagogue Diuretic Febrifuge TonicThe fringe tree was commonly used by the North American Indians and European settlers alike to treat inflammations of the eye, mouth ulcers and spongy gums[254]. In modern herbalism it is considered to be one of the most reliable remedies for disorders of the liver and gall bladder[238]. The dried root bark is alterative, aperient, cholagogue, diuretic, febrifuge and tonic[4, 21, 46, 222, 238]. It is used in the treatment of gallbladder pain, gallstones, jaundice and chronic weakness[254]. A tincture of the bark was once widely used internally in the treatment of hypertrophy of the liver, jaundice, bilious headache. gallstones, rheumatism etc[222, 238]. The root bark also appears to strengthen function in the pancreas and spleen whilst anecdotal evidence indicates that it may substantially reduce sugar levels in the urine[254]. Fringe tree also stimulates the appetite and digestion and is an excellent remedy for chronic illness, especially where the liver has been affected[254]. A tea or a poultice can be made from the root bark for external use as a wash for wounds, inflammations, sores, infections etc[4, 222]. The roots can be harvested at

propta Seed - best sown as soon as it is ripe in a cold frame. Stratify stored seed for 3 months at 2°c[113]. Germination is usually good and takes place in the first spring[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[11].

nwatta Industrial Crop: Hydrocarbon Management: CoppiceSucceeds in any well-drained moisture retentive soil in full sun with shelter from cold winds[200]. Prefers a good loamy soil[11]. A fast growing[1] and very cold-tolerant tree, withstanding temperatures down to about -20°c[74]. Trees are commonly cultivated in Russia and China, both for gutta percha and for the medicinal used of the stembark[11, 218]. By using different solvents it is possible to obtain both of these products and the residue is then used for energy production[218]. This species is the only hardy rubber tree that can be grown outdoors in Britain[11]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.674 Magnolia kobus

Kobus magnolia, Northern Japanese Magnolia 4 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Magnolia kobus is a deciduous Tree growing to 12 m (39ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers LeavesEdible Uses: Condiment TeaFlowers and flower buds - cooked[177, 183]. The leaves are eaten or used to make a tea[183]. Older leaves are powdered and sprinkled on foods as a flavouring[183].

tcanta WoodWood - soft, light. Used for engraving, utensils. matches etc[46, 61].

dwatta Treats headaches[174].

nrakta E. Asia - Japan. ksacta Hills and bases of mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200]. Cuttings of half-ripe wood in early summer[202].

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Succeeds in acid or neutral soils in sun or part shade[184]. Fairly lime tolerant[200, 202]. The branches are brittle so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -28°c[200]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. Plants take 10 - 15 years to flower after being planted out[202]. The leaves are slightly aromatic[188]. Very closely related to M. stellata, differing in having 3 narrow sepals and 6 - 9 broader petals. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

# 5.2.675 Idesia polycarpa

Idesia

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli drutta Idesia polycarpa is a deciduous Tree growing to  $12 \,\mathrm{m}$  (39ft) by  $10 \,\mathrm{m}$  (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is a many seeded berry with a pulpy flesh[2], it is about 10mm in diameter[200].

nrakta E. Asia - China, Japan. ksacta Hills and mountain forests above elevations of 2000 metres[58, 109].

propta Seed - sow spring in a greenhouse[78]. Germination is usually very good[78]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their fist two winters. Plant them out into their permanent positions in late spring, after the last expected frosts and consider giving them some protection from the cold for their first winter or two outdoors[K]. Plants cannot be sexed until they flower[78]. Cuttings of half-ripe wood with a heel, July/August in a frame. Fair percentage[78]. Layering in spring. Takes 12 months[78].

mwatta Prefers a neutral to slightly acid loamy soil, but tolerates a chalky sub-soil if the top soil is deep[200]. Succeeds in full sun or semi-shade[188]. The dormant plant is hardy to about -15°c, though the tree is somewhat hardier if the wood is thoroughly ripened by a long hot summer[200]. The young shoots in spring can be damaged by late frosts. A very ornamental plant[1]. The flowers have a most delicious perfume, which can be wafted far and wide by warm breezes[245]. Trees produce fruit regularly at Kew[11]. Dioecious. Male and female plants must be grown if fruit and seed is required. Female plants can produce some fruit in the absence of a male plant[11].

# 5.2.676 Salix acutifolia

Sharp-Leaf Willow

4 tlin 8 cvuc 1 kcak 3 tcan 2 dwat 10 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix acutifolia is a deciduous Shrub growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and added to cereal flours for use in making bread etc. A famine food, it is only used when all else fails[172]. Young shoots - cooked. They are not very palatable[172].

tcanta Basketry Shelterbelt Soil stabilizationStems are very flexible and are used in basket making[46, 61]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. Trees can be planted in shelter-belts for protection against the wind[166]. The extensive root system of this plant is good for binding sandy soils[11]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta N. Europe to E. Asia. ksacta Not known

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and

given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Very wind-resistant, tolerating maritime exposure[166]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Closely related to Staphnoides[200] and considered to be a part of that species by some authorities[11, 17]. Some named forms have been developed for their ornamental value[182]. There are also named forms cultivated for basket making[46, 61]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.677 Magnolia virginiana

Laurel Magnolia, Sweetbay
4 tlin 8 cyuc 1 kcak 2 tcan 3 dwat 10 m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik
hpa7tmwatli xre7t hionli

drutta Magnolia virginiana is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves are used as a condiment in gravies etc[183]. A tea is made from the leaves[183].

tcanta WoodAn essential oil from the flowers has been used in the manufacture of perfumes[227]. Wood - straight-grained, light, soft, easily worked, finishes well, aromatic and yellow in colour[4, 46, 61, 229]. It weighs 31lb per cubic foot[227]. Used for furniture, broom handles, bowls and light woodenware articles etc[46, 61, 227, 229].

dwatta Aromatic Astringent Bitter Diaphoretic Febrifuge Hallucinogenic Malaria StimulantA tea made from the bark is antiperiodic, aromatic, diaphoretic, laxative, stimulant and tonic[4, 222]. It has historically been used as a substitute for quinine in the treatment of malaria[222, 238] and is also taken internally in the treatment of colds, bronchial diseases, upper respiratory tract infections, rheumatism and gout[238, 257]. The bark has been chewed by people trying to break the tobacco habit[222]. The bark is harvested in the autumn and dried for later use[238]. It does not store well so stocks should be renewed annually[238]. A tea made from the fruit is a tonic, used in the treatment of general debility and was formerly esteemed in the treatment of stomach allments[222]. The leaves or bark have been placed in cupped hands over the nose and inhaled as a mild hallucinogen[257].

nrakta Eastern N. America - Massachusetts to Florida, west to Missouri and Tennessee. ksacta Wet acid sandy barrens and swamps at low elevations[184, 229]. Swamps, bays, low wet woods, savannahs; chiefly in coastal plain and lower piedmont from sea level to 540 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Lavering in early spring[200].

nwatta Requires a sunny sheltered position in a deep soil that does not dry out in the summer[11]. Plants are also tolerant of wet soils[238]. Succeeds in acid or neutral soils in sun or part shade[184]. Dislikes limey soils[11]. Tolerates some alkalinity so long as there is at least 50cm of good soil above the alkaline layer[202]. The branches are brittle so

578

a sheltered position is required[200]. Plants are very tolerant of atmospheric pollution[200]. Mature dormant plants are hardy to about -20°c but the flowers are easily damaged by frost or wind.[184]. A warmth-loving species, it is best grown in the south and east of Britain[11]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. A slow growing tree but it flowers whilst young[182]. The flowers have a delicious scent of lemons[182]. A number of cultivars have been developed for their ornamental value. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a nonsuckering single trunk [1-2]. An evergreen. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

# 5.2.678 Sorbus pohuashanensis

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sorbus pohuashanensis is a deciduous Tree growing to  $10\ m$  (32ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A rather bitter flavour[K]. The fruit is up to 6 - 8mm in diameter[200] and is borne in fairly large bunches which makes harvesting easier[K].

nrakta E. Asia - N. China. ksacta Mountain slopes and mixed forests in valleys at elevations of 900 - 2500 metres in Gansu, Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol, Shaanxi, Shandong and Shanxi Provinces[266].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates light shade[188], though it fruits better in a sunny position[K]. A fast-growing tree, especially in its first few years from seed[K]. Plants are susceptible to fireblight[188].

hpa7tmwatli xre7t hjonli

drutta Lonicera henry i is an evergreen Climber growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: Edible flowers, leaves and stems[105, 177, 183]. No further details are given, but some caution is advised because this genus contains a number of mildly toxic plants[K].

tcanta MiscellanyA very vigorous climbing plant, it makes a good dense ground cover plant where it has the space to run along the ground, but it will swamp smaller plants[197].

dwatta MiscellanyThe plant is used medicinally in China, but the report gives no more details[218].

nrakta E. Asia - China from W. Hubei to W. Sichuan. ks-acta Scrub, 1200 - 2300 metres[184].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good moist soil with its roots in the shade and its top growing up into the light[200]. Plants are hardy to about -20°c[184]. A vigorous climber, supporting itself by twining around other plants[182, 219]. Any pruning is best carried out in the spring[219].

# 5.2.690 Euonymus hamiltonianus sieboldianus

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutia Euonymus hamiltonianus sieboldianus is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - they must be well boiled[105, 177]. This report should be treated with some caution since many members of this genus are poisonous.

tcanta Latex WoodRoots and stem yield gutta-percha, a non elastic rubber used as an electrical insulator and in making plastics etc[61, 103]. Wood - heavy, hard, close-grained. Used for mosaic, printing blocks etc[46].

nrakta E. Asia - Japan. ksacta Mountains and hills throughout Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[113]. Stored seed requires 3 months cold stratification so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate[74]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, taken at a node, July/August in a frame. Very easy[200]. Root cuttings in winter[113].

nwatta Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[11]. This species is often called E. yedoensis in the garden[11].

# 5.2.691 Lonicera caprifolium

Italian Honeysuckle, Italian woodbine
4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 6 m hkuc
pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutia Lonicera caprifolium is a deciduous Climber growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: FruitEdible Uses: TeaThe fruit is eaten in small quantities[177]. It is probably cooked first[K]. An infusion of the heavily perfumed flowers is used as a tea substitute[7].

tcanta EssentialAn essential oil has been extracted from the flowers and used to make a very sweet perfume, but yields are extremely low[7].

dwatta Antispasmodic Bach Cathartic Diuretic Emelic Emollient Expectorant Laxative Pectoral Skin VulneraryThe fruit is emetic and cathartic[4]. The pressed juice makes a mild purgative[7, 61]. The leaves and flowers are antispasmodic, emollient and expectorant[7]. They are used as a cutaneous and mucous tonic and as a vulnerary[4]. Recent research has shown that the plant has an outstanding curative action in cases of colitis[7]. The seed is diuretic[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Dwelling upon thoughts of the past', 'Nostalgia' and 'Homesickness' [2091.

nrakta Europe - Austria and Czechoslovakia to Romania and Turkey. Introduced in Britain. ksacta Hedges, scrub and woods[100].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Lavering in autumn[200].

nwatta Prefers a good moist soil with its roots in the shade and its top growing into the light[200]. Succeeds even in quite deep shade[219]. Tolerates both acid and alkaline soils, only showing distress on very alkaline soils[202]. Plants are hardy to about -15°c[202]. Plants are moderately fast-growing[202]. They climb by twining around other plants[182]. The flowers are very fragrant, especially of a night time in order to attract pollinating moths, and are produced in abundance[202, 219, 245], but plants only produce fruit after a hot summer[202]. Plants are prone to attacks by mildew and blackfly[202].

# 5.2.692 Viburnum lantana

583

Wayfaring Tree, Wayfaring Tree Viburnum 4 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Viburnum lantana is a deciduous Shrub growing to 5 m (16ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay)

pcista Although no specific mention of toxicity has been found for this species, there is the suggestion that some members of this genus could be mildly poisonous[65].

kcakta Edible Parts: Leaves OilEdible Uses: Oil TeaLeaves - cooked. They can be parboiled and eaten[183]. The leaves are a tea substitute[177, 183].

tcanta Dye Hedge Hedge Miscellany Oil WoodA green dye is obtained from the leaves and branches[46, 61, 151]. A yellow dye can be obtained from the bark and the fruit[266]. A lubricating oil is obtained from the seeds[266]. Plants can be grown as an informal hedge, they are also amenable to trimming[200]. The hard wood can be used to make furniture[266].

dwatta MiscellanyThe fleshy fruit is used as medicine[266]. No more details are given.

nrakta E. Asia - Siberia to China. ksacta Forest undergrowth in the Himalayas[146]. Forests on slopes, thickets or the margin of forests, humid places along the sides of canals at elevations under 1800 metres in China[266].

propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at about 5° and should be sown as early in the year as possible in a cold frame or outdoor seedbed[200]. Germination is usually good, at least 80% by late spring. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta An easily grown plant, it succeeds in any reasonably good soil[11]. This species is very closely related to R. cathartica[11]. The species in this genus are notably resistant to honey fungus[200].

# 5.2.687 Celastrus flagellaris

4tlin 8 cyuc 1 kcak 0 tcan 1 dwat 7.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Celastrus flagellaris is a deciduous Climber growing to 7.5 m (24ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

dwatta CancerMany plants in this genus contain compounds of interest for their antitumour activity[218].

nrakta E. Asia - China, Japan, Korea. ksacta Mountains in S. Japan[58]. Valley, forest on riverside, thickets and sunny slopes in China[266].

propta Seed - gather when ripe, store in dry sand and sow February in a warm greenhouse[78]. Three months cold stratification leads to a higher germination rate[113]. Remove the aril since this inhibits germination [113]. Germination rates are usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in August of the current seasons growth. Takes 12 months[78]. Root cuttings, 6mm thick 25mm long in December. Plant horizontally in pots in a frame[78].

nwatta Prefers a deep loamy soil[11]. A gross feeder, it requires a rich soil[11]. A rampant climber, it requires ample space and is best grown into an old tree[1, 200]. Fruits best when its top growth is in a sunny position[182]. Plants climb by means of twining and by hooked prickles[182]. They do not normally require pruning[219]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious, male and female plants must be grown if seed is required.

#### 5.2.688 Salix viminalis

Osier. Basket Willow

4tlin8cyuc1kcak3tcan2dwat6m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Salix viminalis is a deciduous Tree growing to 6 m (19ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - cooked. Not very palatable[172].

tcanta Basketry Fodder Soil stabilization TanninThe stems are very flexible and are used in basket making[11, 23, 46]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The annual yield can be around 12 tonnes per hectare, 40% of which is class 1[74]. The bark contains about 10% tannin[223]. Often planted along the banks of rivers and lakes to prevent soil erosion[1].

dwatta Anodyne Antirheumatic FebrifugeAntirheumatic, febrifuge[13]. The fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta Europe, incl Britain, from Scandanavia south and east to France through temperate Asia to Japan. ksacta By rivers and streams, also on deep moist alluvial soils, avoiding very acid soils[186].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame. Very easy.

nwatta Fodder: Bank Industrial Crop: Biomass Industri Crop: Tannin Management: Coppice Other Systems: SRC Regional CropSucceeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Dislikes heavy shade and dry soils[186]. Rarely thrives on chalk[200]. Tolerates atmospheric pollution[186]. A fast growing tree, it is very wind resistant[K]. Widely cultivated for basket making. there are many named varieties[11, 17]. Trees are usually coppiced annually for this purpose, they do not respond so well to pollarding. It should be cut back almost to ground level each year when being grown for basket making since this encourages the production of long flexible shoots[11]. In very good conditions plants can put on 4 metres or more of new growth in a year when treated in this way. A very important food source for the caterpillars of many butterfly species[30], it is also a valuable early pollen source for bees[11, 186]. The plants are rich in insect life[186]. Best planted into its permanent position as soon as possible[11]. The root system is rather aggressive and can cause problems with drains[200]. Plants are best not grown within 10 metres of buildings. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.689 Lonicera henryi

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

# 5.2.679 Salix caprea

Goat Willow, Kilmarnock Willow, Pink Pussy Willow, Pussy Willow

4 tlin 9 cyuc 1 kcak 4 tcan 2 dwat 10 m hkuc

hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Salix caprea is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to April, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Inner bark Leaves MannaEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172]. The source of an edible manna[183]. No further details.

tcanta Basketry Charcoal Hedge Hedge Leather Pioneer Shelterbelt Tannin WoodLandscape Uses: Border, Massing, Pollard, Standard, Specimen. The stems are very flexible and are used in basket making[61]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The bark is tough and flexible, it is used as a substitute for leather[115]. The bark contains around 10% tannin[223]. The plant is fast growing and tolerant of maritime exposure, it can be used as a windbreak hedge and shelterbelt though it is of untidy habit[75]. The seeds are very light and so can travel some distance in the wind. The plant is therefore able to find its way to areas such as cleared woodland where the soil has been disturbed. Seedlings will grow away quickly, even in exposed conditions and the plant will provide good shelter for the establishment of woodland plants. Thus it makes a good pioneer species and, except in wetter and moorland-type soils, will eventually be largely out-competed by the other woodland trees. Its main disadvantage as a pioneer plant is that it has an extensive root system and is quite a greedy plant, thus it will not help as much in enriching the soil for the other woodland plants as other pioneer species such as the alders, Alnus species[K]. Some cultivars can be grown as ground cover[208]. 'Pendula' is female whilst 'Kilmarnock' is a male, they should be spaced about 1.5 metres apart each way[208]. Wood - soft, elastic, easily split. Used for baskets, rugs etc[46, 61]. A good quality charcoal is made from the wood[46, 61]. Dynamic accumulator.

dwatta Anodyne Aphrodisiac Astringent Febrifuge Ophthalmic StimulantThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226]. A decoction of the leaves is used in the treatment of fevers[240]. A distilled water from the flowers is aphrodisiac, cordial and stimulant[240]. It is used externally in the treatment of headaches and ophthalmia[240]. The ashes of the wood are useful in the treatment of haemoptysis[240]. The stems and the leaves are astringent[240]. A gum and the juice of the trees are used to increase visual powers[240].

nrakta Europe, including Britain, from Norway south and east to Spain, temperate Asia and Syria. ksacta Woods, scrub and hedges, usually on basic soils, to 840 metres[17].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Cuttings of this species do not root well[200]. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame. Cuttings of this species do not root well[200].

nwatta Succeeds in most soils, including wet, ill-drained

or intermittently flooded soils[1], but prefers a damp, heavy soil in a sunny position. Grows in drier soils than any other British species of Salix[186]. Rarely thrives on chalk[200]. Plants are found most frequently on basic soils in the wild[17]. Tolerates atmospheric pollution and exposed positions, including maritime exposure[75, 186]. A fast growing tree, it establishes well[75]. The tree has an untidy habit[75]. A light demanding tree, it becomes tall and drawn when grown in woodland, though it grows well along the sunnier edges[186]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Trees are very tolerant of cutting, they coppice well[186]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features:Not North American native, Wetlands plant, Attractive flowers or blooms.

#### 5.2.680 Ilex pedunculosa

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta llex pedunculosa is an evergreen Shrub growing to 10 m (32ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower in June, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177, 178]. Some caution is advised, see the notes above on toxicity.

tcanta Dye WoodA dark red dye is obtained from the leaves [178]. Wood - white, beautifully veined [178].

dwatta Carminative Skin TonicCarminative, skin, tonic[178].

nrakta E. Asia - China, Japan. ksacta Woods in mountains of Japan[184]. Woodlands and the sides of streams in W. China[109]. Broad-leaf woods, thickets, margins of woods on mountains at elevations of 1200 - 1900 metres in China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils so long as they are not water-logged. Plants are hardy to about -10°c[184]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

### 5.2.681 Salix daphnoides

Violet Willow, Daphne willow

4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 10 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix daphnoides is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to March, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Inner bark Leaves RootEdible Uses: Inner bark - raw or cooked[172, 183]. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172]. Rich in vitamin C[183]. Young catkin-bearing shoots - raw or cooked[183]. The growing tips of underground rhizomes are peeled and eaten [183].

tcanta Basketry Shelterbelt Soil stabilization WoodThe stems are very flexible and are used in basket making[1, 61, 74, 131, 158] or for making wattle and daub walls[158]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. Trees are fast growing and tolerate maritime exposure so can be grown as a shelterbelt[166]. Plants have extensive root systems and are often used to stabilize sand dunes[11, 200]. Wood - soft, even grained, smooth. Used for construction, pales, tubs etc[146, 158]. Dynamic accumulator.

dwatta Anodyne Febrifuge Vitamin CThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta Europe to W. Asia as far as the Himalayas. Scarcely naturalized in Britain[17]. ksacta Moist soils.

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1], but prefers a deep damp, heavy soil in a sunny position[11, 200]. Rarely thrives on chalk[200]. Succeeds in poor strong soils[131]. Succeeds in maritime exposure[166]. The root system is rather aggressive and can cause problems with drains[200]. It is best not to plant this species within 10 metres of buildings. Hybridizes freely with other members of this genus. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. A very ornamental and fast growing plant[1, 74]. There are some named varieties. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.682 Euonymus hamiltonianus

Hamilton's spindletree

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euonymus hamiltonianus is a deciduous Shrub growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly

acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177]. This report should be treated with some caution since many members of this genus are poisonous.

tcanta Latex WoodRoots and stem yield gutta-percha, a non elastic rubber used as an electrical insulator and in making plastics etc[74]. Wood - heavy, hard, close-grained. Used for mosaic, printing blocks etc[46]. Th wood is used to make combs[272].

nrakta E. Asia - Afghanistan to China. ksacta Scrub and woods to 2700 metres[184]. Open places around villages at elevations of 500 - 2500 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame[113]. Stored seed requires 3 months cold stratification so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate[74]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, taken at a node, July/August in a frame. Very easy[200]. Root cuttings in winter[113].

nwatta Thrives in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil. Plants are hardy to about -15°c[184]. A very ornamental plant[1], there are a number of named varieties selected for their good fruiting and autumn colour[184].

# 5.2.683 Sorbus hybrida

Swedish Service Tree, Oakleaf mountain ash 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslin hpa7tmwatli fyifxre7t hionli

d'rutta Sorbus hybrida is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3]. The fruit is up to 10 - 12mm across[200] and is produced in fairly large bunches, making harvesting easier[K].

nrakta Europe - S. and S.W. Scandinavia. ksacta Usually found near the coast[11].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates very acid or alkaline

soils[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. The trees usually have apomictic flowers. They thus produce seed asexually, each seedling being a clone of the parent[11].

# 5.2.684 Rhus succedanea

Wax Tree

4 tlin 9 cyuc 1 kcak 4 tcan 2 dwat 9 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus succedanea is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant contains toxic substances which can cause severe irritation to some people. The fresh sap causes skin blisters[145]. The leaves contain the ubiquitous carcinogen shikimic acid[218].

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit[105]. The acid pulp is eaten[158, 272]. The edible fruit contains ellagic acid[218]. These reports need to be treated with some caution due to the general toxicity of the species[K].

tcanta Dye Lacquer Mordant Oil Varnish WaxThe leaves contain about 20% tannin[218]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. The sap is tapped and used as a lacquer[57, 64, 146, 158, 171]. It is much used in Japanese art and needs to be kept in a cool humid place for it to dry properly. The Japanese traditionally kept their paintings in a damp cave until the lacquer had dried. A yellow dye is obtained from the wool[178]. A wax obtained from the fruit is used to make candles, floor wax, varnish etc[1, 4, 11, 51, 64, 158, 171]. The fruit contains about 17% wax[174]. The fatty acid composition of the wax is 77% palmitic, 5% stearic and arachidic, 6% dibasic, 12% oleic and a trace of linoleic[218]. The seed oil contains 25% glycerides of palmitic, 47% oleic and 28% linoleic[218].

dwatta Antidote Antivinous Cancer Cholagogue Febrifuge OphthalmicAntidote, antivinous, cholagogue, febrifuge, ophthalmic. Used as a wash to counteract varnish poisoning[178]. Use with extreme caution, see notes above on toxicity. The fruit is used in the treatment of phthisis[240]. A wax from the fruits is used in ointments[218]. An ethanolic extract of the leaves exhibits anticancer and antiviral activities[218].

nrakta E. Asia - China, Japan, Himalayas. ksacta Forests and shrubberies to 2,400 metres in the Himalayas[51]. Lowland and hill forests, lowland thickets on limestone; at elevations from 100 - 1,500 metres, occasionally to 2,500 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Industrial Crop: Oil Industrial Crop: Wax Management: Standard Regional CropSucceeds in a well-drained fertile soil in full sun[11, 200]. Plants are not very hardy in Britain, though they succeed outdoors in the mildest areas of the country[1, 11]. The young growth in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. This species is frequently cultivated in Japan for its sap and the wax obtained from its fruit[11]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 5.2.685 Halesia carolina

xre7t hjonli

Silver-Bell Tree, Carolina silverbell, Mountain silverbell 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 8 m hkuc htut cyutli tcup hwicli hrasilut hpa7tli flatorik hpa7tmwatli

drutta Halesia carolina is a deciduous Tree growing to 8 m (26ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The ripe fruit is chewed for its acidity[183]. Unripe fruits are sometimes pickled[2, 183]. The fruit is about 4cm in diameter[200].

tcanta WoodWood - soft, light, close-grained[82]. It weighs 35lb per cubic foot[235]. Trees occasionally grow large enough for saw timber and are then cut and used for panelling and cabinet making[229].

nrakta South-eastern N. America - Virginia to Florida, west to Oklahoma. ksacta Moist woods along the sides of streams in the mountains[43, 184].

propta Seed - best sown as soon as it is ripe in a cold frame [78, 113, 200]. It takes 18 months to germinate [113]. Warm stratifying the seed for  $2 \cdot 3$  months at  $14 \cdot 25^\circ$  chen cold stratifying for  $2 \cdot 3$  months at  $0 \cdot 5^\circ$ c can reduce the germination time. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early sumer, after the last expected frosts. Cuttings of greenwood,  $5 \cdot 8$ cm with a heel, May/June in a frame. Roots in 28 days. A fair percentage [78]. Layering in early spring as the buds break. Takes 12 months. High percentage [78].

nwatta Prefers a sunny sheltered position and a deep moist sandy soil[1, 11]. Succeeds in most moist soils[184] and in most positions[11] so long as they are well-drained[202]. Requires a lime-free soil[200]. Dormant plants are hardy to about -25°c[184]. A very ornamental plant[1, 11], it has a moderate rate of growth and lives about 100 years[229]. It can flower when only 1.2 metres tall[113]. The flowers have a delicate sweet perfume[245]. The subspecies H. tetraptera monticola forms a tree about 24 metres tall. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.686 Rhamnus dahurica

Dahurian Buckthorn

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rhamnus dahurica is a deciduous Shrub growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

plants often self-layer[200].

nwatta Landscape Uses:Border, Container, Massing, Rock garden, Specimen. Succeeds in any soil but is hardier in a poor dry soil[4, 37, 200]. Prefers an open sunny position[7, 182]. Prefers a partially shaded sheltered dry position but succeeds in full sun[1, 4, 200]. Prefers a welldrained or rocky soil[200]. Likes some lime in the soil[11]. Established plants are drought tolerant[190]. Hardy to about -10°c, possibly to lower temperatures when it is grown in a dry soil[187]. Often cultivated as a culinary and medicinal herb, there are some named varieties[187]. The bruised leaves have a pleasant orange-like fragrance[245]. It is one of the most pleasant herbs to inhale[245]. Rue releases its scent in a remarkable way. The essential oil is contained in a cavity immediately beneath the surface of the leaf, above which is a thin layer of cells pierced by a cavity in the middle. The cells swell up and bend inwards, pressing on the essential oil beneath, which is driven to the surface of the leaf and there released[245]. Rue is a poor companion plant for many other species, growing badly with sage, cabbage and sweet basil[14, 18, 20, 201]. It is a good companion for roses and raspberries[201]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage, Edible, Not North American native, Suitable for cut flowers, Suitable for dried flowers.

# 5.2.856 Tricvrtis macropoda

4 tlin 8 cvuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tricyrtis macropoda is a PERENNIAL growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermanhrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - cooked[105, 177].

nrakta E. Asia - China, Korea ksacta Forests, grassy slopes and rock crevices at elevations of 800 - 2400 metres[266]

propta Seed - best sown in a cold frame as soon as it is ripe. Stored seed requires 12 weeks stratification at 5°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division just before growth starts in spring to single crowns[175]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a humus-rich fertile well-drained but moisture-retentive acid or neutral light sandy loam in partial shade[175, 200]. Prefers the dappled shade of a woodland garden but tolerates full sun if the soil is reliably moist throughout the growing season[200], flowering earlier in such a position. Plants require a sunnier position when growing in northern Britain[233]. This species is hardy to about -20°c, but if prolonged cold weather is not accompanied by snow cover the plants will appreciate a good mulch of organic matter[187]. A very ornamental plant[233]. Plants are very susceptible to attacks by slugs[175].

# 5.2.857 Heuchera cylindrica

Alum Root, Roundleaf alumroot, Alpine alumroot, Beautiful alumroot. Poker alumroot

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Heuchera cylindrica is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not

frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked[172].

tcanta MordantThe root can be used as an alum substitute, this is a mordant that is used in fixing dyes[168, 257]. The root is rich in tannin and it has been suggested that this is the mordant[168, 172]]. A good ground cover plant for the woodland garden[200]. Plants should be spaced about 30cm apart each way[208].

dwatta The whole plant, but especially the roots, is astringent[257]. A decoction of the roots is used in the treatment of diarrhoea and stomach cramps[257]. Externally, a decoction is used as a wash on aching joints [257]. A poultice of the mashed peeled roots is used in treating rashes, sores and cuts[257]. When mixed with the spores of puffballs, it has been used as a salve for treating nappy rash[257].

nrakta N. America - British Columbia to California and east to Nevada, Wyoming and Montana. ksacta Streambanks and wet rocky places[172]. Rocky soils, cliffs and talus

propta Seed - sow early spring in a warm greenhouse and only just cover the seed. Germination is usually fairly rapid. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in late spring or early summer. The seed can also be sown in the middle of spring in an outdoor seedbed and planted out in early summer. Alternatively, you can sow the seed in an outdoor seedbed in the middle of summer for planting out in the following spring. Division in March or October [1, 111]. It is best to divide the plants in August or early September, making sure that the woody roots are planted quite deeply with only the crown of foliage above the ground[233].

nwatta Succeeds in any good sweet garden soil that does not dry out in spring[1]. Prefers full sun but tolerates partial shade[1, 111]. Prefers a well-drained fairly rich and not too heavy soil[111]. Plants are hardy to about -20°c[187]. Closely related to H. chlorantha[200], it is apt to hybridize with other members of this genus[111]. A very ornamental plant[60], a number of named forms have been selected for their ornamental value[187]. The subspecies H. cylindrica glabella has been specifically mentioned for its use as a mordant[168, 172].

# 5.2.858 Gentiana punctata

Spotted Gentian

4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana punctata is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light. (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta The root is sometimes used in the manufacture of gentian hitters[183]

dwatta Anthelmintic Antiinflammatory Antiseptic Bitter Cholagogue Emmenagogue Febrifuge Refrigerant Stomachic TonicThis species is one of several that are the source of the medicinal gentian root[4], the thick rootstock can be up to 1 metre long[239]. The following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 182, 200]. Grows well in heavy clay soils. Prefers a lime-free soil[182]. Prefers a dry sunny position[11]. A very ornamental plant[1], it is closely related to B. vulgaris[200]. This species is probably an alternate host of 'black-stem rust' of wheat and is best not cultivated in cereal growing areas[K]. Hybridizes freely with other members of this genus[1]. Plants produce suckers freely, forming thickets[182]. They can be pruned back quite severely and will resprout well from the base[200].

# 5.2.739 Gentiana lutea

Yellow Gentian

4 tlin 8 cyuc 1 kcak 0 tcan 5 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana lutea is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Contraindicated with gastric or duodenal ulcer patients. Possible headaches, nausea and vomiting [301].

kcakta Edible Parts: Edible Uses: CondimentThe root is sometimes used in the manufacture of gentian bitters[183]. The root contains sugar and mucilage[2] (this is probably a reference to its medicinal properties). The root was occasionally used as a flavouring in beer before the use of hops (Humulus lunulus) became widespread[4]

dwatta Anthelmintic Antiinflammatory Antiseptic Appetizer Bitter Cholagogue Emmenagogue Febrifuge Refrigerant Stomachic Tonic Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant and stomachic[4, 7, 9, 14, 21, 165]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root, which can be as thick as a person's arm and has few branches[239], is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Gentiana lutea as a tonic (see [302] for critics of commission E).

nrakta C. and S. Europe. ksacta Grassy alpine and subalpine pastures, usually on calcareous soils[9, 50].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period

and should be sown in a cold frame as early in the year as of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surfacesown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is easily grown in any good garden soil so long as it is deep enough to accommodate its roots[187, 239], though it prefers alkaline conditions[238]. It prefers full sun but succeeds in partial shade[111]. A slow-growing plant, it takes many years to reach its full stature[239]. A moisture loving plant, growing well by water, it prefers to grow with full exposure to the sun but with plenty of underground moisture in the summer and it grows better in the north and west of Britain[1]. Plants are very deep-rooted and are intolerant of root disturbance[4, 200]. They are very long lived, to 50 years or more[9]. A very ornamental plant[1], it takes about 3 years to reach flowering size from seed[4]. Cultivated as a medicinal plant in Europe[4, 57].

# 5.2.740 Sanguisorba obtusa

Japanese burnet

4 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sanguisorba obtusa is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked[105]. A famine food, they are only used when all else fails[105].

nrakta E. Asia - Japan, ksacta Damp alpine meadows[187, 200].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring.

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Hardy to about -20°c[187]. A very ornamental plant[1].

# 5.2.741 Ammophila arenaria

Marram Grass, European beachgrass 4 tlin 8 cyuc 1 kcak 4 tcan 0 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasilut hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Ammophila arenaria is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: RootEdible Uses: Root[74]. No more details, but the root is rather thin and fibrous[K].

tcanta Basketry Broom Fibre Paper Soil stabilization Thatching WeavingThe flowering stems and leaves are used for thatching, in basketry, making brooms etc[61, 66, 100]. The rhizomes are used for making rope and mats[115]. A fibre obtained from the stems is used for making paper[189]. The stems are harvested in the summer, cut into usable pieces and soaked for 24 hours in clear water before cooking for 2 hours with soda ash. Beat the fibres in a ball mill for 1½ hours. The fibres make a tan-brown paper[189]. This plant has an extensive root system and grows naturally in sand dunes along the coast where it is very important for its action of binding the dunes and therefore allowing other plants to grow. It is much planted in sand dunes and other similar habitats for erosion control[200].

nrakta W. Europe, including Britain. ksacta Sand dunes by the coast[17].

propta Seed - sow in pots outdoors as soon as it is ripe or sow in situ during March/April. Division in spring or autumn. nwatta Requires a sunny position in a light well-drained soil. Very tolerant of severe maritime exposure[17]. Toler-

# 5.2.742 Ribes fasciculatum

ates a pH in the range 4.5 to 6.8.

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ribes fasciculatum is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from March to November, in flower in April, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked[177]. Unpalatable[1]. The reddish-brown fruit is about 5 - 10mm in diameter and contains a lot of fairly large seeds[266]. What little flesh there is remains unpleasant even in the autumn[K]. The fruit hangs well, probably because it is unpalatable[K]. Young leaves - cooked[105, 177].

nrakta E. Asia - China, Japan, Korea, ksacta Stony places near villages in Korea[151]. Forests and forest margins, bamboo woods, foothills, stony slopes and roadsides at elevations of 700 - 2400 metres in China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11, 200]. Plants are guite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°c[200]. The flowers have a delicious aromatic perfume[245]. The fruit can hang on the plant until winter[182]. Plants can harbour a stage of white pine blister rust, so should not be grown in

the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Female flowers appear to be perfect but the pollen in them and the ovules in the male flowers are sterile[11]. Plants are therefore functionally dioecious, male and female plants must be grown if fruit and seed is required.

# 5.2.743 Cimicifuga simplex

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cimicifuga simplex is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it does belong to a family that contains a number of toxic species and at least one species in this genus is said to be mildly poisonous. Some caution is therefore ad-

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - cooked[105, 177, 183]. Some caution is advised, see the notes above on toxicity. The fragrant root is used as a spice[183].

nrakta E. Asia - Japan, Dahurica, ksacta Mountain meadows and alpine regions all over Japan[58]. Forest margins, scrub, grassy slopes and open lands at elevations of 300 -3200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 1 -12 months or even longer at 15°c[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°c and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following

nwatta Prefers a moist humus rich soil and some shade[1, 200]. Succeeds in ordinary garden soil[1]. Grows well in the dappled shade of woodland[88]. Plants are hardy to at least -25°c[187]. A number of named varieties have been selected for their ornamental value[187]. A good bee and butterfly plant[88]. The flowers have an unusual, slightly unpleasant smell[188]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

# 5.2.744 Spiraea salicifolia

Bridewort Willowleaf meadowsweet 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Spiraea salicifolia is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: Leaves OilEdible Uses: OilYoung leaves - cooked[177]. Rich in vitamin C[105].

tcanta Hedge Hedge Oil Soil stabilizationA soil stabilizer for river and lakeside banks[200]. Plants are frequently planted in hedges[17].

dwatta Astringent Pectoral Vitamin CThe roots have been used in the treatment of coughs and chest colds[257]. to tone up flabby skin[7]. The root contains up to 20% tan- 5.2.855 Ruta graveolens nin[238].

dwatta Antibiotic Antidiarrhoeal Astringent Dysentery Enuresis Haemostatic Hypoglycaemic OdontalgicContaining more tannin than oak bark, all parts of tormentil are strongly astringent, finding use wherever that action is required. This plant is considered to be one of the safest native astringents and it is widely used in herbal medicine in the treatment of diarrhoea, dysentery, sore throats etc[4, 238, 254]. The whole plant, and especially the root, is antibiotic, strongly astringent, haemostatic and hypoglycaemic[4, 7, 9, 21, 165]. It is used in the treatment of diarrhoea, dysentery, irritable bowel syndrome, colitis, ulcerative colitis etc[254]. Externally, the plant makes a good styptic for cuts etc., and a strongly made decoction has been recommended as a wash for mouth ulcers, infected gums, piles and inflamed eyes[4, 254]. Extracts are used to treat chapping of the anus and cracked nipples[7]. The plant's effectiveness as a toothache remedy is undeniable and it has also been of benefit in treating bedwetting by children[7].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, W. Asia, Siberia. ksacta Grassland, heath, bog, fens, mountain tops and open woods[17], especially in light acid soils[165].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers a light acid soil, disliking heavy and strongly calcareous soils[17]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.854 Scilla scilloides

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Scilla scilloides is a BULB growing to 0.4 m (1ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It. is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - cooked[105, 177]. Bulb[105, 177]. No more details are given. The bulb is up to 2cm in diameter[200].

dwatta PoulticeThe bulbs are pounded and applied to abscesses[218]

nrakta E. Asia - China, Japan, Korea. ksacta Hills and lowland all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow the seed thinly and allow the seedlings to remain in the pot for their first year of growth, giving them liquid feeds if necessary. Prick out the young bulbs, 2-3 to a pot, when dormant and grow them on for their next two years in a frame. Plant them out into their permanent positions when dormant[200]. Division of established clumps when the foliage dies down in the summer[200]. The larger bulbs can be planted out direct into their permanent positions. We have found that it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out when dormant in late summer.

nwatta Succeeds in full sun or light shade in a welldrained humus-rich soil with adequate moisture when in growth[200]. The hardiness of this plant varies according to provenance, the hardiest forms tolerate temperatures down to about -15°c[200]. The flowers have a hyacinth-like aroma[245].

Rue, Common rue, Herb of Grace, Garden Rue 4 tlin 10 cvuc 1 kcak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ruta graveolens is an evergreen Shrub growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to September, and the seeds ripen from August to October. The species is hermanhrodite (has both male and female organs) Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista All parts of this plant are poisonous in large quantities[19]. It should not be used at all by pregnant women since it can induce abortions[165]. The sap contains furanocoumarins, sensitizing the skin to light and causing blistering or dermatitis in sensitive people[200].

kcakta Edible Parts: LeavesEdible Uses: Condiment Rutin TeaLeaves - raw or used as a seasoning[2, 7, 19, 21, 27, 89]. It is occasionally eaten in salads[4], but is strongly aromatic and slightly toxic, so should only be used in small guantities[7, 19, 148, 183]. The taste is strong and bitter[238]. The leaves contain rutin, which has a beneficial effect upon the circulatory system[218]. Some caution is advised, see notes on toxicity above. The leaves can be brewed into a tea[183].

tcanta Dye Essential Repellent StrewingThe growing or the dried plant can be used to repel insects, it is most useful when the plant is grown near roses and raspberries[4, 14, 18, 20, 148]. The dried herb can also be put in the linen cupboard to repel moths[14, 18]. The growing plant is also said to repel cats[20]. A red dye is obtained from the plant[148]. An essential oil is obtained from the leaves and young shoots, it is used in perfumery and as a food flavouring[61]. The plant was formerly used as a strewing herb[148]. Plants can be grown for ground cover when planted about 45cm apart each way[208]. They can be trimmed back in spring to keep them bushy[208].

dwatta Abortifacient Anthelmintic Antidiarrhoeal Antidote Antiinflammatory Antispasmodic Carminative Emetic Emmenagogue Expectorant Haemostatic Homeopathy Ophthalmic Rubefacient Stimulant Stomachic Rue has a long history of use as a domestic remedy, being especially valued for its strengthening action on the eyes[4]. The plant contains flavonoids (notably rutin) that reduce capillary fragility. which might explain the plants reputation as an eye strengthener[238]. Some caution is advised in its use internally, however, since in large doses it is toxic and it can also cause miscarriages[4, 7, 238]. The whole herb is abortifacient, anthelmintic, antidote, antispasmodic, carminative, emetic, emmenagoque, expectorant, haemostatic, ophthalmic, rubefacient, strongly stimulant, mildly stomachic and uterotonic[4, 7, 21, 165, 218]. The tops of fresh shoots are the most active medicinally, they should be gathered before the plant flowers and can be used fresh or dried[4]. An infusion is used in the treatment of hysterical affections. coughs, flatulence etc[4]. The juice of the plant has been used in treating earaches and chewing a leaf or two is said to quickly bring relief from giddiness, nervous headaches, palpitations etc[4]. An alkaloid found in the plant is abortifacient, anti-inflammatory and antispasmodic[218]. A homeopathic remedy is obtained from the fresh herb, harvested in early summer shortly before flowering begins[232]. This is used in the treatment of a variety of complaints including eye strain, headache and sprains[232].

nrakta S. Europe. ksacta Rocks, old walls and dry hills, mainly on limestone[89].

propta Seed - best sown as soon as it is ripe in a cold frame[200], it can also be sown in early to mid spring in a cold frame[14, 27]. When they are large enough to handle. prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of young shoots in late spring[1]. Cuttings of half-ripe wood, July/August in a frame[200]. Very easy[K]. Layering in early summer. Old soil[79], succeeding in a moist border or by water[42, 79]. Grows well in heavy clay soils. The plants are very cold tolerant, but they can be damaged when dormant if the soil is too moist[79]. A very ornamental plant, there are many named varieties[187]. Plant the roots out very shallowly[79]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Suitable for cut flowers.

# 5.2.851 Trillium undulatum

Painted Trillium

4tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.2 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Trillium undulatum is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked. The young unfolding leaves make a good potherb[183].

dwatta OxytoxicThe flowers, sepals and leaves have been eaten to accelerate the delivery of a child[257].

nrakta Eastern N. America - Nova Scotia to Ontario and Wisconsin, south to Georgia and Missouri. ksacta Deep acid humus of pine, spruce, hemlock, oak, mixed deciduous-coniferous woods, rhododendron or mountain laurel thickets in south range, almost any acidic forested situation north, 10 - 1800 m[270].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 -3 months at 15°c. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humusrich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. This species is often found in quite acid soils, seldom in alkaline soils[270]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position it he soil does not dry out[42]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

# 5.2.852 Sedum telephium

Orpine

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.5 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum telephium is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light

(sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves raw or cooked[2, 12, 55, 66, 115, 183]. They have occasionally been used in salads[4]. Root - cooked. Used in soups, stews etc[12]

dwatta Astringent Cytostatic SkinThe whole plant is astringent and cytostatic[4, 66]. It is a popular remedy for diarrhoea, stimulates the kidneys and has a reputation in the treatment of cancer[4]. A poultice of the crushed leaves has been used in the treatment of boils and carbuncles[257].

nrakta Europe, incl Britain, south and east from Scandanavia to the Pyrenees, temperate Asia, N. America. ksacta Hedge banks and the shady sides of damp woods[1, 4, 67].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings can be taken at almost any time in the growing season, though early in the season is probably best.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil that is not too dry[187]. Tolerates poor soils[233]. Succeeds in most soils and is tolerant of guite deep shade[219]. Established plants are drought tolerant[190], they grow well in dry soils and can be grown in crevices on walls[219]. Hardy to about -20°c[187]. This species has pink to red flowers[200]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85], Polymorphic, intergrading with S. caucasicum where their ranges meet. Plants in this genus seem to be immune to the predations of rabbits[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

#### 5.2.853 Potentilla erecta

Tormentil, Erect cinquefoil 4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.3 m hkuc

4 tim 8 cyuc 1 kcak 0 tean 3 dwat 0.3 in nkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla erecta is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Gastrointestinal symptoms if doses over 1g. Interferes with iron absorption and other minerals when taken internally. Avoid if inflammatory or ulcerative bowel disease. Avoid if pregnant or lactating [301].

kcakta Edible Parts: RootEdible Uses: TeaThe roots are extremely rich in tannin, long boiling converts this into a gum and it can then be eaten [115]. An emergency food, it is only eaten when all else fails[177]. A tea is made from the rhizomes[183].

tcanta Cosmetic Dye TanninA red dye is obtained from the roots[4, 66, 115]. The plant, and especially the root, is rich in tannin[4, 7]. It s used cosmetically as a compress Immature seeds have been used in the treatment of diarrhoea with blood[257].

nrakta Europe to E. Asia. Naturalized in Wales and N. Britain[17]. ksacta Wet boggy places in the mountains of N. Japan[58]. More or less naturalized in woods in Wales and N. England[17].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Prefers a moist lime-free soil[182], plants quickly become chlorotic on chalk soils[200]. A very cold hardy plant, tolerating temperatures down to about -25°c[184]. Hybridizes freely with other members of this genus[11]. A rampant suckering shrub, it quickly produces dense thickets[182]. It is apt to get thin and poor unless divided up fairly regularly and replanted in fairly good soil[1].

# 5.2.745 Sanguisorba tenuifolia

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sanguisorba tenuifolia is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

nrakta E. Asia - China, Japan. ksacta Wet meadows and wet places along streams in lowland and mountain areas all over Japan[58].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring.

nwatta Succeeds in ordinary garden soil[1]. Prefers a good moist soil that does not dry out in the summer, in sun or partial shade[187, 200]. Hardy to about -25°c[187]. A polymorphic species[58].

# 5.2.746 Chasmanthium latifolium

Indian Woodoats, Wild Oats Grass, North American Wild Oats, Northern Sea Oats, Spanglegrass River Oa 4 tlin 10 cvuc 1 kcak 0 tcan 0 dwat 1 m hkuc

hmimbut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chasmanthium latifolium is a PERENNIAL growing to 1 m (3ff 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. It can be used as a cereal in making bread, biscuits etc, or can be ground into a flour and used as a mush[177, 257]. A food crop of the Cocopa Indians of Mexico[236].

nrakta South-eastern N. America to northern Mexico. ksacta Moist fertile woodlands[200]. Along stream and river banks and in rich deciduous woods[270].

propta Seed - sow early spring in situ and only just cover the seed[1]. Division in spring[200].

nwatta Landscape Uses:Container, Erosion control. Massing, Seashore, Specimen. Thrives in full sun or dappled shade on rich, moisture-retentive soils sheltered from strong winds[200]. The dried flower heads are sometimes used in flower arranging[274]. Special Features:Attracts birds, North American native, Invasive, Naturalizing, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

#### 5.2.747 Verbena stricta

Hoary Vervain, Hoary verbena 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Verbena stricta is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK 2000 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA tea-like beverage has been made from the leaves[257].

dwatta Febrifuge StomachicThe plant is thought to be specific for fever and ague[207]. An infusion of the leaves has been used in the treatment of stomach aches[257].

nrakta Central N. America - Ontario and Ohio to South Dakota and Wyoming, south to Tennessee and Texas. ksacta Roadsides and other dry open places[60].

propta Seed - sow early spring in a greenhouse or cold frame[1]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in early summer. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any moderately fertile well-drained but moisture retentive soil in a sunny position[1, 200]. Plants are hardy to about -20°c[187]. Plants are often short-lived and sometimes only annual[60]. Hybridizes with V. hastata[200].

# 5.2.748 Cimicifuga dahurica

Xing An Sheng Ma

4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 1.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cimicifuga dahurica is a PERENNIAL growing to 1.5 m (5ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August

to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it does belong to a family that contains a number of toxic species and at least one species in this genus is said to be mildly poisonous. Some caution is therefore advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

dwatta Analgesic Antibacterial Antiviral Depurative Diaphoretic Diuretic Febrifuge Sedative TonicThis plant is an anti-infective herb that lowers fevers and reduces pain[238]. The root is analgesic, antibacterial, antiviral, depurative, diaphoretic, diuretic, febrifuge, sedative, tonic[46, 61, 147, 176, 218]. It is used internally in the treatment of coughs, colds, headaches, gum diseases and feverish infections such as measles[238]. The root is harvested in the autumn and used fresh or dried[238]. Use with caution[176], see the notes above on toxicity.

nrakta E. Asia - China, Japan, Mongolia, Siberia. ksacta Forest margins, shrub thickets, forests and very dry places in valley meadows[74].

propta Seed - best sown as soon as it is ripe in a cold frame[1]. Only just cover the seed. It germinates in 1-12 months or even longer at 15°c[164]. The seed does not store well and soon loses its viability[200], stored seed may germinate better if given 6 - 8 weeks warm stratification at 15°c and then 8 weeks cold stratification[164]. Prick out the young seedlings into individual pots when they are large enough to handle and grow them on in a frame for their first winter. Plant out in late spring or early summer[K]. Division in spring or autumn[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

mwatta Prefers a moist humus rich soil and some shade[1, 200]. Succeeds in ordinary garden soil[1]. Grows well in a cool moist site in a woodland[200]. The flowers have an unusual, slightly unpleasant smell[188]. A greedy plant, inhibiting the growth of nearby plants, especially lequmes[54].

# 5.2.749 Grindelia lanceolata

Rosin Weed, Narrowleaf gumweed, Texan gumweed 4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Grindelia lanceolata is a BIENNIAL/PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: Gum TeaThe following reports are for the related G. squarrosa, they probably also apply to this species[222]. The fresh or dried leaves can be used to make an aromatic, slightly bitter but pleasing tea[183]. A sticky resinous sap that covers the leaves can be used as a chewing qum substitute[183].

tcanta Dye GumThe following report is for the related G. squarrosa, it probably also applies to this species[222]. Yellow and green dyes are obtained from the flowering heads and bods[168]. Aromatic.

dwatta Antispasmodic Eczema Expectorant SedativeThe following reports are for the related C. squarrosa, they also apply to this species[222]. Rosin weed was used by the native North American Indians to treat bronchial problems and also skin afflictions such as reactions to poison ivy[254]. It is still used in modern herbalism where it is valued especially as a treatment for bronchial asthma and for states where

phlegm in the airways impedes respiration[254]. In addition, it is believed to desensitize the nerve endings in the bronchial tree and slow the heart rate, thus leading to easier breathing[254]. The plant merits investigation as a treatment for asthma[222]. The herb is contraindicated for patients with kidney or heart complaints [254]. The dried leaves and flowering tops are antiasthmatic, anti-inflammatory, antispasmodic, expectorant and sedative[4, 46, 207, 212, 238, 2541. The principal use of this herb is in the treatment of bronchial catarrh, especially when there is an asthmatic tendency, it is also used to treat whooping cough and cystitis[4, 2541. The active principle is excreted from the kidneys, and this sometimes produces signs of renal irritation[4, 238]. Externally, the plant is used as a poultice to treat burns, poison ivy rash, dermatitis, eczema and skin eruptions[212, 213, 222, 238]. The plant is harvested when in full bloom and can be used fresh as a poultice or dried for infusions etc[254]. A fluid extract is prepared by placing the freshly gathered leaves and flowers in a small quantity of simmering water for about 15 minutes[213]. A homeopathic remedy is prepared from the leaves and flowering stems[4].

nrakta Central and Southern N. America - Tennessee to Missouri, Kansas, Louisiana and Texas. ksacta Dry souls[235] on prairies and roadsides[222]. Calcareous soils in Texas[274].

propta Seed - sow autumn or spring in a cool greenhouse and only just cover the seed. Prick out the plants into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. Division as new growth commences in the spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings.

nwatta Succeeds in any well-drained soil in full surgesting soils [200]. Does well on dry sandy banks and in poor soils[200]. Grows mainly in calacareous soils in the wild[274]. Prefers a peaty loam soil[1]. This is one of the first species to invade disturbed or denuded ground and often becomes a serious weed of grazing land[212]. A very polymorphic plant[43].

# 5.2.750 Xerophyllum tenax

Indian Basket Grass, Common beargrass 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Xerophyllum tenax is an evergreen Perennial growing to 1.2 m (4ft) by 2 m (6ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: RootEdible Uses: Root - baked[92]. tcanta Basketry Fibre WeavingA watertight basket can be made from the leaves[21, 46, 61, 99, 257]. This basket has been used for cooking food in[257]. The fibres are split from the leaves and then used[92]. The plant is also used to decorate baskets[257]. The small leaves have been used to make dresses[257]. The plants were burnt every year. The leaves were harvested in the spring when they first started to grow out of the charred rhizome. Prior to using, the leaves were soaked in water to make them pliable, but if left too long they turned green[257]. The dried and bleached leaves are used for weaving into hats and causes[207, 257].

dwatta Ophthalmic StypticThe roots are styptic[257]. A poultice of the chewed root has been applied to wounds[257]. A decoction of the grated root has been used as a wash on bleeding wounds, sprains and broken limbs[257]. The washed roots have been rubbed to make a lather and then used to wash sore eyes[257].

nrakta Western N. America - British Columbia to California. ksacta Dry sunny hills and open woods[187]. Moist places in open woods and clearings, from sea level to 2100 metres[1,60].

dwatta Analgesic Antibacterial Anticoagulant Antipruritic Antirheumatic Antispasmodic Antitumor Astringent Bach Birthing aid Depurative Diaphoretic Diuretic Dysentery Eczema Emmenagogue Galactogogue Stimulant Tonic VulneraryVervain, which has tonic and restorative properties, is sometimes used as a domestic herbal remedy. It is useful when taken internally in the treatment of headaches, fevers nervous exhaustion, depression, gall bladder problems, insufficient lactation etc[4, 238]. It should not be given to pregnant women, though it can be used to assist contractions during labour[238]. Externally, it is used to treat minor injuries, eczema, sores, neuralgia and gum disease[238]. The leaves and flowering stems are analgesic, antibacterial, anticoagulant, antispasmodic, astringent, depurative, diaphoretic, mildly diuretic, emmenagogue, galactogogue, stimulant, tonic and vulnerary[4, 9, 21, 147, 165, 176, 218, 238]. The plant is harvested as flowering begins in the summer and dried for later use[7, 238]. Some remarkable results have been obtained when using this plant in the treatment of certain tumours, but further research needs to be carried out before definite claims can be made[7]. The root is astringent. it is used in the treatment of dysentery[218]. This species was ranked 12th in a Chinese survey of 250 potential antifertility plants[218]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Strain', 'Stress', 'Tension' and 'Over-enthusiasm'[209].

nrakta Europe, including Britain, from Denmark south and east to N. Africa, W. Asia to the Himalayas. ksacta Waste ground and roadsides, avoiding acid soils and shady positions[4, 7, 17].

propta Seed - sow early spring in a greenhouse and only just cover the seed. Germination should take place within 3 weeks. Prick out the seedlings into individual pots once they are large enough to handle and plant them out in early summer. If you have sufficient seed, it can also be sown in situ in late spring. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in early summer. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta A very easily grown plant, it succeeds in any moderately fertile well-drained but moisture retentive soil in a sunny position[1, 200]. Plants are very tolerant of neglect and will maintain themselves for a number of years even when growing in dense weed competition[K]. Self-sows freely when growing in a suitable position[K]. The growing plant attracts butterflies and moths[30].

#### 5.2.849 Hosta sieboldii

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hosta sieboldii is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105, 177]. Not very tastv[116].

tcanta Suitable for ground cover, the plants should be spaced about 35cm apart each way[208].

nrakta E. Asia - Japan. ksacta Lowland moors and meadows, usually fully exposed to the sun[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and

grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. This species tolerates dryish conditions[121]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position [200]. The leaves turn vellowish when the plant is grown in full sun[121]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. Forming mediumsized clumps, the rhizome is short and creeping[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111. K]. There are some named forms, selected for their ornamental value[187]. Hybridizes freely with other members of this genus[200].

# 5.2.850 Iris sibirica

Siberian Iris

4 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

druttå Iris sibiricå is a PEŘENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: RootEdible Uses: Root - an edible starch is said to be extracted from it[2, 105, 177]. The root is not eaten in China[178]. Some caution is advised since there are reports that the plant might be poisonous. Perhaps the extracted starch is edible

tcanta InsecticideAn insecticide is obtained from the plant[178]. (from the root?)

dwatta ExpectorantExpectorant[178].

nrakta C. Europe to Russia. ksacta Damp woodland[50], pastures and heaths[100]

propta Seed - Dest sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in August/September after flowering but can also be done in April. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Specimen, Woodland garden. Prefers a humus-rich

toadflax has a long history of herbal use. It acts mainly on the liver and was once widely employed as a diuretic in the treatment of oedema[238]. It is little used now, but undoubtedly merits investigation[238]. The whole plant is antiphlogistic, astringent, cathartic, detergent, depurative, diuretic, hepatic, ophthalmic and purgative[4, 7, 9, 21]. It is gathered when just coming into flower and can be used fresh or dried[4, 238]. The plant is especially valued for its strongly laxative and diuretic activities[4]. It is employed internally in the treatment of oedema, jaundice, liver diseases, gall bladder complaints and skin problems[4, 222, 238]. Externally it is applied to haemorrhoids, skin eruptions, sores and malignant ulcers[238]. The plant should be used with caution. It should preferably only be prescribed by a qualified practitioner and should not be given to pregnant women[238]. Dosage is critical, the plant might be slightly toxic[21, 238]. The fresh plant, or an ointment made from the flowers, is applied to piles, skin eruptions etc[4, 222]. The juice of the plant, or the distilled water, is a good remedy for inflamed eyes and cleaning ulcerous sores[4]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of diarrhoea and cystitis[9].

nrakta Europe, including Britain, from Norway south and east to the Pyrenees, Greece and W. Asia. ksacta Hedgerows, by ditches, on dry banks and roadside verges. It is especially abundant in sandy and gravelly soils, and in chalk and limestone districts, and avoids acid soils[4, 7].

propta Seed - sow early spring in situ. Division in April or the autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. This species can be divided successfully at almost any time in the growing

nwatta Succeeds in a moderately good well-drained soil[1]. Grows best in a neutral to alkaline soil[238]. It prefers a sunny position[111] but also succeeds in semishade[219]. A very drought resistant plant once established[200], it can be grown in a drystone wall[219]. Plants can spread fairly aggressively at the roots when they are in a suitable position[K]. They also often self-sow freely[238].

# 5.2.846 Euonymus macropterus

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euonymus macropterus is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177]. Some caution is advised, see the notes above on possible toxicity.

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Mixed and coniferous forests and thickets in the mountains of C. and N. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[121]. Stored seed requires 3 months cold stratification, so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 7cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a welldrained loamy soil[11]. Plants are hardy to about -25°c[184].

#### 5.2.847 Trillium kamtschaticum

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Trillium kamtschaticum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[105]. No more details are given.

dwatta MiscellanyThe root contains steroidal saponins. which have hormonal effects on the body[222, 238]. They are being used in gynaecological and obstetric medicine[238].

nrakta E. Asia - Japan, Korea. ksacta Humus-rich soils in woodlands, N. Japan[58, 200]. Forests, forest margins and moist places at elevations of 500 - 1400 metres in Jilin province in China[266].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 -3 months at 15°c. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst vet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humusrich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

# 5.2.848 Verbena officinalis

Vervain, Herb of the cross, Prostrate verbena 4 tlin 8 cvuc 1 kcak 0 tcan 3 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Verbena officinalis is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from April to October, in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista High doses of verbenalin can cause nervous system paralysis resulting in stupor and convulsion. Allopathic medicine for high blood pressure can be effected by vervain. Uterus stimulation possible - avoid during pregnancy. Avoid if breast feeding. If allergies or fits use with caution [301].

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaLeaves - parboiled, seasoned and then eaten[183]. The leaves are used as a tea substitute[7, 183]. The flowers are used as a garnish[183].

but suggest sowing the seed in a cold frame as soon as it is ripe if possible, otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division as the plant comes into growth in the spring.

nwatta Requires a well-drained soil in full sun[187]. Prefers a fairly moisture-retentive sandy peaty soil[1, 200]. Requires a damp peaty soil[233]. Plants can be difficult to cultivate[188]. Plants are hardy to about -20°c[187], especially if the roots are given a good mulch in the winter[200]. If left undisturbed, plants can form guite large colonies, spreading by means of their tough rhizomes[200]. Plants do not flower every year, there are often gaps of 5 - 7 years between flowering[212].

# 5.2.751 Ageratina aromatica

4 tlin 8 cvuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ageratina aromatica is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is selffertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: RootEdible Uses: One report says that the root is aromatic and suggests that it could be edible[177].

dwatta Antispasmodic Diaphoretic Diuretic ExpectorantThe plant is antispasmodic, diaphoretic, diuretic and expectorant[61]. It is used in the treatment of inflammation and irritability of the bladder[4], ague, pulmonary diseases, stomach complaints and nervous diseases[207].

nrakta Eastern N. America. ksacta Dry woods, thickets and clearings[43]

propta Seed - sow spring in a cold frame, only just covering the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Succeeds in an ordinary well-drained but moisture retentive garden soil in sun or part shade[200].

# 5.2.752 Iris germanica

Purple Flag, German iris, Orris-root, Tall Bearded German Iris. Bearded Iris

4 tlin 10 cvuc 1 kcak 0 tcan 3 dwat 1 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Iris germanica is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The leaves, and especially the rhizomes, of this species contain an irritating resinous substance called irisin. If ingested this can cause severe gastric disturbances[274]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: Edible Uses: CondimentThe root is dried and used as a flavouring[105, 183].

tcanta Baby care Beads Cosmetic Dve EssentialThe root is a source of Orris powder which has the scent of violets[238]. It is obtained by grinding up the dried root[4, 7, 46]. It is much used as a fixative in perfumery and pot-pourri, as an ingredient of toothpastes, breath fresheners etc and as a food flavouring. The root can take several years of drying to fully develop its fragrance, when fresh it has an acrid flavour

propta Seed - we have no information for this species and almost no smell[4, 168]. An essential oil is obtained from the fresh root, this has the same uses as the root[57, 61]. The juice of the root is sometimes used as a cosmetic and also for the removal of freckles from the skin[4]. A black dve is obtained from the root[168]. A blue dye is obtained from the flowers[168]. The seeds are used as rosary beads[61].

> dwatta Diuretic Emetic Expectorant PurgativeThe root is diuretic, emetic, expectorant and mildly purgative[7, 9, 61]. Another report says that the juice of the fresh root is a strong purge of great efficiency in the treatment of dropsy[4]. In the past, sections of the dried root have been given to teething babies to chew on, though this has been discontinued for hygienic reasons[9]. Roots of plants 2 - 3 years old are dug up after flowering and are then dried for later use[7].

> nrakta The original habitat is obscure, it is probably of hybrid origin, ksacta Dry rocky places[187]

> propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. A sterile plant, it does not produce seed[233]. Division, best done after flowering. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

> nwatta Landscape Uses:Border, Container, Massing, Rock garden, Specimen. A very easily grown plant that tolerates considerable neglect[233], it prefers a sunny position in a well-drained soil that contains some lime[1, 79]. Grows well in dry soils in light deciduous shade[187]. Succeeds in full sun or partial shade [79]. Prefers a pH in the range 6 to 7.5 or higher[200]. Many named varieties have been selected for their ornamental value[187]. The plant is also sometimes cultivated for the essential oil in its root[9]. The plant is sterile and does not produce seed[233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Not North American native, All or parts of this plant are poisonous, Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

#### 5.2.753 Kalimeris incisa

4 tlin 8 cvuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Kalimeris incisa is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young plants - cooked[105, 177].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Meadows and waste ground in lowland C, and S, Japan [58].

propta Seed - sow spring in a greenhouse and only just cover. Keep the compost moist. The seed usually germinates in 2 - 3 weeks at 15°c[138]. Grow on in cool conditions, about 10°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. This should be done at least every 3 years in order to maintain the vigour of the

nwatta Prefers a moist loamy soil[138] though it succeeds in most soils[1].

# 5.2.754 Salvia glutinosa

Jupiter's Distaff, Sticky Sage 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1.2 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia glutinosa is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August.

The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment GumThe aromatic leaves are used as a flavouring in country wines[183].

tcanta GumAn aromatic gum is obtained from the plant[244]. No details are given of an uses for this gum[K]. Plants can be grown as a ground cover when spaced about 75cm apart each way[208]. They are useful for colonizing large areas[208].

nrakta Europe to W. Asia. ksacta Scrub and moist places in deciduous forests[187].

propta Seed - sow March/April in a greenhouse[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Succeeds in any good soil in full sun or partial shade[187]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Plants are hardy to about -20°c[187]. During the summer the whole plant becomes covered in a tacky substance like a fragrant gum[245]. This species has a running root system and can spread freely[233]. Plants can be killed by excessive winter wet[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.755 Pycnanthemum flexuosum

Mountain Mint, Appalachian mountainmint 4 tiin 8 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pycnanthemum flexuosum is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta One report says that the plant is used for food, but gives no details[257].

dwatta Analgesic Diaphoretic Febrifuge StomachicThe leaves and flowering stems are popularly used in the treatment of bowel complaints[207]. A hot infusion of the plant is diaphoretic[207]. The plant is also used internally in the treatment of stomach upsets, fevers, colds and sinus headaches[238, 257]. A poultice of the leaves is used in the treatment of headaches[257]. A warm infusion of the plant has been used to bathe an inflamed penis[257]. The plant is harvested as it comes into flower and can be used fresh or dried.

nrakta Eastern N. America - Maine to Florida, New York, Minnesota, Kansas and Texas. ksacta Upland prairies, pastures, meadows, open woodland and roadsides[228].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If there are sufficient seeds they can be sown in an outdoor seedbed in April. Division in spring.

nwatta Succeeds in most soils[1] but prefers a rich loamy soil in full sun or partial shade with plenty of moisture in the growing season[200]. Hardy to at least -15°c[200]. The correct name for this species should be P. tenuifolium. Schrad.[228]. The bruised leaves are very aromatic[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.756 Monarda clinopodia

White Basil-Balm, White bergamot 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Monarda clinopodia is a PERENNIAL growing to 1.3 m (4ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe fresh or dried leaves and flower heads are brewed into a tea. Said to be excellent when mixed with other teas[183].

nrakta Eastern N. America - New York to Illinois, Georgia and Kentucky, ksacta Woods and thickets[235].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°c. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1]. Requires a moist soil and a sunny position[1, 200]. Likes some shade. A good bee plant. Plants are subject to mildew in dry summers[200].

# 5.2.757 Salix brachycarpa

shortfruit willow

4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 1.4 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix brachycarpa is a deciduous Shrub growing to 1.4 m (4ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - not very palatable[172].

tcanta ShelterbeltA salt tolerant coastal plant, it can be grown as part of a shelterbelt[200]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta N. America - Canada to Oregon. S. Greenland. ksacta Found in a wide range of habitats, including saline, calcareous and serpentine, from lowland to alpine elevations (2041.

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and

zone 5. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: Leaves SeedEdible Uses: Young stems and leaves[105, 145]. A famine food, only used in times of scarcity[218]. The spores are produced in a sporocarp (like a fairly large container) and in allied species this is ground up and mixed with flour etc and used in making bread etc. It is rich in starch[144].

dwatta Antidote Antiphlogistic Depurative Diuretic Febrifuge SkinA juice made from the leaves is diuretic and febrifuge[218]. It is also used to treat snakebite and applied to abscesses etc[218]. The plant is anti-inflammatory, diuretic, depurative, febrifuge and refrigerant[147, 178, 218].

nrakta C. Europe to Asia. ksacta Ponds and paddy fields all over [apan[58].

propta Spores. The plant produces sporocarps, these need to be lightly abraded and then immersed in water. The sporocarps will then swell and burst to release the spores. The spores germinate immediately, the highly developed prothallus remains inside the large seed-like spores. The gametophyte generation is completed in 24 hours and the first roots and shoots appear in 2 - 3 days. Mature plants bearing sporocarps can develop in as little as 3 months[200]. Spore germination in the family occurs after rupture of the sporocarp wall allows the sporocarp contents to be hydrated. A gelatinous structure emerges from the sporocarp, breaking it into valves and carrying the sori into the water. Spore germination (gametophyte growth) and fertilization occur immediately[270]. Division.

nwatta Requires a permanently moist or wet soil, it can be grown by the side of ponds etc or in the shallow edges of the pond[56]. Thrives in a turfy loam or in peat[1]. Hardy to about -15°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.844 Gentiana pannonica

4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Gentiana pannonica is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta The root is sometimes used in the manufacture of gentian bitters[183].

dwatta Anthelmintic Antiinflammatory Antiseptic Bitter Cholagogue Emmenagogue Febrifuge Refrigerant Stomachic TonicThis species is one of several that are the source of the medicinal gentian root[4], the following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagoque, emmenagoque, febrifuge, refrigerant, stomachic[4,

7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta C. Europe. ksacta Meadows and pastures, screes and grassy bottoms of alpine corries, amongst dwarf pine and in forests[239]. It is found on both limestone and acid rocks[239].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surfacesown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division of older plants in March[111, 239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200] 239]. Most species will grow well in the rock garden[200]. This species is not particular about soil type, so long as it is deep enough to accommodate the plant's roots[239]. Although sometimes found wild on alkaline soils, it prefers a neutral to slightly acid soil in cultivation[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. This species is closely related to G. punctata and G. purpurea[239]. Plants are intolerant of root disturbance [200]. The flowers have the scent of the old tea rose[245].

# 5.2.845 Linaria vulgaris

Yellow Toadflax, Butter and eggs 4 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutia Linaria vulgaris is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista One report suggests that the plant might be slightly toxic[76].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[7]. Use with caution, see the notes above on toxicity.

tcanta Dye InsecticideA yellow dye is obtained from the whole plant[7, 13]. It is obtained from the flowers according to other reports[4, 100]. A tea made from the plant has been used as an insecticide[222]. A good bee plant[24]. Dynamic accumulator

dwatta Antiphlogistic Astringent Cathartic Detergent Diuretic Hepatic Homeopathy Ophthalmic PurgativeYellow

Woodland garden. Prefers a sandy humus-rich soil in a shady position that is moist even in winter[1]. Tolerates part sun for up to 6 hours a day if the soil remains moist[200]. Prefers a pH in the range 6.5 to 7.5[200]. A very ornamental plant, it is hardy in all parts of Britain but is best grown in a greenhouse[1]. Members of this genus are rarely if ever troubled by browsing deer[233]. Remove old fronds from the plant in the spring because they may harbour fungal diseases[200]. Special Features: Attractive foliage, North American native, Attracts butterflies. There are no flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

#### 5.2.840 Geranium incanum

Geranium, Cranesbill

4 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geranium incanum is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 9 and is not frost tender. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are a tea substitute[183].

nrakta S. Africa. ksacta Scrub, dunes and forest clearings[187]

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden. Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. Plants are not very hardy in Britain[200]. They tolerate occasional falls in temperature down to about -10°c, though if killed by cold they usually reappear from seed[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The plant often adopts a climbing habit, sprawling through scrub[187]. Special Features:Attractive foliage, Fragrant foliage, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms.

#### 5.2.841 Incarvillea sinensis

4tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.9 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Incarvillea sinensis is a ANNUAL/PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils to an grow in semi-shade (light woodland) or no shade. It

prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista One report suggests that the plant might be slightly toxic[179].

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - cooked. A famine food, it is only used when all else fails[179]. Some caution is advised, see the notes above on toxicity.

dwatta SkinThe plant is used to treat skin ailments, spongy gums and ulcers[218].

nrakta E. Asia - N. China, Manchuria. ksacta Sandy and rocky places, embankments and old walls from 400 - 2100 metres, often in wind-swept sites[214].

propta Seed - sow autumn or spring in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow on for at least their first winter in a greenhouse and plant out into their permanent positions in spring after the last expected frosts. Division with care in early spring or autumn.

nwatta Easily grown in a deep well-drained sandy but rich soil in full sun[1, 200]. Plants grow better if they are given some shade around midday[200]. Dislikes dry summer soils and winter wet[200]. One report says that this species should be grown in a greenhouse[1] whilst another says that it is hardy to about -15°, tolerating lower temperatures if the roots are well mulched, preferably with dry bracken[200]. The crown of the plant requires protection from slugs in the winter[187]. A very ornamental plant, it usually takes about 1 - 2 years to come into flower from seed[1]. A variable species[214], some forms are perennial whilst others are annual[1]. I. sinensis sinensis is an annual whilst I. sinensis variabilis (Batal.) Grierson is a perennial [200]. Plants are intolerant of root disturbance, it is best to place them in their permanent positions whilst small[200]. The plants will often sulk for several years if they are divided[214].

# 5.2.842 Spiraea betulifolia aemiliana

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Spiraea betulifolia aemiliana is a deciduous Shrub growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are a tea substitute[177, 183].

nrakta E. Asia - Japan. ksacta High mountains, N.

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Hybridizes freely with other members of this genus[11].

# 5.2.843 Marsilea quadrifolia

Water Clover, European waterclover 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Marsilea quadrifolia is a FERN growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK

given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Very tolerant of maritime exposure[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.758 Lysimachia vulgaris

Yellow Loosestrife, Garden yellow loosestrife 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lysimachia vulgaris is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Young leaves[105, 177]. No more details are given.

tcanta DyeA yellow dye is obtained from the flowers[13, 100]. A brown dye is obtained from the rhizomes[13]. The growing plant repels gnats and flies, it has been burnt in houses in order to remove these insects[4].

dwatta Antidiarrhoeal Astringent Demulcent Dysentery ExpectorantAn astringent herb, yellow loosestrife is principally used to treat gastro-intestinal conditions such as diarrhoea and dysentery, to stop internal and external bleeding and to cleanse wounds[254]. The herb is astringent, demulcent and expectorant[4, 61]. It is harvested when in flower in July and dried for later use[4]. The plant can be used internally or externally and is useful in checking bleeding of the mouth, nose and wounds, restraining profuse haemorrhages of any kind and in the treatment of diarrhoea[4]. It makes a serviceable mouthwash for treating sore gums and mouth ulcers[254].

nrakta Most areas of Europe and Asia, including Britain, but excluding the extreme north and south. ksacta Marshes, streams and in shallow water in reed swamps[187]. Shady places near water, avoiding acid soils[4, 17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings, March to April in a cold frame. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, succeeding in a moist or wet loamy soil in sun or partial shade[187]. Prefers a shady position[111]. Grows well in heavy clay soils. Hardy to at least -25°c[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. A very ornamental plant[1]. The sub-species L. vulgaris davurica. (Ledeb.)Kunth. is the form used for food in China and lapan[177].

# 5.2.759 Sorbus sitchensis

Sitka Mountain Ash, Western mountain ash 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Sorbus sitchensis is a deciduous Shrub growing to  $1.8~\mathrm{m}$  (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone  $5.~\mathrm{lt}$  is in lower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, preserves etc[62, 105, 161, 183]. Of poor quality[256]. The fruit turns sweeter and so tastes best after a frost[101]. The fruit is produced in clusters, each fruit being about 6 - 12mm in diameter[229].

tcanta Parasiticide Pioneer WoodThis species is capable of growing in exposed conditions in poor soils[229], and so could be used in re-afforestation as a pioneer plant to provide suitable conditions for other woodland trees to be established[K]. It is rather slow-growing, however, and would only be used in situations where faster species were not so suitable[K]. The berries have been rubbed onto the scalp in order to get rid of lice[257]. Wood - moderately light with little strength, it is of no commercial value[229].

dwatta Antirheumatic Enuresis Kidney Parasiticide StomachicAn infusion of the branches has been given to young children with bed-wetting problems[257]. An infusion of the root and branch bark has been drunk in the treatment of stomach problems and rheumatism[257]. The infusion can also be used externally as a bath for treating rheumatism[257]. A decoction of the root and branch bark has been used as an eyewash[257]. The bark has been chewed in the treatment of colds[257]. An infusion of the branches has been used in the treatment of weak kidneys in order to stop the frequent urination[257].

nrakta Western N. America - Alaska to California, east to Idaho and Montana. ksacta Found mainly on rich moist soils along the borders of streams, or rocky hillsides, usually in association with conifers[229].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates light shade[188], though it fruits better in a sunny position[K]. This species is able to succeed in poor soils and to become established on exposed broken ground[229], it is thus suitable for use as a pioneer species in re-establishing woodland[K]. A slow-growing shrub in the wild, it can sometimes become a small tree up to 9 metres tall[229]. It usually produces abundant crops of fruit every year[229]. Plants are susceptible to fireblight[188].

# 5.2.760 Lonicera utahensis

Utah Honevsuckle

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lonicera utahensis is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium

(loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[212, 257]. The fruit is about 1cm in diameter[60].

dwatta Laxative SalveThe branches are mildly laxative[257]. An infusion of the branches and leaves has been used as a wash on sores and infections[257].

nrakta Western N. America - British Columbia to Oregon, Utah, Wyoming and Montana. ksacta Moist wooded or open slopes at moderate to rather high elevations in the mountains[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autuml[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200]. Closely related to L. canadensis[212].

#### 5.2.761 Artemisia absinthium

Wormwood, Absinthium.

4 tlin 9 cyuc 1 kcak 2 tcan 3 dwat 1 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Artemisia absinthium is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant is poisonous if used in large quantities[20, 61]. Even small quantities have been known to cause nervous disorders, convulsions, insomnia etc[222]. Just the scent of the plant has been known to cause headaches and nervousness in some people[169]. The plant contains thujone. In small quantities this acts as a brain stimulant but is toxic in excess[254]. Avoid if prone to seizures. Avoid during pregnancy and breast feeding. Absinthism adverse effects include hallucinations, insomnia, loss of intellect, psychosis, tremor and seizures [301].

kcakta Edible Parts: Edible Uses: CondimentLeaves are occasionally used as a flavouring[27, 177, 183]. Caution is advised, prolonged use is known to have a detrimental effect see the notes above on toxicity[K]. Absinthe - a distilled, highly alcoholic drink usually produced in France, Switzerland, Australia, Spain, and the Czech Republic.

tcanta Repellent StrewingThe fresh or dried shoots are said to repel insects and mice[6, 18, 20, 169], they have been laid amongst clothing to repel moths and have also been used as a strewing herb[4, 14, 257]. An infusion of the plant is said to discourage slugs and insects[14, 18, 201]. The plant contains substances called sesquiterpene lactones, these are strongly insecticidal[254].

dwatta Anthelmintic Antiseptic Antispasmodic Appetizer Carminative Cholagogue Emmenagogue Febrifuge Homeopathy Hypnotic Stimulant Stomachic Tonic VermifugeWormwood is a very bitter plant with a long history of use as a medicinal herb. It is valued especially for its tonic effect on the liver, gallbladder and digestive system, and for its vermicidal activity[4, 238, 254]. It is an extremely useful medicine for those with weak and underactive digestion. It increases stomach acid and bile production, improving digestion and the absorption of nutrients[254]. It also eases wind and bloating and, if taken regularly, helps the body return to full vitality after a prolonged illness[254]. The leaves and flowering shoots are an

thelmintic, anti-inflammatory, antiseptic, antispasmodic, antitumor, carminative, cholagogue, emmenagogue, febrifuge, hypnotic, stimulant, stomachic, tonic and vermifuge[4, 9, 21, 46, 165, 222, 254]. The plant is harvested as it is coming into flower and then dried for later use[4]. Use with caution[21], the plant should be taken internally in small doses for shortterm treatment only, preferably under the supervision of a qualified practitioner[238]. It should not be prescribed for children or pregnant women[238]. See also the notes above on toxicity. The extremely bitter leaves are chewed to stimulate the appetite[222]. The bitter taste on the tongue sets off a reflex action, stimulating stomach and other digestive secretions[254]. The leaves have been used with some success in the treatment of anorexia nervosa[244]. The plant is applied externally to bruises and bites[238]. A warm compress has been used to ease sprains and strained muscles[257]. A homeopathic remedy is made from the leaves[9]. It is used to stimulate bile and gastric juice production and to treat disorders of the liver and gall bladder[9].

nrakta Temperate regions of Europe and Asia, including Britain, north to Lapland and Siberia. ksacta Waste land, rocks and screes[4, 9, 100].

propta Seed - surface sow from late winter to early summer in a greenhouse. The seed usually germinates within 2-26 weeks at 15°c[134]. When they are large enough to handle, prick the seedlings out into individual pots. They can be planted out in the summer, or kept in pots in a cold frame for the winter and then planted out in the spring. Cuttings of half-ripe wood, July/August in a frame. Division in spring or autumn.

nwatta Landscape Uses:Border, Ground cover, Seashore. Succeeds in any soil but it is best in a poor dry one with a warm aspect[37]. Established plants are very drought tolerant[190, 200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Prefers a shady situation according to another report[4]. Tolerates a pH in the range 4.8 to 8.2. Wormwood is occasionally grown in the herb garden, there are some named forms[187]. The growing plant is said to inhibit the growth of fennel, sage, caraway, anise and most young plants, especially in wet years[14, 18, 20]. Wormwood is a good companion for carrots, however, helping to protect them from root fly[201]. This herb was at one time the principal flavouring in the liqueur 'Absinthe' but its use has now been banned in most countries since prolonged consumption can lead to chronic poisoning, epileptiform convulsions and degeneration of the central nervous system[244]. The scent of the plant attracts dogs[169]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, Suitable for dried

# 5.2.762 Lycopus europaeus

Sypsywort

4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 1 m hkuc

hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lycopus europaeus is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista Known to cause the enlargement of the thyroid gland. Avoid in patients with thyroid disease or given concomitantly with thyroid therapy. Avoid during pregnancy [301]

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked. A famine food, it is only used when all else fails[179]. tcanta Dye MiscellanyA black dye is obtained from the

tcanta Dye MiscellanyA black dye is obtained from the plant[4, 100]. It is said to give a permanent colour and was also used by gypsies in order to darken the skin[4].

dwatta Astringent Miscellany Poultice SedativeThe fresh or dried flowering herb is astringent and sedative[4]. It

nrakta Central and southern Europe. ksacta Woods and scrub[187]. Shaded positions in deep humus-rich soils[200].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn or after flowering in early summer if the soil is not too dry[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Specimen, Woodland garden. Grows well in any moderately good soil including heavy clay soils[1, 31]. Prefers full to part shade in a moist humus rich soil[200]. Succeeds in the sunless shade of buildings[200]. Dislikes dry soils[200]. Plants growing in shady positions tolerate drought if the soil is rich in humus[190]. The leaves tend to wilt in hot weather when the plant is grown in full sun[190]. Hardy to about -20°c[187]. A very ornamental plant[233], it is semi-evergreen, forming small overwintering rosettes[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A valuable early nectar source for bees[200]. Plants seen growing in dappled shade at Hilliers Arboretum in April 1999 were selfsowing quite freely[K]. Hybridizes freely with other members of this genus[200]. There are many named varieties, selected for their ornamental value [200]. Special Features: Attractive foliage.

# 5.2.837 Acinos alpinus

Alpine Calamint

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Acinos alpinus is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves are used as a flavouring in cooked dishes[183] and also as a tea substitute[148].

dwatta Diaphoretic FebrifugeDiaphoretic, febrifuge[148]. nrakta C. and S. Europe ksacta Dry sunny habitats in mountains and rocky places[50, 148].

propta Seed - sow early spring in a cold frame. If you have sufficient seed then you could try sowing in situ in April or May. Germination should take place within a month. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Basal cuttings in late spring.

nwatta Succeeds in almost any well-drained soil, doing well in a hot dry soil[200].

#### 5.2.838 Crocus cancellatus

4tlin8cyuc1kcak0tcan0dwat $0.1\ m$ hkuc

thut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Crocus cancellatus is a CORM growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from March to July, in flower from September to November, and the seeds ripen from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, butterflies. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Corm - cooked[89]. Used when the bulb is sprouting, it is prized as a vegetable[2].

nrakta N. Africa to W. Asia - N. Palestine to Armenia. ksacta Rocky hillsides and open woods, to 1800 metres[50].

propta Seed - best sown as soon as it is ripe in a light sandy soil in pots in a cold frame[1]. The seed can also be sown in a cold frame in early spring[1]. Sow thinly because the seed usually germinates freely[1], within 1 - 6 months at 18°c[164]. Unless the seed has been sown too thickly, do not transplant the seedlings in their first year of growth, but give them regular liquid feeds to make sure they do not become deficient. Divide the small bulbs once the plants have died down, planting 2 - 3 bulbs per 8cm pot. Grow them on for another 2 years in a greenhouse or frame and plant them out into their permanent positions when dormant in late summer[K]. Plants take 3 - 4 years to flower from seed[200]. Division of the clumps after the leaves die down in spring[1, 200]. The bulbs can be replanted direct into their permanent positions if required.

nwatta Grows best on a gritty well-drained slope[42]. Plants succeed outdoors if they are given perfect drainage in a warm sunny position[200], otherwise they are better grown in a bulb frame[90]. Bulbs should be planted 5 - 7cm deep in the soil[79]. June is the best time to do this[245]. This species includes C. edulis, which is a synonym of C. cancellatus damascenus[42]. The corms are sold in local markets in Syria[89]. Plants tend to move considerably from their original planting place because of their means of vegetative reproduction, it is therefore wise not to grow different species in close proximity[1]. The flowers are only open during the day time, closing at night[245].

# 5.2.839 Polystichum acrostichoides

Christmas Fern

4 tlin 9 cvuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis

drutta Polystichum acrostichoides is an evergreen Fern growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: Young fronds[159, 257]. No more details are given, but they are probably harvested as they unfurl and eaten cooked.

dwatta Antiaphonic Emetic PoulticeChristmas fern was employed medicinally by several native North American Indian tribes, who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. A tea made from the root is blood purifier, emetic and febrifuge[222, 257]. It is used in the treatment of chills, fevers, pneumonia, stomach or bowel complaints and rheumatism[222, 257]. A poultice of the root is used in the treatment of rheumatism[222]. A decoction of the root has been massaged into rheumatic joints[257]. The powdered root has been inhaled and then coughed up in order to restore the voice[257].

nrakta Eastern N. America - Nova Scotia to Wisconsin, south to Florida, Texas and Mexico. ksacta Wet woods and rocky slopes[43, 159]. Forest floor and shady, rocky slopes from sea level to 1500 metres[270].

propta Spores - best sown as soon as they are ripe, though they can also be sown in the spring. Sow them on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division. This is best done in the spring[188].

nwatta Landscape Uses:Border, Container, Erosion control, Foundation, Ground cover, Massing, Rock garden,

or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Prefers a rich heavy soil that is well-drained but remains moist in the summer[187]. The species is hardy to about -25°c, but there are many named varieties some of which are hardy to about -50°[187]. Cultivated as a medicinal plant in China[178]. A very ornamental[1] and long-lived plant, surviving in gardens for 50 years or more[200]. Many hundreds of named varieties have been developed for their ornamental value[250]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover if it is transplanted[1]. Plants should be planted with their crowns no more than 3cm below soil level. If planted deeper they do not flower so well[187]. Peony species are usually selffertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 -5 years to flower from seed[200]. They generally breed true from seed[1]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

# 5.2.834 Sedum aizoon

Sedum

4 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 0.4 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum aizoon is an evergreen Perennial growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. pcista Although not poisonous, if large quantities of this

plant are eaten it can cause a stomach upset[62, 85]. kcakta Edible Parts: LeavesEdible Uses: Leaves and young stems - raw or cooked[105, 177]. There is a definite bitterness in the flavour, few people would want to eat them as a regular part of their diet[K].

dwatta The plant is used medicinally[266]. No further information is given.

nrakta E. Asia - Siberia to Japan. A garden escape in N. and C. Europe[50]. ksacta Dry grassy slopes, dry shrub thickets, dry meadows, rock streams and sandy cliffs[74].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden. A very easily grown plant, it succeeds in most soils[188], tolerating those on the poor side[233], though it prefers a fertile well-drained soil[200]. Established plants are drought tolerant[200] although it prefers a soil that stays moist in the summer[187]. Requires a sunny position[188]. Hardy to -15°c according to one report[200] whilst another says that it is hardy to about -25°c[187]. A polymorphic species[1]. Butterflies are attracted to the flowers of this plant[233]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to

the predations of rabbits[233]. Special Features:Attractive foliage, Not North American native, Naturalizing, Attracts butterflies, Attractive flowers or blooms.

#### 5.2.835 Heuchera diversifolia

Alum Root, Crevice alumroot

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Heuchera diversifolia is an evergreen Perennial growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked. Not very palatable[172].

tcanta MordantThe root can be used as an alum substitute, this is a mordant used in fixing dyes[168, 172]. The root is rich in tannin, is this the active ingredient that acts as a mordant?[172]. A good ground cover plant for the woodland garden[200]. Plants should be spaced about 30cm apart each way[208].

dwatta Antiphlogistic Antiseptic Astringent Febrifuge OphthalmicThe root is antiphlogistic, antiseptic, astringent, febrifuge and ophthalmic[94, 172].

nrakta Western N. America - British Columbia to California ksacta Moist banks of humus and rocks in woodland below 600 metres, from British Columbia to California, Gravelly banks and rock crevices from low elevations to the subalpine zone[204].

propta Seed - sow early spring in a warm greenhouse and only just cover the seed. Germination is usually fairly rapid. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in late spring or early summer. The seed can also be sown in the middle of spring in an outdoor seedbed and planted out in early summer. Alternatively, you can sow the seed in an outdoor seedbed in the middle of summer for planting out in the following spring. Division in March or October [1, 111]. It is best to divide the plants in August or early September, making sure that the woody roots are planted quite deeply with only the crown of foliage above the ground[233].

nwatta Succeeds in any good sweet garden soil that does not dry out in spring[1]. Prefers full sun but tolerates partial shade[1, 111]. Prefers a well-drained fairly rich and not too heavy soil[111]. Plants are hardy to about -15°c[187]. Apt to hybridize with other members of this genus[111]. This species is probably best treated as a sub-species of H. mi-

#### 5.2.836 Pulmonaria saccharata

Jerusalem Sage, Bethlehem lungwort, Lungwort 4 tlin 8 cvuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc pcimhmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pulmonaria saccharata is an evergreen Perennial growing to 0.3 m (1ft) by 0.6 m (2ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe plant is said to be used as a spice[177, 183]. No more details are

tcanta A good ground cover plant for a shady position[188, 197]. Plants should be spaced about 60cm apart each way[208].

inhibits iodine conversion in the thyroid gland and is used in the treatment of hyperthyroidism and related disorders[9]. The whole plant is used as an astringent, hypoglycaemic, mild narcotic and mild sedative[4, 238]. It also slows and strengthens heart contractions[238]. The plant has been shown to be of value in the treatment of hyperthyroidism[9, 238], it is also used in the treatment of coughs, bleeding from the lungs and consumption, excessive menstruation etc[4, 2381. The leaves are applied as a poultice to cleanse foul wounds[240]. This remedy should not be prescribed for pregnant women or patients with hypothyroidism[238]. The plant is harvested as flowering begins and can be use fresh or dried, in an infusion or as a tincture[4, 238]. Current uses are predominantly for increased activity of the thyroid gland and for premenstrual syndrome symptoms such as breast pain [301]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Lycopus for nervousness and premenstrual syndrome (see [302] for critics of commission E).

nrakta Europe, including Britain, to the Mediterranean, north and central Asia. ksacta By rivers, streams and ditches, also in marshes and fens[9, 17].

propta Seed - sow spring or autumn in a cold frame[238] Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Tolerates most soil types so long as they are wet. Grows well in shallow water. Succeeds in sun or shade.

# 5.2.763 Cardamine raphanifolia

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc pcimhmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine raphanifolia is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: We have no information on the edibility of this plant but the leaves are almost certainly edible[K].

tcanta Plants can be grown as a ground cover, making a fairly good carpet in a moist position[208].

nrakta Europe - France, Spain and Italy. Occasionally established in Britain. ksacta Damp places and streamsides

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Prefers a moist humus rich soil in shade or semishade[200] but succeeds in most soils that are not dry[1]. Plants are closely related to C. pratensis[17].

# 5.2.764 Dianthus plumarius

Pink, Feathered pink, Cottage Pink 4 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hionli

drutta Dianthus plumarius is an evergreen Perennial growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: The petals are made into cordials, syrups, sauces, vinegars etc[183].

nrakta E. Europe. Naturalized in Britain. ksacta Grows in old walls in many parts of Britain[17].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings, taken at flowering time, with four pairs of leaves and trimmed just below a joint[200].

nwatta Landscape Uses:Alpine garden, Border, Container, Rock garden, Seashore, Specimen. Prefers a neutral to slightly alkaline soil in a sunny well-drained position[200]. Succeeds in dry soils and in poor soils[200]. Plants can be grown on walls [200]. There are many named forms, selected for their ornamental value[200]. The flowers are very fragrant[17], diffusing a powerful clove-like scent[245]. Individual plants become rather untidy after a few years and are best replaced every 2 - 4 years[200]. Some older cultivars, such as 'Sops in Wine' have a tendency to flower themselves to death. These should be grown in a richer soil in order to encourage the production of more foliage and should not be allowed to flower in their first year[200]. Special Features:Attractive foliage, Suitable for cut flowers, Fragrant

### 5.2.765 Lysimachia nummularia

Creeping Jenny, Moneywort, Creeping Charlie 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lysimachia nummularia is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Edible Uses: TeaA tea is made from the leaves and flowers[46, 61, 177, 183].

tcanta Can be used as a ground cover plant in moist soils but requires weeding for the first year or so. Plants should be spaced about 60cm apart each way and form a carpet, rooting as they spread[208].

dwatta Antidiarrhoeal Antiscorbutic Astringent Diuretic VulneraryThe whole herb, used fresh or dried, is antiscorbutic, mildly astringent, diuretic and vulnerary[4, 9, 46]. For drying, the herb is harvested in June[4]. Creeping Jenny is a very good wound-herb, the fresh leaves being bruised and applied externally to the affected area[4]. An infusion is used to treat internal bleeding and diarrhoea[9].

nrakta Europe, including Britain, from Sweden south and east to Spain, N. Greece and the Caucasus. ksacta Damp situations in pastures and by the sides of streams, avoiding acid soils[4, 9].

propta Seed - sow spring or autumn in a cold frame[200]. This species rarely produces seed in Britain[17]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Container, Ground cover, Rock garden, Woodland garden. An easily grown plant, succeeding in a moist loamy soil[1]. Grows well in heavy clay soils. Grows well in marshy soil and in shallow water in pond margins[24, 56]. Prefers a shady position[111] but also succeeds

in full sun[188]. Plants are hardy to at least -25°c[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. A very ornamental plant[1]. Special Features:Attractive foliage, Invasive, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms.

# 5.2.766 Trillium grandiflorum

White Trillium, Large Flower Trillium, White Trillium, Large Flower Wakerobin, Large Flowered Tril

4 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.4 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trillium grandiflorum is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked and used like spinach[46, 61, 105, 183]. A famine food, it is only used when all else fails[177].

dwatta Antispasmodic Diuretic Emmenagogue OphthalmicThe root is diuretic[257]. The raw root is grated and applied as a poultice to the eye in order to reduce swelling[207, 213]. The raw root s also used as a poultice on aching rheumatic joints[257]. A decoction of the root bark can be used as drops in treating a sore ear[257]. The grated root is steeped in water and drunk as a tea for the treatment of cramps[207]. The grated root is simmered in water and drunk for the treatment of irregular menses[207, 213].

nrakta Eastern N. America - Maine to Ontario, south to Georgia and Arkansas. ksacta Rich woods and thickets, usually on limestone[43]. Rich deciduous or mixed coniferous-deciduous upland woods, floodplains, roadsides at elevations of 20 - 700 metres[270].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 -3 months at 15°c. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Landscape Uses:Border, Ground cover, Woodland garden. Prefers a deep well-drained woodland or humus-rich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil but succeeds in acid or limey soils[200]. Grows well in open woodland[1, 90]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42, 138]. A very ornamental and long-lived plant[1, 138, 233]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238]. A polymorphic species, it is very subject to mutation[90]. Some named varieties have been selected for their ornamental value[200]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Special Features: Attractive foliage. North American native. Naturalizing. Attracts butterflies. The plant is heat tolerant in zones 7 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 5.2.767 Lycopus americanus

Water Horehound, American water horehound 4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lycopus americanus is a PERENNIAL growing to October 10 (18 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: middly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[207]. This contradicts with the report in [200] that the plant does not form tubers on its rhizomes.

tcanta DyeThe juice gives a permanent colour to linen and wool and does not wash out[207]. The colour is not mentioned[K]

dwatta Astringent Narcotic SedativeThe whole plant is used as an astringent, hypoglycaemic, mild narcotic and mild sedative[4, 102, 222, 238]. It also slows and strengthens heart contractions[238]. The plant has been shown to be of value in the treatment of hyperthyroidism[222, 238], it is also used in the treatment of coughs, bleeding from the lungs and consumption, excessive menstruation etc[4, 238]. It should not be prescribed for pregnant women or patients with hypothyroidism[238]. The plant is harvested as flowering begins and can be use fresh or dried, in an infusion or as a tincture[4, 238].

nrakta N. America - Newfoundland to British Columbia, south to Florida, Texas, Utah and California. ksacta Low moist or wet places[222, 274].

propta Seed - sow spring or autumn in a cold frame [238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in early summer. Division in spring or autumn[238]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in damp meadows or in wet places by ponds or streams[200].

# 5.2.768 Solidago virgaurea

Goldenrod

4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Solidago virgaurea is a PERENNIAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Mild allergic reactions. Avoid during pregnancy and breast feeding. Care if chronic kidney disease. Irrigation therapy is contraindicated in oedema cases [301]. places and wet meadows at low elevations and in the mountains of C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size. place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species requires a moist well-drained neutral to acid soil[200, 238]. Another report says that it is happy in any reasonable soil[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. A very ornamental plant[1]. Plants are intolerant of root disturbance[200].

#### 5.2.832 Pvcnanthemum muticum

Cluster Mountain Mint

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pycnanthemum muticum is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves have a pleasant mint-like aroma and flavour and can be used to make a refreshing tea[183]. They can also be used as a mint substitute in cooking[238].

nrakta Eastern N. America - Maine to Virginia and Florida, west to Pennsylvania and Missouri. ksacta Sandy soils[235]. Dry open woods in Texas[274].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If there are sufficient seeds they can be sown in an outdoor seedbed in April. Division in spring.

nwatta Succeeds in most soils[1] but prefers a rich loamy soil in full sun or partial shade with plenty of moisture in the growing season[200]. Hardy to at least -15°c[200]. The bruised leaves are very aromatic[200].

#### 5.2.833 Paeonia lactiflora

Chinese Peony, Peony 4 tlin 10 cyuc 1 kcak 0 tcan 3 dwat 0.8 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Paeonia lactiflora is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable forlight (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Root Seed StemEdible Uses: Root - cooked and eaten in a broth[2, 4, 46, 183]. Stems - cooked[177]. Seed - powdered and mixed with tea[4, 183].

dwatta Alterative Analgesic Anodyne Antibacterial Antiinflammatory Antiseptic Antispasmodic Astringent Carminative Diuretic Emmenagogue Expectorant Febrifuge Hypotensive Nervine Tonic Women's complaintsThe root of Chinese peony has been used for over 1,500 years in Chinese medicine. It is known most widely as one of the herbs used to make 'Four Things Soup', a woman's tonic, and it is also a remedy for gynaecological problems and for cramp, pain and giddiness[254]. When the whole root is harvested it is called Chi Shao Yao, if the bark is removed during preparation then it is called Bai Shao Yao[250]. The root is alterative, analgesic, anodyne, antibacterial, anti-inflammatory, antiseptic, antispasmodic, astringent, carminative, diuretic, emmenagogue, expectorant, febrifuge, hypotensive, nervine and tonic[176, 218, 238, 279]. The most important ingredient medicinally in the root is paeoniflorin, which has been shown to have a strong antispasmodic effect on mammalian intestines, it also reduces blood pressure, reduces body temperature caused by fever and protects against stress ulcers[250]. It is taken internally in the treatment of menstrual disorders, injuries, high blood pressure, pre-menstrual tension and liver disorders[238]. It should only be used under the supervision of a qualified practitioner and should not be prescribed for pregnant women[238]. The roots are harvested in the autumn from cultivated plants that are 4 -5 years old and are boiled before being sun-dried for later use[238, 250]. The roots of wild plants are harvested in the spring or (preferably) in the autumn and are sun-dried for later use[238]. The root is an ingredient of 'Four Things Soup', the most widely used woman's tonic in China[254]. The other species used are Rehmannia glutinosa, Ligusticum wallichii and Angelica sinensis[254]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - Siberia to Mongolia. ksacta Dry open stony slopes, riverbanks and sparse woodland edges[74]. Woods and grasslands at elevations of 400 - 2300 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Landscape Uses:Border, Foundation, Massing, Seashore, Specimen. An easily grown and undemanding plant[250], it does best in a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged

soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

#### 5.2.829 Scutellaria indica

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Scutellaria indica is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant cooked[105, 177].

dwatta Used as a folk remedy for traumatic injurues[266].

nrakta E. Asia - China, Japan, Korea. ksacta Sunny hills in C. and S. Japan[58]. Hillsides, grasslands, open rocky areas, roadsides and sparse forests at elevations up to 1500 metres[266].

propta Seed - sow in situ outdoors in late spring. If there is only a small quantity of seed it is better to sow it in a pot in a cold frame in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the spring. Division in spring just before new growth begins. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Basal cuttings in early summer in a frame. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in a sunny position in any ordinary garden soil that does not dry out during the growing season[200]. This species grows well in a rock garden[188].

# 5.2.830 Anthemis cotula

Mayweed, Stinking chamomile

4 tlin 8 cvuc 1 kcak 1 tcan 2 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Anthemis cotula is a ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. The plant is self-fertile. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The whole plant is penetrated by an acrid juice, touching or ingesting the plant can cause allergies in some people[4, 222].

kcakta Edible Parts: LeavesEdible Uses: TeaThe herb is used as a flavouring in Peru[183]. It is aromatic. Caution is advised, there are some reports of toxicity. A herb tea is made from the flowers in a similar way to camomile tea[183] and it has a similar though weaker effect medicinally[4]. The odour is not very pleasant and so it is not commonly used[4].

tcanta Dve RepellentThe growing and the dried plant is said to repel mice and fleas[4, 20], it can also be used as an insecticide[21, 61, 100]. A gold dye is obtained from the whole plant[168, 169].

dwatta Antispasmodic Astringent Diaphoretic Diuretic Emetic Emmenagogue Epilepsy Stings TonicMayweed is closely related to camomile, but is far less effective as a

medicine[254]. It has been used as an antispasmodic and to induce menstruation and was traditionally used to treat supposedly hysterical conditions related to the uterus[254]. It is rarely used in contemporary herbal medicine[254]. The whole plant is antispasmodic, astringent, diaphoretic, diuretic, emetic, emmenagogue and tonic[4, 61]. It is used internally as a tea, which can be made either from the flowers or the whole plant, though the flowers are less unpleasant and so are more commonly used[4]. An infusion is used in the treatment of a variety of complaints such as rheumatism, epilepsy, asthma, colds and fevers[257]. Applied externally, it is used as a poultice on piles or to draw splinters out of the body, and can also be applied to the bath water[4, 257]. The leaves are rubbed onto insect stings[222]. Some people are allergic to the plant and this remedy could give them painful blisters[240]. This herb is contraindicated for pregnant women or nursing mothers[254].

nrakta Most of Europe, including Britain, east to N. and W. Asia. ksacta Waste places usually on heavy soil[4, 17].

propta Seed - best sown outdoors as soon as it is ripe. Most of the seed germinates in the autumn.

nwatta Prefers a sunny position and a well-drained soil that is neutral to slightly acid[1, 200]. Succeeds in heavy clay soils. Bees dislike this plant[4]. The leaves contain glands which release a most disagreeable odour when the plant is handled and can cause allergic reactions in people.

# 5.2.831 Gentiana scabra

Long Dan Cao

4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana scabra is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies, Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant and old leaves - cooked[105]. A famine food, used when all else fails[177, 179].

dwatta Anodyne Anthelmintic Antiinflammatory Antiseptic Bitter Cholagogue Eczema Emmenagogue Expectorant Febrifuge Pectoral Refrigerant Stomachic Tonic UrinaryLong Dan Cao is used as a bitter tonic in Chinese herbalism where it promotes digestive secretions and treats a range of illnesses associated with the liver[254, 279]. The root is antibacterial and stomachic[176]. It is used in the treatment of anorexia, dyspepsia, jaundice, leucorrhoea, eczema, conjunctivitis, sore throat, acute infection of the urinary system, hypertension with dizziness and tinnitus[176, 279]. The root is harvested in the autumn and dried for later use. This species is one of several that are the source of the medicinal gentian root[4], the following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is guite likely that the roots of plants that have not flowered are the richest in medicinal proper-

nrakta E. Asia - China, Japan. ksacta Thickets, grassy

kcakta Edible Parts: Edible Uses: TeaA tea is obtained from the leaves[46, 61, 183].

tcanta DyeMustard, orange and brown dyes can be obtained from the whole plant[168]. A yellow dye is obtained from the leaves and flowers[4, 100].

dwatta Anthelmintic Anticoagulant Antifungal Antiinflammatory Antirheumatic Antiseptic Aromatic Astringent Carminative Diaphoretic Diuretic Febrifuge Hypoglycaemic Stimulant TB UrinaryGoldenrod is a safe and gentle remedy for a number of disorders. In particular, it is a valuable astringent remedy treating wounds and bleeding, whilst it is particularly useful in the treatment of urinary tract disorders, being used both for serious ailments such as nephritis and for more common problems such as cystitis[254]. The plant contains saponins that are antifungal and act specifically against the Candida fungus which is the cause of vagina and oral thrush[238, 254]. It also contains rutin which is used to treat capillary fragility, and phenolic glycosides which are anti-inflammatory[238]. The leaves and flowering tops are anthelmintic, anti-inflammatory, antiseptic, aromatic, astringent, carminative, diaphoretic, mildly diuretic, febrifuge and stimulant[4, 7, 9, 21, 147, 165]. A good vulnerary herb, it has also proved of value when used internally in the treatment of urinary infections, chronic catarrh, skin diseases, influenza, whooping cough, bladder and kidney stones etc[4, 238]. Due to its mild action, goldenrod is used to treat gastro-enteritis in children[254]. It makes an excellent mouthwash in the treatment of thrush[7]. The plant is gathered in the summer and dried for later use[7]. The seed is anticoagulant, astringent and carminative[218]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of kidney and bladder disorders, rheumatism and arthritis[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Solidago virgaurea for infection of the urinary tract, kidney and bladder stones (see [302] for critics of commission E).

nrakta Most of Europe, including Britain, temperate Asia and N. America. ksacta Dry woods, grassland, rocks, cliffs, hedgebanks, dunes etc on acid or calcareous soils[17].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the sum-

nwatta An easily grown plant, it succeeds in any moderately fertile moisture retentive soil in sun or semishade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The bruised plant smells like wild carrots[4]. The sub-species S. virgaurea minuta is only 10cm tall and wide[188]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

# 5.2.769 Carex disticha

Tworank sedge

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Carex disticha is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Root SeedEdible Uses: Root cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe leaves are used for bedding[61].

nrakta Central and northern Europe, including Britain, ocasional in S. Europe, east to Siberia. ksacta Damp grassy places, fens, marshes and wet meadows[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.770 Arabis hirsuta

Hairy rockcress, Mountain rockcress, Creamflower rock-

4 tlin 8 cvuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arabis hirsuta is a BIENNIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies), insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[177].

nrakta Most of Europe, including Britain, N. Africa and N. Asia to Japan. ksacta Chalk and limestone slopes, limestone rocks and walls, dunes and dry banks[17].

propta Seed - it is best to surface sow the seed as soon as it is ripe in a light position in a cold frame[134]. Seed can also be sown in spring. It usually germinates in 2 - 3 weeks at 21°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering[111]. Very easy, the divisions can be planted out straight into their permanent positions if required. Cuttings in a shady border in summer[1].

nwatta Easily grown in ordinary well-drained soil. Succeeds in dry soils and on walls[K].

#### 5.2.771 Heuchera micrantha

Alum Root, Crevice alumroot

4 tlin 8 cvuc 1 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Heuchera micrantha is an evergreen Perennial growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked. Not very palatable[172].

tcanta Hair MordantThe root can be used as an alum substitute, this is a mordant used in fixing dyes[168, 172]. The root is rich in tannin, is this the active ingredient that acts as a mordant?[172]. A good ground cover plant for the woodland garden[200]. Plants should be spaced about 30cm apart each way[208].

dwatta Antiphlogistic Antiseptic Astringent Febrifuge Ophthalmic PoulticeThe root is antiphlogistic, antiseptic, astringent, febrifuge and ophthalmic[94, 172].

nrakta Western N. America - British Columbia to California ksacta Moist banks of humus and rocks in woodland below 600 metres, from British Columbia to California. Gravelly banks and rock crevices from low elevations to the subalpine zone[204].

propta Seed - sow early spring in a warm greenhouse and only just cover the seed. Germination is usually fairly rapid. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in late spring or early summer. The seed can also be sown in the middle of spring in an outdoor seedbed and planted out in early summer. Alternatively, you can sow the seed in an outdoor seedbed in the middle of summer for planting out in the following spring. Division in March or October[1, 111]. It is best to divide the plants in August or early September, making sure that the woody roots are planted quite deeply with only the crown of foliage above the ground[233].

nwatta Succeeds in any good sweet garden soil that does not dry out in spring[1]. Prefers full sun but tolerates partial shade[1, 111]. Prefers a well-drained fairly rich and not too heavy soil[111]. Plants are hardy to about -15°c[187]. Apt to hybridize with other members of this genus[111]. This species is probably best treated as a sub-species of H. micrantha.

# 5.2.772 Scutellaria baicalensis

Baikal Skullcap - Huang-Qin 4 tin 8 cyuc 1 koak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Scutellaria baicalensis is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil

pcista Liver toxicity (hepatotoxicity). Unknown effects during pregnancy [301].

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - cooked as a vegetable[105, 177, 183]. The whole plant is dried and used as a tea substitute[105, 183].

dwatta Anodyne Antibacterial Anticholesterolemic Antipyretic Antispasmodic Astringent Cancer Cholagogue Diuretic Dysentery Expectorant Febrifuge Haemostatic Laxative Nervine Sedative Stomachic TB Tonic UrinaryBaikal skullcap is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs and is used primarily in treating "hot and damp" conditions such as dysentery and diarrhoea[218, 254]. It has been used medicinally for over 2,000 years and recent research has found that the roots contain flavonoids that greatly enhance liver function and also have anti-inflammatory and antiallergenic effects[238]. The root is anodyne, antibacterial, anticholesterolemic, antipyretic, antispasmodic, astringent, cholagogue, diuretic, expectorant, febrifuge, haemostatic, laxative, nervine, mildly sedative, stomachic and tonic (for TB)[46, 61, 147, 174, 176, 218, 238]. It reputedly calms the foetus in pregnant women[238]. The root is used internally in the treatment of enteritis, dysentery, diarrhoea, jaundice, chronic hepatitis, urinary tract infections, hypertension, threatened miscarriage, nosebleed and haemorrhage from the lungs or bowel[238]. It is one of the ingredients of the Chinese drug 'injection of three yellow herbs' [238]. The root is harvested in the autumn or spring from plants 3 - 4 years old and is dried for later use[238]. The seed is used to cleanse the bowels of blood and pus[218]. For the treatment of prostate cancer [301].

nrakta E. Asia - China, Japan, Korea, Mongolia. ksacta Sandy and rocky places near the sea shore. Sunny, grassy slopes and waste ground from 100 - 2,000 metres above sea level [254]

propta Seed - sow outdoors in situ in late spring[200] If there is only a small quantity of seed it is better to sow it in a pot in a cold frame in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring just before new growth begins. Very easy, larger divisions can be planted out direct into their permanent positions. We have

found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in a sunny position in any ordinary garden soil that does not dry out during the growing sea-son[200]. Prefers a light well-drained soil in sun or partial shade[238]. This species requires sharp drainage and, once established, is drought tolerant[238]. Plants are hardy to at least -15\*c[238]. A very ornamental plant[1].

#### 5.2.773 Bromus carinatus

Californian Brome

4 tlin 8 cyuc 1 kcak 1 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Bromus carinatus is a ANNUAL/BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed cooked[161, 177]. Used as a piñole[183]. The dried seed can be ground into a powder and mixed with water to make a mush or made into bread[257]. The seed is rather small and fiddly to utilize[K].

tcanta Used for control of erosion and revegetation of damaged land, as well as a highly palatable forage for livestock

nrakta Western N. America - British Columbia to California and New Mexico. Naturalized in Britain[17]. ksacta Various habitats from moist woods to dry open meadows or sagebrush covered hills, sometimes to the timber line[60]. Found naturalized along the Thames at Kew and Oxford[17].

propta Seed - sow spring or autumn in situ and only just cover. Germination should take place within 2 weeks. If seed is in short supply it can be surface sown in a cold frame in early spring. When large enough to handle, prick out the seedlings into individual pots and plant them out in early summer. Division in spring. Large clumps can be planted out direct into their permanent positions whilst it is best to pot up smaller clumps and grow them on in a cold frame until they are ready to be planted out.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. A potential perennial cereal crop, it is able to survive summer droughts without needing irrigation[183]. Tolerates a pH in the range 5.3 to 7.8. The plant has cleistogamous flowers - these do not open in the usual way but are self-pollinated by the plant. The following notes are based on the general needs of the genus. Succeeds in a sunny position in most well-drained soils[138, 200].

# 5.2.774 Ophioglossum vulgatum

Adder's Tongue, Southern adderstongue 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ophioglossum vulgatum is a FERN growing to 0.3 m (1fb). See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen from May to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is

male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[172]. Not choice[172].

tcanta Mordant TanninThe root can be used as an alum substitute, this is a mordant used in fixing dyes[172]. The root is rich in tannin(it contains about 9 - 20%), is this the active ingredient that acts as a mordant?[172]. A good ground cover plant for the woodland garden[200].

dwatta Antiseptic Salve Styptic Tonic VDThe root is antiseptic, salve, styptic and tonic[172]. It has been used to treat inflammation of the testicles caused by syphilis[257].

nrakta Western N. America. ksacta Stream banks and crevices of moist rocks from the coast to above the timber line[60]

propta Seed - sow early spring in a warm greenhouse and only just cover the seed. Germination is usually fairly rapid. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in late spring or early summer. The seed can also be sown in the middle of spring in an outdoor seedbed and planted out in early summer. Alternatively, you can sow the seed in an outdoor seedbed in the middle of summer for planting out in the following spring. Division in March or October[1, 111]. It is best to divide the plants in August or early September, making sure that the woody roots are planted quite deeply with only the crown of foliage above the ground[233].

nwatta Succeeds in any good sweet garden soil that does not dry out in spring[1]. Prefers full sun but tolerates partial shade[1, 111]. Prefers a well-drained fairly rich and not too heavy soil[111]. Apt to hybridize with other members of this genus[111]. A very ornamental plant[60].

# 5.2.826 Taraxacum megalorrhizon

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Taraxacum megalorrhizon is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Coffee TeaLeaves - raw or cooked. The following uses are also probably applicable to this species, though we have no records for them[K] Root - cooked[183]. Flowers - raw or cooked[183]. The unopened flower buds can be used in fritters[183]. The whole plant is dried and used as a tea[177, 183]. A pleasant tea is made from the flowers. The leaves and the roots can also be used to make tea. The root is dried and roasted to make a coffee substitute.

tcanta LatexA latex obtained from the roots is used to make a high-class rubber[61, 110].

nrakta S. Europe. ksacta Not known

propta Seed - sow spring in a cold frame and either surface-sow or only just cover the seed. Make sure the compost does not dry out. Germination should take place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle, choosing relatively deep pots to accommodate the tap root. Plant them out in early summer. Division in early spring as the plant comes into growth.

nwatta Prefers a well-drained humus-rich soil in full sun or light shade. According to one report this species reproduces apomictically and sexually[50], whilst another report says that only apomictic seed production is undergone[110]. Apomixy is an asexual method of seed production where each seed is genetically identical to the parent plant. Occasionally seed is produced sexually, the resulting seedlings are somewhat different to the parent plants and if these plants are sufficiently distinct from the parents and then produce apomictic seedlings these seedlings are, in theory at least, a new species.

# 5.2.827 Ranunculus aquatilis

Water Crowfoot, White water crowfoot

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ranunculus aquatilis is a ANNUAL/PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista All parts of the plant are poisonous when fresh, the toxins are destroyed by heat or by drying[4, 10, 19, 21, 65]. The plant also has a strongly acrid juice that can cause blistering to the skin[65, 183].

kcakta Edible Parts: LeavesEdible Uses: The entire plant has been boiled and eaten[257]. Some caution is advised, see the notes above on toxicity.

dwatta Antiasthmatic Antirheumatic FebrifugeThe subspecies R. aquatilis capillaceus is used is used in India in the treatment of intermittent fevers, rheumatism and asthma[240].

nrakta Most of Europe, including Britain. ksacta Ponds, ditches and streams throughout lowland Britain[17].

propta Seed - sow spring in a tray of water in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer

nwatta A plant of boggy soils and shallow water, it prefers a loamy soil and a sunny position. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 5.2.828 Trillium smallii

4tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trillium smallii is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[58, 105, 177]. No more details are given.

nrakta E. Asia - Japan. ksacta Woods in foothills all over Japan[58]. Also found in grassy places in mountains and occasionally in stony places by the sea[42].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 -3 months at 15°c. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238] The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humusrich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid

a cardiac and nervous sedative, producing a hypnotic state with a diminution of the senses followed by a paralysing action[218]. A constituent similar to digitalis can be extracted from the whole herb with the roots removed[176]. This is cardiotonic[176].

nrakta E. Asia - China, Japan, Korea. ksacta Grassland in low mountains, C. and S. Japan. Grassy slopes in northern

propta Seed - best sown as soon as it is ripe in early summer in a cold frame. The seed usually germinates in about 2 - 3 weeks. Sow stored seed in late winter in a cold frame. Germination takes about 1 - 6 months at 15°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in the spring. Root cuttings, 4cm long taken in early winter, potted up in a mixture of peat and sand[175]. They can also be taken in July/August, planted vertically in pots in a greenhouse or frame.

nwatta Requires a well-drained humus-rich gritty soil and a sunny position[200]. Tolerant of alkaline soils[200]. This species is closely related to P. dahurica[200]. Large plants have a deep woody rootstock and transplant badly[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

# 5.2.822 Potentilla rupestris

Rock Cinquefoil

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla rupestris is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is selffertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea[2, 46, 61, 183].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, W. and C. Asia. ksacta Basic rocks[17] and woody slopes in mountains[100]. Dry sunny rocky slopes in the mountains[187].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Succeeds in dry soils in the wild[187]. Hardy to about -25°c[187]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.823 Lysimachia barystachys

Manchurian vellow loosestrife

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lysimachia barystachys is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and stems - cooked[177].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Sunny hills and low elevations in mountains, central Japan[58]. Mountain meadows, grassy mountain slopes, among shrubs at elevations of 800 - 2000 metres[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, succeeding in a moist loamy soil[1]. Most species in this genus seem to be immune to the predations of rabbits[233].

#### 5.2.824 Trillium tschonoskii

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trillium tschonoskii is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 177]. No more details are given.

dwatta MiscellanyThe root contains steroidal saponins, which have hormonal effects on the body[222, 238]. They are being used in gynaecological and obstetric medicine[238].

nrakta E. Asia - Japan, Korea, ksacta Mountains in C. and S. Japan[58]. Shady places in rocky wooded ravines in humus-rich soils[42, 90, 200].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 -3 months at 15°c. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humusrich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. This species is closely related to T. kamtschaticum[200]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

# 5.2.825 Heuchera glabra

Alpine Heuchera

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Heuchera glabra is an evergreen Perennial growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both destroyed by heat or thorough drying, so cooking the plant as well as being intolerant of root disturbance which makes will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: Used as a vegetable[145]. No more details are given.

dwatta Emetic Skin VulneraryThe root and the leaves are antiseptic, detergent, emetic, haemostatic, styptic and vulnerary[4, 61, 218]. An ointment made from the plant is considered to be a good remedy for wounds and is also used in the treatment of skin ulcers[4, 145]. The expressed juice of the leaves is drunk as a treatment for internal bleeding and bruising[4].

nrakta Europe, including Britain, from Iceland south and east to N. Africa, north and west Asia. ksacta Damp grassland, fens and scrub[17].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep them in humid conditions until they are well established. Do not plant outside until the ferns are at least 2 years old. Division of underground rhizomes with care because the roots are brittle[200]

nwatta Prefers a moist free-draining soil[1]. Plants are hardy to about -15°c[200]. The prothalli (a small plant formed when the spore germinates) of this species form a symbiotic relationship with a mycorrhizal fungus in much the same way as orchid seedlings[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants can be hard to establish, they can be naturalized in a meadow or cultivated in the border where they should be left undisturbed[200]. Unlike most species of ferns, the fronds of this species grow up straight and not curled inward, crozier fash-

# 5.2.775 Orthilia secunda

Sidebells Wintergreen

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.1 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Orthilia secunda is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: TeaSeed[172]. No more details are given. The leaves are occasionally used as a tea[183].

dwatta OphthalmicA strong decoction of the root has been used as an eye wash[257].

nrakta Europe, including Britain, from Iceland south and east to the Pyrenees and Asia. N. America. ksacta Damp coniferous woods and on damp rock ledges[17, 200].

propta Seed - the only information we have on this species is that it is difficult from seed and germinates infrequently[200]. We would suggest sowing the seed as soon as it is ripe if this is possible. Sow it into soil collected from around an established plant, only just covering the seed, and put the pot in a shady part of a cold frame. Pot up any young seedlings as soon as they are large enough to handle, once again using soil from around an established plant. Plant out into their permanent positions when the plants are large enough. You should not need to use soil from around an established plant to do this since the soil in the pot will contain the necessary micorrhiza. Division with great care in the spring[1, 111]. Pot up the divisions using some soil from around an established plant, grow on in a lightly shaded part of a greenhouse or frame and do not plant out until the plants are growing away vigorously[200].

nwatta Prefers a moist sandy woodland soil[111, 200] in a cool position with partial shade[1, 11, 200]. Requires a peaty or leafy but not very acid soil that remains moist in the summer[31, 187]. This is a very difficult plant to grow. It requires a mycorrhizal relationship in the soil and therefore needs to be grown initially in soil collected from around an established plant[200]. It is also very difficult from seed

division difficult[1].

# 5.2.776 Hosta plantaginae

August Lily

4 tlin 8 cvuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hosta plantaginae is a PERENNIAL growing to 0.6 m (2ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista One report suggests the plant may be poisonous[178]

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105, 177]. One report suggests the plant may be poisonous[178].

tcanta EssentialAn essential oil is obtained from the leaves, used in perfumery[178]. A useful ground cover plant, succeeding in dense shade, though rather slow spreading[197]. Plants should be spaced about 60cm apart each way[208].

dwatta CancerThe flowers are said to have anticancer activity[218]

nrakta E. Asia - China, Japan, ksacta Forests, grassy slopes and rocky places from near sea level to 2200 me-

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. This species tolerates guite a lot of sun[187]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. The plant forms open clumps[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, Kl. A very ornamental plant[1]. there are some named varieties[187]. The flowers open in the evening[188] and have a delicious lily-like fragrance[233]. The plant only flowers well when grown in a warm position[233], and is not really satisfactory when grown in most areas north of London[251].. Hybridizes freely with other members of this genus[200].

# 5.2.777 Paronychia capitata

Algerian Tea

4 tlin 8 cvuc 1 kcak 0 tcan 1 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Paronychia capitata is an evergreen Perennial. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: TeaAn infusion of the flowers is used as a tea[183].

tcanta Especially useful as a ground cover plant with bulbs, covering the soil after the bulbs have flowered[200, 208]. The plants form a low carpet, rooting as they spread, and they should be spaced about 30cm apart each way[208].

dwatta Aphrodisiac Diuretic TBAn infusion of the leaves is aphrodisiac and diuretic[200]. It is also used in the treatment of TB[200].

nrakta Europe - Mediterranean. ksacta Dry rocky habitats[200].

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

nwatta Requires a sunny position succeeding in hot dry soils and tolerating drought once established[190]. Requires a warm open position in full sun, in a sharply drained sandy or gritty soil. If the soil is too rich the plants leaves will not be so silvery[200]. Plants can be grown in a wall[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c, perhaps more if in a perfectly drained soil[200]. This report is a little confusing since the same article says that the plant succeeds in climatic zone 5 and should therefore be hardy in almost all of Britain[K]. This species is closely related to P. argentes but is less tolerant of winter cold and wet conditions[200].

#### 5.2.778 Leucojum aestivum

Summer Snowflake

4 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Leucojum aestivum is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: Bulb -cooked[105]. I have some reservations about this report, though no records of the plant being poisonous have been found so far.

nrakta Europe, including Britain, from France south and east to Spain, Greece, the Crimea and Iran. ksacta Marshes, wet meadows and willow thickets, avoiding acid soils[17].

propta The seed is best sown as soon as it is ripe in a well-drained soil in a cold frame. Stored seed requires 2- 3 months cold stratification, it should then germinate in 2- 4 weeks at  $10^{\circ} \text{c}[134]$ . Sow the seed thinly so that the seedlings can be allowed to grow on undisturbed in the pots for their first year of growth. Give them an occasional weak liquid feed to ensure that they do not become nutrient deficient. Pot up the small bulbs when dormant, planting 2- 3 bulbs in each pot. Grow them on for another 2- 3 years before planting them out. Division of offsets in September/October. It is best done as soon as the foliage ripens[1]. Scooping the

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden, Specimen, Woodland garden. Easily grown in ordinary garden soil[1]. It does well in a moist heavy soil in full sun or partial shade[1, 17, 31, 90] and is happy in water-logged conditions[90]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°c[214]. Plants can be naturalized in damp rough grass[200]. Flowers are produced within 4 - 5 years from seed. The seedpods are swollen and filled with air so that they can be dispersed by floating in water[90]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features:Attractive foliage, Naturalizing, Suitable for cut flowers.

#### 5.2.779 Viburnum mongolicum

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum mongolicum is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[179].

nrakta E. Asia - E. Siberia, ksacta Not known

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. This species is closely related to V. dilatatum[179].

#### **5.2.780** Sedum acre

Common Stonecrop, Goldmoss stonecrop, Gold Moss Sedum 4 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.1 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum acre is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable forlight (sandy), medium (loamy) and heavy (clay) soils, prefers

Prefers a pH in the range 6.5 to 7.5[200]. A very ornamental plant[1]. Members of this genus are rarely if ever troubled by browsing deer[233]. Remove old fronds from the plant in the spring because they may harbour fungal diseases[200]. Some named forms have been selected for their ornamental value[187].

# 5.2.818 Lobelia sessilifolia

4 tin 8 cyuc 1 kcak 0 tcan 0 dwat 0.7 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lobelia sessilifolia is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The plant contains a toxic alkaloid[179]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274].

kcakta Edible Parts: LeavesEdible Uses: The buds and young plants are cooked and used as a famine food[177, 179]. Caution is advised because they contain a toxic alkaloid[179].

nrakta E. Asia - Japan. ksacta Wet places in lowland and mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Basal cuttings in spring[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering in moist sand, it forms roots at the nodes[200].

nwatta Requires a wet soil[1].

# 5.2.819 Centaurea nigra

Black Knapweed, Lesser knapweed 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Centaurea nigra is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FlowersEdible Uses: Flower petals - raw. Added to salads[183].

dwatta Diaphoretic Diuretic TonicThe roots and seeds are diaphoretic, diuretic, tonic and vulnerary[4, 61]. The plant once had a very high reputation as a healer of wounds[4].

nrakta Western Europe, including Britain, from Spain to Norway, east to Germany and Switzerland. ksacta Grassland, waysides, cliffs etc to 600 metres[17].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. This should be done at least once every three years in order to maintain the vigour of the plant. Basal cuttings in spring. Harvest the

shoots when they are about 10 - 15 cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. Established plants are tolerant of considerable neglect, thriving and even self-sowing in dense weed growth[K]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.820 Rhodiola rhodantha

Queen's Crown, Redpod stonecrop 4 tlin 8 cyuc 1 keak 0 tcan 0 dwat 0.4 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rhodiola rhodantha is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked as a potherb[183, 212]. Chopped finely and added to salads[183]. Best used when they are young[83].

nrakta Western N. America - Arizona to Montana. ksacta Moist places in tundra or in meadows and by streams in the Rocky Mountains to 2700 metres[83].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse for their first winter. Plant out in early summer of the following year. Division in spring or early summer Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile well-drained soil in a sunny positin[200]. Established plants are drought tolerant[200]. A good plant for the flower border[83]. This species has pink to white flowers[200]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85].

# 5.2.821 Pulsatilla cernua

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Pulsatilla cernua is a PERENNIAL growing to  $0.2\,\mathrm{m}$  (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no mention has been seen for this species, at least one member of the genus is slightly toxic, the toxins being dissipated by heat or by drying the plant[65].

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves and roots - cooked with other foods[177]. Some caution is advised, see the notes above on toxicity.

dwatta Analgesic Antiinflammatory Antispasmodic Astringent Cardiotonic Dysentery Haemostatic Hypnotic SedativeHaemostatic[174]. The root is anodyne, anti-inflammatory, antispasmodic, astringent and sedative[174, 176, 218]. The root is an effective cure for bacterial and amoebic dysentery[176, 218]. It is also used in the treatment of nose bleeds and haemorrhoids and is used externally to treat Trichomonas vaginitis[176]. The fresh herb is

cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta An easily grown plant, it does best in a deep rich soil, preferably neutral or slightly alkaline[1], doing guite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Very cold resistant[74], tolerating temperatures down to at least -25°c[187]. A very ornamental[74] and long-lived plant, specimens can survive in the garden for at least 50 years [200]. This species is closely related to P. veitchii, differing mainly in only having one flower to a stem[250]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually selffertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 -5 years to flower from seed[200]. They generally breed true from seed[1].

#### 5.2.815 Festuca ovina

4 tlin 8 cvuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Festuca ovina is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed[105, 161]. No further details but the seed is rather small and would be very fiddly to utilise[K].

nrakta Most of Europe, including Britain. ksacta Poor, well-drained shallow soils from low to high elevations[1].

propta Seed - sow spring in situ[162]. The seed usually germinates within three weeks. Division in spring[162]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Prefers a light well-drained soil in full sun[200]. A drought resistant plant once established[1], it succeeds on shallow chalky soils[61]. Tolerant of constant cutting, this plant is often grown in lawns[1].

# 5.2.816 Cystopteris bulbifera

Berry Bladder Fern, Bulblet bladderfern 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Cystopteris bulbifera is a deciduous Fern growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen from August to October. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex.

In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: RootEdible Uses: Root. An emergency food, it is only used when all else fails[172].

tcanta A good ground cover plant[200]. Forming a slowly spreading clump, it should be planted 30cm apart each way[208].

nrakta Eastern N. America - Newfoundland to Manitoba, Wisconsin and Iowa, south to Georgia and Arkansas. ksacta Shaded ravines, cracks and ledges on cliffs, rarely terrestrial: usually on calcareous substrates from sea level to 2500 metres[43 270]

propta Spores - best sown as soon as ripe on the surface of a humus-rich sterilized soil. Keep the compost moist. preferably by putting a plastic bag over the pot. Germinates in 1 - 3 months at 20°c[164]. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Division in spring. Bulbils are produced at intervals along the midrib and these can be planted into pots as soon as they are ripe[188, 219].

nwatta Prefers a shady position in a moist but welldrained soil, succeeding in most soil types[200]. Plants can tolerate up to 4 hours direct sun per day[200]. Prefers a pH between 6.5 and 7, but tolerates a range from 5.5 to 7.5[200]. Plants can be grown on old mortared walls if they are in a shady position[219]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants die back early in dry seasons[200]. This plant produces bulbils on the leaves, these fall off when mature and grow into new plants[200, 235]. In this way the plant can become invasive[200].

# 5.2.817 Polystichum aculeatum

Hard Shield Fern

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.8 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Polystichum aculeatum is an evergreen Fern growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen from July to August. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: Eaten in curries[177]. We have no more details, it is probably the young leaves that are used though it might be the root.

tcanta Plants can be grown as a ground cover and are best placed about 60cm apart each way[208].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, S.W. Asia to China, Japan. ksacta Deciduous woodland, often on limy soils, and sometimes on shaded limestone outcrops[187]. Especially in the wetter areas of Britain[17].

propta Spores - best sown as soon as they are ripe, though they can also be sown in the spring. Sow them on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division. This is best done in the spring.

nwatta Very hardy and easily grown in light shade in any reasonable soil[187]. Prefers a sandy humus-rich soil in a shady position that is moist even in winter[1]. Tolerates part sun for up to 6 hours a day if the soil remains moist[200].

well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime expo-

pcista Poisonous[19]? The sap can irritate the skin of some people[76]. Other reports suggest that no members of this genus are poisonous[62, 85]. The flowers are yellow which suggests that in quantity the leaves can cause stomach

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - raw or cooked[13, 100]. Rich in vitamin C, but it has a bitter acrid taste[1, 244]. The main interest in the edible qualities of this plant is as a survival food, since it grows wild in the driest deserts as well as in arctic conditions[244]. Large quantities can cause stomach upsets[19]. It is best to dry the leaves (which can be difficult because they are very fleshy) and then powder them and use them to add a peppery taste to foods[244]. The leaves are dried and ground into a powder to make a spicy seasoning[183].

tcanta The plant spreads aggressively and can be used for ground cover in a sunny position amongst plants tall enough not to be overrun by it. Many species of the strongergrowing bulbs such as lilies can grow successfully through

dwatta Astringent Foot care Hypotensive Laxative Rubefacient Vermifuge Vitamin C VulneraryThe herb is astringent, hypotensive, laxative, rubefacient, vermifuge and vulnerary[4, 7, 9, 13, 46]. It is considered to be a useful medicinal plant by some herbalists, though others do not use it because of the violence of its operation when taken internally [4]. 7]. One of its best uses is as an effective and harmless cornremover, it can also be used to bring boils to a head, though this can also cause some local irritation[7]. The bruised fresh plant is applied as a poultice to wounds and minor burns[9], though some care should be exercised because the plant can cause blisters or skin irritations[244]. The herb is difficult to dry and so is best used when fresh, it can be gathered at any time during the spring and summer[7]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of piles and anal irritations[9].

nrakta E. Europe - Balkans. Long naturalized in Britain[17]. ksacta Dry sunny situations on rocks, roofs, walls etc, especially near the sea[4, 7, 19]. Often found on limestone hills, it avoids acid soils[17].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. It can also be sown in the autumn in a cold frame, some seed germinates immediately whilst others germinate in the spring. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer. otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Container, Ground cover, Rock garden, Seashore, Specimen. A very easily grown plant, it succeeds in most soils[188] but prefers a sunny position in a fertile well-drained soil[200]. Established plants are drought tolerant[190]. Grows well on walls[190]. Plants can be very aggressive and invasive, spreading freely at the roots[200]. If clearing the plant from an area it is guite important to try and remove every part of the plant since even a small part of the stem, if left in the ground, can form roots and develop into a new plant[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Not North American native, Invasive, Nat-

# 5.2.781 Polygonum persicaria

Red Leg, Spotted ladysthumb

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonum persicaria is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and young shoots - raw or cooked[55, 62, 105, 183]. They contain about 1.9% fat, 5.4% pectin, 3.2% sugars, 27.6% cellulose, 1% tannin[178]. Seed - raw or cooked. It is rather small and fiddly to utilize.

tcanta DyeA yellow dye is obtained from the plant when alum is used as a mordant[207].

dwatta Astringent Diuretic Lithontripic Poultice Rubefacient VermifugeThe leaves are astringent, diuretic, rubefacient and vermifuge[9, 21, 53, 178, 222]. An infusion has been used as a treatment for gravel and stomach pains[257]. A decoction of the plant, mixed with flour, has been used as a poultice to help relieve pain[257]. A decoction of the plant has been used as a foot and leg soak in the treatment of rheumatism[257]. The crushed leaves have been rubbed on poison ivy rash[257].

nrakta Temperate regions of the northern hemisphere. including Britain. ksacta Damp shady places[5]. A common weed of cultivated land, avoiding shade[1].

propta Seed - sow spring in situ.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Plants seem to be immune to the predations of rabbits[233].

# 5.2.782 Polygonum lapathifolium

Curlytop Knotweed

4 tlin 8 cvuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Polygonum lapathifolium is a ANNUAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hy-

peracidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked[105, 177]. Seed - raw or cooked. It is rather small and fiddly to utilize.

tcanta SoapThe plant produces a soft white mass, a froth like that of soap. It is used for bathing and washing clothes[272].

dwatta Antiseptic Astringent Febrifuge StomachicThe whole plant is antiseptic and astringent[178]. An infusion has been used in the treatment of stomach complaints and fevers[257]. The plant produces a soft white mass, a froth like that of soap. It is applied externally to burns[272].

nrakta Temperate regions of the northern hemisphere, including Britain. S. Africa. ksacta Swampy thickets, shores, damp clearings and cultivated fields in N. America[43].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Plants seem to be immune to the predations of rabbits[233].

# 5.2.783 Astilbe thunbergii

Astilb

4tlin 9 cyuc 1 kcak 3 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Astilbe thunbergii is a PERENNIAL growing to 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - cooked[177, 183]. The leaves are a tea substitute[183].

tcanta Landscape Uses: Border, Container, Massing, Woodland garden. Special Features: Attractive foliage. Dynamic accumulator.

nrakta E. Asia - Japan. ksacta Sunny grassy slopes, C. and S. Japan[58].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse in early spring. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 20cm tall. Plant them out in the summer, or late in the following autumn. Division in spring. This is best done every 3 - 4 years in order to maintain the vigour of the plant[200]. Larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in a rich garden soil if this stays reliably moist in the summer[1]. Requires a wet or moist peaty soil in sun or partial shade[187]. Prefers a pH in the range 5.5 to 7[200]. Prefers partial shade[200]. The plant is found in sunny habitats in the wild[58]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

# 5.2.784 Silphium laeve

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Silphium laeve is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root[2, 4, 105]. No more details are given in the reports.

nrakta N. America. ksacta Not known

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[188]. This is very difficult due to the deep and extensive root system.

nwatta We have very little information on this species and do not know if it will be hardy in Britain. The following notes are based on the general needs of the genus. Succeeds in any ordinary garden soil[1]. Prefers a deep moisture retentive moderately fertile soil that is not too nitrogen rich, in sun or dappled shade[200]. Plants have a deep and extensive root system which makes transplanting difficult[200].

#### 5.2.785 Epigaea asiatica

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.1 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Epigaea asiatica is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[58, 105, 177]. No more details are given. The fruit is about 10mm in diameter[200].

tcanta A ground cover plant for a shady position[188], forming a carpet of growth[208]. Plants should be spaced about 25cm apart each way[208]. This species is probably not very worthwhile for ground cover in Britain because of its difficulty to cultivate[208].

nrakta E. Asia - C. and N. Japan. ksacta Open woods in the mountains[58]. In forest margins at elevations of 100 - 1700 metres[275].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame[200]. Another report says that the seed requires no pre-treatment and can be sown in late winter in a cold frame[113]. Surface sow and place the pot in light shade, do not allow it to dry out[113]. The seed usually germinates in 3 - 5 weeks[113]. As soon as they are large enough to handle, pot up the seedlings into individual pots. Be very careful since they strongly resent root disturbance. Grow them on in light shade in the greenhouse and plant them out in their permanent positions in the late spring of their second years growth. Cuttings of half-ripe wood, July/August in a frame[200]. Take the cutting with a part of the previous year's growth[113]. (This report is unclear as to whether it means a heel of older wood or just a small section of older wood[K]) Plants self-layer and can be divided in the spring but this must be done with great care since they deeply resent root disturbance[200].

nwatta Requires an open lime-free humus-rich soil and shade from direct sunlight[11, 200], succeeding also in deep shade[182]. Grows well in the shade of rhododendrons and other calcifuge shrubs[245]. A difficult plant to grow in cultivation[200], though it is easier than E. repens[182]. The flower buds require a period of chilling to about 2°c before they will open[200]. The flowers are sweetly scented[245]. They are produced in terminal racemes on the previous year's shoots[275].

#### **5.2.786 Pyrola minor**

Wintergreen, Snowline wintergreen 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Pyrola minor is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy) and

#### 5.2.812 Astilbe chinensis

Pumila Spirea, Chinese Astilbe 4 tlin 8 cyuc 1 kcak 3 tcan 0 dwat 0.7 m hkuc hmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Astilbe cĥinensis is a PERENNIAL growing to  $0.7 \, \mathrm{m}$  ( $2\mathrm{ft}$  4in) by  $0.5 \, \mathrm{m}$  ( $1\mathrm{ft}$  8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone  $5. \, \mathrm{lt}$  is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoots[177]. No more details are given.

tcanta Landscape Uses: Border, Container, Massing, Rock garden, Woodland garden. There are some named varieties, selected for their ornamental value[233]. A first class ground cover plant, the lower-growing cultivar 'Pumila' is particularly recommended[233]. Special Features:Attractive foliage, Suitable for dried flowers. Dynamic accumulator.

nrakta E. Asia - E. China, Japan, Korea. ksacta Damp woods and along shady streams[187]. Open broad-leaved forests, forest edges and amongst shrubs[74]. Forests, forest margins, meadows, valleys and riversides, 400 - 3600 metres[266].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse in early spring. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 20cm tall. Plant them out in the summer, or late in the following autumn. Division in spring. This is best done every 3 - 4 years in order to maintain the vigour of the plant[200]. Larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Prefers a rich garden soil, but succeeds in most soils so long as they stay reliably moist in the summer[1, 233]. Requires a wet or moist peaty soil in sun or partial shade[187], growing well under shrubs[233]. Prefers a pH in the range 5.5 to 7[200]. Prefers partial shade[200], especially if the soil is on the dry side[233]. Plants are hardy to about -20°c[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. There are some named varieties, selected for their ornamental value[2331].

#### 5.2.813 Campanula rotundifolia

Harebell, Bluebell bellflower 4 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula rotundifolia is a PERENNIAL growing to 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Leaves - raw or cooked[K].

dwatta The root has been chewed in the treatment of heart and lung problems[257]. An infusion of the roots has been used as ear drops for a sore ear[257]. A decoction of the plant has been drunk or used as a wash in the treatment of sore eyes[257].

nrakta Northern Temperate regions of the world, including Britain, to latitude 70° N. ksacta Dry grassy places and on fixed dunes, often in poor shallow soils throughout most of Britain[17].

propta Seed - surface sow in spring in a cold frame. Three or four weeks pre-chilling of the seed improves the germination rate[138]. The seed usually germinates in 2-4 weeks at  $18^{\circ}$ c[138]. When they are large enough to handle,

prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can also be sown outdoors in situ during the spring. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Landscape Uses:Border, Container, Massing, Rock garden, Seashore, Specimen. A very easily grown plant, it succeeds in most fertile well-drained soils[233, 271]. though it prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Succeeds in poor soils[17]. This species can be naturalized in finer turfs, on grassy banks and in chalk downland and heath associations[200]. Plants are hardy to at least -15°c[200]. A very variable species in the wild[271]. When established plants can spread fairly freely and also self-sow, though they are quite easily contained by hoeing[271]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very ornamental plant, there are some named varieties[200]. Special Features: Attractive foliage, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers.

# 5.2.814 Paeonia anomala

wis hpa7tmwatli fyifxre7t hjonli

Anomalous peony, Common Peony 4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

drutta Paeonia anomala is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - dried and cooked with protein foods[74, 250]. Young shoots - cooked[177].

dwatta Antispasmodic Antitussive Astringent Febrifuge Hypotensive StomachicThe root is astringent and stomachic[61]. The Chinese herb Chi Shao Yao is made from the whole root of a number of peony species, especially P. lactiflora, but also occasionally this species[250]. The most important ingredient medicinally in the root is paeoniflorin, which has been shown to have a strong antispasmodic effect on mammalian intestines, it also reduces blood pressure, reduces body temperature caused by fever and protects against stress ulcers[250]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and variosse veins[250].

nrakta Europe to C. Asia. ksacta Coniferous woods, rocky hillsides amongst shrubs and in dry steppe grassland[187]. Forest margins and clearings[74].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division, with care, in early spring or autumn[200].

nwatta Succeeds in an ordinary garden soil with some shade[1, 111]. A rather difficult plant to grow, it is best in a moist position[1].

#### 5.2.809 Fumaria officinalis

Fumitory, Drug fumitory

4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Fumaria officinalis is a ANNUAL growing to  $0.3\,\mathrm{m}$  (1ft) by  $0.3\,\mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Avoid in those with fits and epilepsy. Contraindicated with glaucoma patients. Avoid during pregnancy and breast-feeding. Allopathic medication for high blood pressure - effects increased [301].

kcakta Edible Parts: Edible Uses: Curdling agentThe fresh or dried herb can be added to sour plant milks. A few sprays are added to each litre of liquid and left until the liquid has soured thickly. The sprays are then removed. It gives a tangy taste to the milk, acts as a preservative and prevents the rancid taste that can accompany soured milk[183].

tcanta Baby care DyeA yellow dye is obtained from the flowers[4, 21]. A decoction makes a curative lotion for 'milk-crust' on the scalps of babies[4].

dwatta Antirheumatic Antispasmodic Aperient Cholagogue Diaphoretic Diuretic Eczema Laxative TonicFumitory has been highly valued since at least Roman times for its tonic and blood cleansing effect upon the body[244]. It is particularly valuable in the treatment of all visceral obstructions, particularly those of the liver, in scorbutic affections and in troublesome eruptive diseases of the skin, especially eczema (for which it can be taken internally and externally)[4, 9, 238]. The herb is antispasmodic, aperient, cholagogue, slightly diaphoretic, mildly diuretic, laxative and weakly tonic[4, 9, 21, 165, 240]. The plant is harvested as flowering begins in the summer and can be used fresh or can be dried for later use[9, 238]. Some caution should be exercised in the use of this herb since excess doses cause hypnotic and sedative effects, especially if it is taken for more than about 8 days[238, 244].

nrakta Most of Europe, including Britain, to the Mediterranean and east to Iran. ksacta Arable land and as a weed in gardens, usually on lighter soils[9, 17]. It is also found growing on old walls[244].

propta Seed - sow spring in situ. There is normally very little need to sow this seed, the plant normally self-sows freely and should manage quite nicely by itself.

nwatta Prefers a light well-drained soil in a sunny position[9, 17, 238]. This plant can be a common weed in some gardens, self-sowing freely, though it is fairly easy to conrol by hand weeding[K]. The flowers are seldom visited by insects, but they are self-fertile and usually set every seed[4].

# 5.2.810 Narcissus jonguilla

Iongui

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Narcissus jonquilla is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and

female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have no records for this species, many if not all members of this genus are poisonous[K].

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw or candied and made into desserts[183].

tcanta EssentialAn essential oil obtained from the flowers is used in perfumery[61, 100, 171]. 1 kg of flowers yields 1g absolute of essential oil[46].

nrakta Europe - Mediterranean. ksacta Rocky hillsides, often on limestone[90], also in meadows and damp places[50].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils[1]. Grows well in heavy clay soils. Easily grown in a dry sunny position[90]. Prefers an alkaline soil with a pH between 7 and 8[200]. A very ornamental plant[1], it is widely cultivated around the Mediterranean for its essential oil[50]. The blooms, which are almost intoxicatingly scented, have an undertone of orange in their perfume[245]. The double form, 'flora Pleno' is even more powerfully scented[245].

# 5.2.811 Disporum sessile

Japanese Fairy Bells

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Disporum sessile is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

nrakta E. Asia - Japan. ksacta Woods in hilly country and foothills all over Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe[175]. Use a lime-free compost and keep it moist[175]. Stored seed requires 6 weeks cold stratification and should be sown as early in the year as possible[175]. Germination usually takes place within 3-6 months or more at  $15^{\circ}$ c[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

nwatta Landscape Uses:Border, Woodland garden. Best grown in partial shade in a moist peaty or woodland soil[1, 175]. Plants spread rapidly[188] by means of creeping rhizomes when they are grown in a leafy soil[187]. This species is very closely related to Disporum nantouense, and both species could be identical[266]. Special Features:Attractive foliage.

medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit[5]. No more details are given. Leaves - raw[5, 52].

dwatta Antispasmodic Astringent Diuretic TonicThe plant is antispasmodic, astringent, diuretic and tonic[4, 172]. nrakta Europe, including Britain, from Iceland south and east to Spain, N. Asia to Japan. North N. America ksacta Coniferous woods, moors, damp rock ledges and dunes, on acid and calcareous soils in full sun or deep shade[5, 17].

propta Seed - the only information we have on this species is that it is difficult from seed and germinates infrequently[200]. We would suggest sowing the seed as soon as it is ripe if this is possible. Sow it into soil collected from around an established plant, only just covering the seed, and put the pot in a shady part of a cold frame. Pot up any young seedlings as soon as they are large enough to handle, once again using soil from around an established plant, Plant out into their permanent positions when the plants are large enough. You should not need to use soil from around an established plant to do this since the soil in the pot will contain the necessary micorrhiza. Division with great care in the spring[1, 111]. Pot up the divisions using some soil from around an established plant, grow on in a lightly shaded part of a greenhouse or frame and do not plant out until the plants are growing away vigorously[200].

nwatta Prefers a moist sandy woodland soil[111, 200] in a cool position with partial shade[1, 11, 200]. This is a very ornamental[1] but difficult plant to grow. It requires a my-corrhizal relationship in the soil and therefore needs to be grown initially in soil collected from around an established plant[200]. It is also very difficult from seed as well as being intolerant of root disturbance which makes division difficult[1]. The flowers have a soft almond scent[245].

# 5.2.787 Pimpinella saxifraga

Greater Burnet Saxifrage, Hollowstem burnet saxifrage 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Pimpinella saxifraga is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Photosensitivity possible in light skinned people. Care needed as pimpinella contains essential oils and saponins [301].

kcakta Edible Parts: Leaves SeedEdible Uses: CondimentAn essential oil from the roots is used as a flavouring in candy, liqueurs etc[183].

dwatta Antispasmodic Astringent Carminative Cholagogue Diaphoretic Diuretic Emmenagogue Ophthalmic Resolvent Skin Stomachic UrinaryThe leaves are diaphoretic, diuretic, resolvent and stomachic[4]. The plant is harvested as it comes into flower and dried for later use[4]. The root is anti-inflammatory, mildly astringent and expectorant[9]. The fresh root is very hot and acrid, but this pungency is greatly reduced when the root is dried[4]. When chewed, the fresh root is effective in treating toothaches and paralysis of the tongue[4]. An effective diuretic, the root is used in treating disorders arising from obstructions of the viscera[4]. The root is also used for soothing coughs or the effects of laryngitis and bronchitis[9]. The roots can be harvested in the spring or autumn and are dried for later use[9]. The seeds are carminative[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Pimpinella major Greater Burnet Saxifrage for cough/bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia south and east to Portugal, the Balkans and Caucasus. ksacta Hedge banks, woodland edges and other grassy places[9].

propta The seed requires a period of cold stratification. If you can obtain fresh seed then it is best sown immediately. This can be done in situ if you have sufficient seed, but if you only have a small quantity then it is safer to sow it in pots in a cold frame. Sow stored seed as soon as you can obtain it, this is probably best done in a cold frame. When they are large enough to handle, prick the pot-grown seedlings out into individual pots and plant them out in the summer.

nwatta Easily grown in any good soil[1], preferring rather moist conditions[187]. Grows best in a cool position[233]. Plants are hardy to about -20°c[187].

# 5.2.788 Rhododendron mucronula-

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Rhododendron mucronulatum is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it belongs to a genus where many members have poisonous leaves. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities[183].

kcakta Edible Parts: FlowersEdible Uses: Flower petals - raw[105]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - China, Japan, Korea and Siberia. ksacta Thin woods and open country, especially on volcanic

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in a most humus-rich lime-free soils except those of a dry arid nature or those that are heavy or clayey[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires[200]. A pH between 4.5 and 5.5 is ideal[1]. Hardy to about -25°c[184]. A very ornamental plant[1]. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. Plants form a root ball and are very tolerant of being transplanted, even when quite large, so long as the root ball is kept intact[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.789 Sedum kamtschaticum

Orange stonecrop, Kamschataka Sedum, Kamschataka Stonecrop

4 tlin 10 cyuc 1 kcak 0 tcan 2 dwat 0.1 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum kamtschaticum is an evergreen Perenial growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic

(mildly alkaline) soils. It cannot grow in the shade. It prefers  $\qquad \textbf{5.2.791} \quad \textbf{Campanula parrvi}$ dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Young leaves and stems - cooked[105, 177, 179].

tcanta Plants can be grown as a ground cover when planted about 30cm apart each way[208].

dwatta Anodyne Antiphlogistic PoulticeThe whole plant is anodyne and antiphlogistic. It stimulates the circulation[147]. A decoction is used in the treatment of traumatic injuries, bleeding cuts, burns and poisonous snakebites[147]. The fresh plant is crushed and applied externally to cuts, burns, traumatic injuries etc[218].

nrakta E. Asia - Japan to Siberia. ksacta Rocks in mountains all over Japan[58].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made. it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year [K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Specimen. Succeeds in most soils[188] but prefers a fertile well-drained soil[200]. Requires a sunny position[188, 200]. A very drought tolerant plant once established[190, 200], it can be grown in crevices on walls[219]. Hardy to about -15°c[200]. This species is closely related to S. hybridum[1] and S. aizoon[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Not North American native, Naturalizing.

#### 5.2.790 Oenothera odorata

4 tlin 8 cyuc 1 kcak 2 tcan 0 dwat 0.9 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Oenothera odorata is a PERENNIAL growing to 0.9 m (3ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies), bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves[105, 177]. No more details are given.

nrakta Southern S. America - Chile. ksacta Not known

propta Seed - sow early spring in a sandy medium in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Basal cuttings in spring. Harvest the shoots with plenty of underground stem when they are about 8 -10cm above the ground. Pot them up into individual pots of low-fertility soil and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant out in the following spring.

nwatta Prefers a dryish well-drained sandy loam and full sun[1, 200]. Heavy clay soils may induce winter rots[200]. Succeeds in poor soils. The flowers open in the evening, they are richly scented and are very attractive to moths. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

Parry's Bellflower, Idaho bellflower

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula parryi is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Leaves - raw or cooked

tcanta Miscellany MiscellanyThe chewed blossoms are depilatory[155].

dwatta Antiphlogistic Miscellany Miscellany Poultice SkinThe root is antiphlogistic[155]. A poultice made from the chewed root has been applied to bruises[257]. The plant has been taken by pregnant women who desired a female child[257]. The dried plant has been used as a dusting powder to treat sores[257]. The chewed blossoms have been applied to the skin as a depilatory[257].

nrakta South-western N. America. ksacta Moist subalpine meadows and other open places in mountains, 2100 3000 metres[60].

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[111]. Difficult, because the long runners do not take kindly to separation from the parent plant and are difficult to establish[221].

nwatta Prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Plants grow and spread freely in any light soil and do well when hanging over a wall[221]. Plants are hardy to at least -15°c[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Seed is freely produced in British gardens[221]. Plants are very attractive to slugs[221]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.792 Crocus kotschyanus

4 tlin 8 cvuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Crocus kotschyanus is a CORM growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from February to June, in flower from September to November, and the seeds ripen from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, butterflies. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Corm cooked[124].

nrakta N. Africa to W. Asia - Lebanon to Turkey. ksacta Scrub and rocky places, 500 - 2600 metres[90].

propta Seed - best sown as soon as it is ripe in a light sandy soil in pots in a cold frame[1]. The seed can also be sown in a cold frame in early spring[1]. Sow thinly because the seed usually germinates freely[1], within 1 - 6 months at 18°c[164]. Unless the seed has been sown too thickly, do not transplant the seedlings in their first year of growth, but give them regular liquid feeds to make sure they do not become deficient. Divide the small bulbs once the plants have It can grow in semi-shade (light woodland) or no shade. It 5.2.807 Hosta rectifolia

pcista This species is said to be poisonous to sheep. Although no mention of any toxicity to people has been seen it is wise to assume that it is toxic[187].

kcakta Edible Parts: Edible Uses: GumA chewing gum is obtained from the roots[155, 257].

tcanta Dve Gum MiscellanvA vellow dve is obtained from the flowers[155]. They are usually boiled up with juniper ash to obtain the dye[244].

dwatta Miscellany StomachicThe plant is used as a remedy for vomiting[155, 257]. A snuff made from the crushed blossoms and the leaves of Psoralidium lanceolatum has been inhaled in the treatment of headaches and hav fever[257].

nrakta South-western N. America. ksacta Rich soils in coniferous forests, in meadows along stream sides and on wet slopes, 2250 - 3300 metres in the Southern Rockies[71,

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed it might be worthwhile trying a sowing in mid to late spring in situ outdoors[111]. Cuttings of soft wood from the base of the plant, June/July in a frame. Basal cuttings in spring[200]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn[111]. This needs to be done fairly regularly because the clumps soon become congested[233]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Landscape Uses:Border, Container, Grows well in ordinary garden soil[1, 111], succeeding in most conditions other than boggy soils[233]. It prefers a fertile moisture retentive soil[200] in a sunny position[108, 111]. Dislikes dry soil[200]. This species is hardy to about -25°c[187]. Plants seem to be immune to the predations of rabbits[233]. A good bee and butterfly plant. Special Features:North American native, All or parts of this plant are poisonous, Suitable for cut flowers.

# 5.2.806 Stachys hyssopifolia ambigua

hyssopleaf hedgenettle

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stachys hyssopifolia ambigua is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Eaten as a vegetable[178]. No more details are given, it is likely to be the roots or the leaves that are eaten[K].

dwatta Astringent Carminative DeodorantThe plant is astringent, carminative and deodorant[178, 218].

nrakta E. Asia - Japan, Eastern N. America - Pennsylvania to Illinois, south to Florida. ksacta Damp sands, swamps and prairies[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Succeeds in any deep well-drained moderately fertile soil in full sun or light shade[200]. A good bee plant[200].

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Hosta rectifolia is a PERENNIAL growing to 0.6 m (2ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: Leaves StemEdible Uses: Young leaves and leaf stems - cooked[105]. Not very tasty[116].

tcanta A useful ground cover plant, succeeding in dense shade, though rather slow spreading[197]. Plants should be spaced about 45cm apart each way[208].

nrakta E. Asia - N. Japan. ksacta Damp lakeside moor lands[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain, but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer, so any damage at this time has a deep effect on the plant[233]. A robust plant, forming medium-size to large clumps, the rhizome is slightly stoloniferous[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. Hybridizes freely with other members of this genus[200].

### 5.2.808 Mertensia oblongifolia

Oblongleaf bluebells

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mertensia oblongifolia is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

nrakta Western N. America. ksacta Open slopes and drier meadows, often amongst sagebrush, from the plains and foothills to moderate elevations in the mountains, occasionally to the alpine zone[60].

destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked. A famine food, used when all else fails[177].

nrakta E. Asia - China, Japan, Himalayas. ksacta Not

propta Spores - surface sow as soon as they are ripe in mid-winter and keep the soil moist. It is best to keep the pot in a sealed plastic bag to hold in the moisture. Pot up small clumps of the young plants as soon as they are large enough to handle and grow on in light shade until large enough to plant out. Division during the dormant season between October and March[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatfa Requires a moist but well-drained position and light shade[1, 187]. It grows well in heavy clay soils. Prefers a pH between 5 and 6.5[200]. Plants are hardy to about - 20°c[200]. Plants have an invasive root system and can send up suckers some distance from the main clump[233]. Members of this genus are rarely if ever troubled by browsing deer[233]. Fertile fronds are produced after the first flush of vegetative fronds and persist throughout the following winter. The spores are shed in mid-winter[200].

#### 5.2.803 Hosta clausa

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hosta clausa is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy (alay soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177].

tcanta The plant has a stoloniferous habit and makes an excellent dense ground cover[251].

nrakta E. Asia - Korea. ksacta Along the banks of rivers where it is subject to periodic inundation[251].

propta Seed - sow spring in a lightly shaded position in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. Make sure you keep the compost moist. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division is possible at almost any time of the year so long as there is sufficient moisture[233]. It is best carried out in March as growth commences or in early autumn if the soil is not too dry[200]. Hostas can be left undivided for many years and should not be divided any more frequently than once every 3 - 5 years to allow the leaves to reach maturity[200].

nwatta Thrives in most fertile soils if they are rich in humus[200]. Grows well in heavy clay soils and in sandy ones[208]. Very limy soils inhibit growth, but plants can thrive in such a situation if plenty of humus is added[208]. Prefers a pH between 6 and 7[200]. Requires a rich soil that does not dry out readily[1]. Succeeds in full sun as well as in deep shade, growing well in the semi-shade of a woodland[200, 233]. In general, the sunnier the position the moister the soil should be[233]. Plants are best not grown under trees in town gardens since the soot washed from the leaves of the trees in wet weather will tend to remain on the hosta[208]. Plants flower better when grown in a sunny position but the foliage is better when the plant is in a shady position[200]. Plants are in general fully hardy in Britain. but young leaves in spring can be destroyed by frost. New leaves are only produced in the spring and very early summer. so any damage at this time has a deep effect on the plant[233]. A spreading plant with stoloniferous roots, forming medium size clumps[200, 233]. A triploid species that is not often found in the wild, it does not flower very freely and

indeed there are forms that do not flower at all[251]. The cultivar 'Normalis' flowers more freely and is very showy, but is less stoloniferous and therefore less suitable for ground cover[251]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants are very attractive to slugs and snails, the young shoots in spring are especially at risk[111, K]. Hybridizes freely with other members of this genus[200].

# 5.2.804 Euphorbia marginata

Mountain Snow, Ghost Spurge, Ghost Weed 4 tlin 8 cyuc 1 kcak 3 tcan 1 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Euphorbia marginata is a ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

pcista The sap contains a latex which is toxic on ingestion and highly irritant externally, causing photosensitive skin reactions and severe inflammation, especially on contact with eyes or open cuts. The toxicity can remain high even in dried plant material[200]. Prolonged and regular contact with the sap is inadvisable because of its carcinogenic nature[214].

kcakta Edible Parts: Edible Uses: GumA latex from the plant is used for chewing[61, 177, 257]. Caution is advised, see the notes on toxicity above.

tcanta GumLandscape Uses: Border, Container, Specimer. A very ornamental plant, its long-lasting flowers are used in button holes[1]. Hybridizes with other members of this genus[200]. This genus has been singled out as a potential source of latex (for making rubber) for the temperate zone, although no individual species has been singled out[141]. Special Features: Attractive foliage, North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant. Dynamic accumulator.

dwatta Astringent Galactogogue Salve Women's complaintsAstringent, women's complaints. Used in the treatment of leucorrhoea[4]. An infusion of the crushed leaves has been used as a liniment in the treatment of swellings[257]. An infusion of the plant has been used to increase milk flow in nursing mothers[257]. Any medicinal use of this plant should be carried out with great care, see the notes above on toxicity[257].

nrakta Central N. America. A garden escape in S.E. Europe. ksacta Infrequent to locally abundant, the plant has a liking for calcareous soils of prairies, roadsides, pastures and waste places[228].

propta Seed - sow spring in situ. Germination usually takes place within 2 - 3 weeks at 20°c.

nwatta Prefers a light well-drained moderately rich loam in an open position[200]. Succeeds in dry soils[1]. The ripe seed is released explosively from the seed capsules[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

#### 5.2.805 Helenium hoopesii

Owls Claws, Orange Sneezeweed 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Helenium hoopesii is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable off: mildly acid, neutral and basic (mildly alkaline) soils.

died down, planting 2 - 3 bulbs per 8cm pot. Grow them on for another 2 years in a greenhouse or frame and plant them out into their permanent positions when dormant in late summer[K]. Plants take 3 - 4 years to flower from seed[200]. Division of the clumps after the leaves die down in spring[1, 200]. The bulbs can be replanted direct into their permanent positions if required.

nwatta Prefers a sandy loam[1]. Plants are easily grown in a bulb frame or in a sunny position outdoors[90], succeeding in a well-drained moisture-retentive soil[200]. A very ornamental plant[1]. Plants tend to move considerably from their original planting place because of their means of vegetative reproduction, it is therefore wise not to grow different species in close proximity[1]. Any planting out is best done in late spring and early summer[245]. Protect the corms from mice[1]. The flowers are only open during the day time, closing at night[245].

#### 5.2.793 Acinos rotundifolius

4tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Acinos rotundifolius is a ANNUAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe leaves are used as a flavouring with beans etc, and are said to be a substitute for summer savoury, Satureia hortensis[200], though we prefer that species[K].

dwatta Aphrodisiac StimulantAphrodisiac, stimulant[61].

nrakta S. Europe to Afghanistan in W. Asia. ksacta Not

propta Seed - sow early spring in a cold frame. If you have sufficient seed then you could try sowing in situ in April or May. Germination should take place within a month. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Succeeds in almost any well-drained soil, doing well in a hot dry soil[200].

#### 5.2.794 Pimpinella major

Greater Burnet Saxifrage, Hollowstem burnet saxifrage  $4 \, \text{tlin } 8 \, \text{cyuc} \, 1 \, \text{kcak} \, 0 \, \text{tcan} \, 2 \, \text{dwat m hkuc}$ 

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Pimpinella major is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Photosensitivity possible in light skinned people. Care needed as pimpinella contains essential oils and saponins [301].

kcakta Edible Parts: Edible Uses: CondimentAn essential oil from the roots is used as a flavouring in candy, liqueurs etc[183].

dwatta Antiinflammatory Astringent Carminative Diuretic ExpectorantThe leaves are diaphoretic, diuretic, resolvent and stomachic[4]. The plant is harvested as it comes into flower and dried for later use[4]. The root is antiinflammatory, mildly astringent and expectorant[9]. The fresh root is very hot and acrid, but this pungency is greatly reduced when the root is dried[4]. When chewed, the fresh root is effective in treating toothaches and paralysis of the tongue[4]. An effective diuretic, the root is used in treating disorders arising from obstructions of the visceral[4]. The

root is also used for soothing coughs or the effects of laryngitis and bronchitis[9]. The roots can be harvested in the spring or autumn and are dried for later use[9]. The seeds are carminative[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Pimpinella major Greater Burnet Saxifrage for cough/bronchitis (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia south and east to Portugal, the Balkans and Caucasus. ksacta Hedge banks, woodland edges and other grassy places[9].

propta The seed requires a period of cold stratification. If you can obtain fresh seed then it is best sown immediately. This can be done in situ if you have sufficient seed, but if you only have a small quantity then it is safer to sow it in pots in a cold frame. Sow stored seed as soon as you can obtain it, this is probably best done in a cold frame. When they are large enough to handle, prick the pot-grown seedlings out into individual pots and plant them out in the summer.

nwatta Easily grown in any good soil[1], preferring rather moist conditions[187]. Grows best in a cool position[233]. Plants are hardy to about -20°c[187].

#### 5.2.795 Arisaema dracontium

Green-Dragon

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Arisaema dracontium is a PERENNIAL growing to  $0.8~\mathrm{m}$  (2ft 7in) by  $0.5~\mathrm{m}$  (1ft 8in). See above for USDA hardness. It is hardy to UK zone 4. It is in flower in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

kcakta Edible Parts: RootEdible Uses: Root. Considered to be edible once it has been dried, aged and elaborately processed[222]. The root contains calcium oxalate crystals - these are destroyed by drying the plant or by thorough cooking[K].

dwatta Antiasthmatic Women's complaints The dried and aged root was used by the N. American Indians in the treatment of 'female disorders' [222, 257]. The plant (leaves?) were chewed in the treatment of asthma [213].

nrakta Eastern N. America - Quebec to Florida, west to Wisconsin, Nebraska and Texas. ksacta Rich moist woods[222]. Found mainly in wet woods and along the sides of streams, but sometimes also in dry soils[235].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame[134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1- 6 months at  $15\,^{\circ}\text{c}[134]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Prefers a cool peaty soil in the bog garden, wood-land garden or a sheltered border in semi-shade[90, 134, 200]. Prefers a loamy or peaty soil and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too hot or exposed[1, 200]. Tubers should be planted about 10cm deep[233]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants need protection from slugs[200]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year.

# 5.2.796 Cystopteris montana

Mountain Bladder Fern

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Cystopteris montana is a deciduous Fern growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. The seeds ripen from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: RootEdible Uses: Root. An emergency food, it is only used when all else fails[172].

nrakta Northern, but not arctic, Europe, including Britain, east to Siberia. Also in northern N. America. ksacta Damp, usually basic, rocks on mountains, 700 - 1100 metres in Northern England and Scotland[17].

propta Spores - best sown as soon as ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Germinates in 1 - 3 months at 20°c[164].Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Division in spring.

nwatta Prefers a shady position in a moist but well-drained soil, succeeding in most soil types[200]. Plants can be tolerate up to 4 hours direct sun per day[200]. Prefers a pH between 6.5 and 7, but tolerates a range from 5.5 to 7.5[200]. Prefers high humidity, plants die back early in dry seasons[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1]. Plants spread by means of a creeping rhizome[1].

# 5.2.797 Euonymus hamiltonianus maackii

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euonymus hamiltonianus maackii is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177].This report should be treated with some caution since many members of this genus are poisonous.

tcanta LatexRoots yield up to 6% gutta-percha, a nonelastic rubber used as an electrical insulator and in making plastics etc[74].

nrakta E. Asia - N. China, Korea. ksacta Shrubby formations in river valleys, coastal plains etc, usually on alluvial sands, occasionally on dry ridges with open forest[74].

propta Seed - best sown as soon as it is ripe in a cold frame[113]. Stored seed requires 3 months cold stratification so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate[74]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, taken

at a node, July/August in a frame. Very easy[200]. Root cuttings in winter[113].

nwatta Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. Cultivated for its latex in Russia, producing most when grown in open arid habitats[74].

# 5.2.798 Gentiana purpurea

4tlin8cyuc1kcak0tcan3dwat0.6~mhkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Gentiana purpurea is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta The root is sometimes used in the manufacture of gentian bitters[183].

dwatta Anthelmintic Antiinflammatory Antiseptic Bitter Cholagogue Emmenagogue Febrifuge Refrigerant Stomachic TonicThis species is one of several that are the source of the medicinal gentian root[4], the following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is guite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta C. and N. Europe. ksacta Meadows, pastures and the grassy bottoms of mountain corries, sometimes in scrub and thin conifer woodland, usually on lime-free soils[239].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored. with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soli in a sheltered position, a certain minimum of atmospheric blumidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to

grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is easily grown in a sandy, lime-free soil enriched with organic matter, so long as this is deep enough to accommodate the plant's roots[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. Plants are intolerant of root disturbance[200].

# 5.2.799 Mertensia ciliata

Mountain Bell, Tall fringed bluebells 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat priklwis hpa7tmwatli xre7t hjonli

druttå Mertensia ciliata is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Édible Parts: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

dwatta Antipruritic GalactogogueThe plant is galactogogue[257]. An infusion has been used to increase the milk flow of nursing mothers[257]. An infusion of the powdered root has been used to relieve the itching caused by smallpox and measles[257].

nrakta South-western N. America - Oregon to New Mexico. ksacta Streambanks, wet meadows, damp thickets and wet cliffs from the foothills to high elevations in the mountains[60, 172].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division, with care, in early spring or autumn[200].

nwatta Easily grown in an ordinary garden soil with some shade[1, 111]. Requires a moist peaty soil in full sun or light shade[187]. Plants are hardy to about -20°c[187]. A very ornamental plant[1].

# 5.2.800 Nemopanthus mucronatus

Mountain Holly

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Nemopanthus mucronatus is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 161]. Ouite bitter[257].

dwatta Diuretic TonicThe root is diuretic[257]. An infusion of the grated root is used in the treatment of gravel[257]. A decoction of the small branches, reduced to a syrup, has been used as a tonic[257].

nrakta Eastern N. America - Newfoundland to Ontario, south to Wisconsin, Indiana and Virginia. ksacta Damp woods, thickets and swamps[43].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification

and then a cold stratification may speed up the germination time[78, 80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early sumer, after the last expected frosts. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years[78].

nwatta Tolerates most soils except those that are water-logged[200]. Prefers a cold damp spoil[1]. Seldom fruits well in Britain[11, 182], the seed only matures in reasonable summers[1]. Most of the plants that have been supplied under this name in Britain this century are in fact llex collina[200]. Dioecious, male and female plants must be grown if seed is required.

# 5.2.801 Tricyrtis latifolia

4tlin8cyuc1kcak0tcan0dwat $0.6~\mathrm{m}$ hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Tricyrtis latifolia is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - cooked[105, 177].

nrakta E. Asia - China, Japan. ksacta Woods in mountains all over Japan[58]. Forests and forest margins in Hebei, Henan. Hubei. Shaanxi and Sichuan provinces in China[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Stored seed requires 12 weeks stratification at  $5\,^\circ\text{c}[200]$ . When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division just before growth starts in spring to single crowns[175]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a humus-rich fertile well-drained but moisture-retentive acid or neutral light sandy loam in partial shade[175, 200]. Prefers the dappled shade of a wood-land garden but tolerates full sun if the soil is reliably moist throughout the growing season[200], flowering earlier in such a position. Plants require a sunnier position when growing in northern Britain[233]. This species is hardy to about -20°c, but if prolonged cold weather is not accompanied by snow cover the plants will appreciate a good mulch of organic matter[187]. Plants are very susceptible to attacks by sluts[175].

#### 5.2.802 Matteuccia orientalis

4tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Matteuccia orientalis is a FERN growing to 0.6 m (2ft) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Melanthium virginicum is a PERENNIAL growing to 1.7 m (5ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista All parts of the plant are highly toxic[207]. dwatta AnthelminticThe root has been used to kill inter-

nal parasites[207].
nrakta Eastern N. America - New York to Florida,
Texas and Indiana. ksacta Lowland prairies and moist open
woods[228]. Bogs, marshes, wet woods, savannas, meadows,
along railroads at elevations of 10 - 800 metres[270].

propta Unless the seed is stored in damp sand at around 4°c it has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in a cold frame as soon as it is ripe[200]. Stored seed needs to be cold stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°c but can be much longer[200]. Sow the seed thinly so that it can be grown on in the pot without disturbance for the first couple of years. Give an occasional liquid feed in the growing season to ensure the plants do not become nutrient deficient. The plant produces just one seed leaf in its first year, this forms an overwintering bulb. At the end of the second year's growth, pot up the over-wintering bulbs, placing one or two bulbs in each pot. Grow them on in a lightly shaded position in a cold frame for at least another couple of years before planting them out into their permanent positions. It takes up to 10 years for the plant to reach maturity[200]. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils[42]. Grows best in a cool woodland garden or a north facing border[42]. Succeeds in acid soils in a bog garden[200].

#### 5.2.964 Populus maximowiczii

Doronoki, Japanese poplar

4 tlin 8 cyuc 0 kcak 2 tcan 1 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Populus maximowiczii is a deciduous Tree growing to 30 m (98th) by 8 m (26th) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June, and the seeds ripen from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Rooting hormone WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion. Used for wood pulp, boxes, timber for construction, ship building, and matchwood[11, 46, 61, 266].

dwatta Anodyne Antiinflammatory FebrifugeAlthough no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, antiinflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta E. Asia - China, Japan, Korea. ksacta Sunny fluvial plains and river banks, C. and N. Japan[58]. Woods at

elevations of 500 - 2000 metres in China[266].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the old frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

mwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumeutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. It does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. Trees are susceptible to bacterial canker[11]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200].

# 5.2.965 Eupatorium cannabinum

Hemp Agrimony

4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 1.5 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Eupatorium cannabinum is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

tcanta Preservative RepellentThe leaves have been laid on bread in order to prevent it from becoming mouldy[4]. The leaf juice has been rubbed onto the coats of animals as an insect repellent[7].

dwatta Alterative Antitumor Cholagogue Depurative Diaphoretic Diuretic Emetic Expectorant Febrifuge Homeopathy Laxative Purgative TonicHemp agrimony has been employed chiefly as a detoxifying herb for fevers, colds, flu and other viral conditions. It also stimulates the removal of waste products via the kidneys[254]. Due to its content of alkaloids, the plant should only be used under professional supervision[254]. The leaves and flowering tops are alterative, cholagogue, depurative, diuretic, emetic, expectorant, febrifuge, purgative and tonic[4, 7, 9, 21, 46, 238]. The plant has a long history of use as a gentle laxative that does not provoke irritation[7], though excessive doses cause purging and vomiting[238]. A tea made from the dried leaves will give prompt relief if taken at the onset of influenza[4]. Recent research has shown that the plant might have anti-tumour activity, though the plant also contains pyrrolizidine alkaloids that can cause damage or cancer to the liver[238]. The plant is harvested in the summer and dried for later use[7]. The roots are diaphoretic, laxative and tonic[7]. They are harvested in the autumn and dried for later use[238]. Recently the plant has been found of use as an immune system stimulant, helping to maintain resistance to acute viral and other infections[254]. A homeopathic remedy is made from the leaves[4]. It is used in the treatment of influenza and feverish chills[4] and also for disorders of the liver, spleen and gall bladder[9].

of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta S. Europe. ksacta Stony pastures, the grassy bottoms of mountain corries, screes and moraines, among rhododendrons and in conifer woods, on both limestone and igneous rocks[239].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is not particular about soil type, so long as it is deep enough to accommodate the plant's roots[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. Plants are intolerant of root disturbance[200].

# 5.2.859 Paeonia officinalis

Peony, Common peony

4 tlin 10 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Paeonia officinalis is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The entire plant is poisonous if taken in large doses[7, 21].

kcakta Edible Parts: FlowersEdible Uses: Condiment-Flowers - cooked. They can be used as a vegetable[177] or to scent tea[183]. The hot seeds are ground into a powder and used as a spice in ale or in the food that accompanies it[183]. (Does this mean that the seed is heated before grinding, or that it has a hot flavour?[K])

dwatta Anticonvulsant Antirheumatic Antispasmodic Diuretic Epilepsy Sedative TonicPeony root has been used medicinally for over 2,000 years and it gained a reputation as a treatment for epilepsy and to promote menstruation. This species was very popular up to the 16th century, but is little used in contemporary European herbalism, though it is sometimes employed where an antispasmodic and sedative are required[238, 254]. The root is antispasmodic, diuretic, sedative and tonic[4, 7, 21]. The root is harvested in the autumn from plants that are at least two years old and is dried for later use[4]. It has been successfully employed in the treatment of convulsions and spasmodic nervous affections such as epilepsy[4, 7]. It has also been used in the treatment of whooping cough whilst suppositories are sometimes made of the root to relieve anal and intestinal spasms[254]. This remedy should be used with caution and not at all by pregnant women. Large doses can be toxic[7, 21, 254]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta Europe - France to Albania. ksacta Rocky woodlands and meadows[1, 7], usually on limestone[187].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200] Stored seed is much slower it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance [250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Landscape Uses:Border, Foundation, Seashore, Specimen. Requires a deep rich soil, preferably neutral or slightly alkaline[1, 233], doing guite well in sun or light shade[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterloaged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Plants can be naturalised in grass so long as the soil is good[233]. Hardy to about -25°c[187]. A very variable plant, there are at least 4 sub-species[250]. There are a number of named forms, selected for their ornamental value[187]. A long-lived plant, living for 50 years or more in gardens[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. This species can spread fairly freely by means of its tuberous rootstock[233]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually selffertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 -5 years to flower from seed[200]. They generally breed true from seed[1]. Special Features:Not North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Fragrant flowers.

# 5.2.860 Mertensia paniculata

Tall bluebells, Alaska tall bluebells, Northern bluebells, Eastwood's bluebells

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Mertensia paniculata is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July. The

species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw[172]. Leaves - raw or cooked[172]. The leaves are rather hairy and are not so nice when eaten raw[172].

nrakta Western N. America - Hudson Bay to Alaska, south to Michigan, Nebraska, Idaho and Washington. ksacta Woods, moist meadows, damp thickets, wet cliffs, riverbanks, dry slopes and burn areas from the foothills to high elevations in the mountains[60, 172].

propta Seed - best sown in a cold frame as soon as it is ripe[1, 200]. Sow stored seed as early in the year as possible. Protect from direct sunlight[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division, with care, in early spring or autumn[200].

nwatta Easily grown in an ordinary garden soil with some shade[1, 111]. Prefers a deep moist but well-drained humus-rich soil in sun or semi-shade[200]. If the plant is cut down after flowering, it will normally produce another flush of flowers[233]. A very ornamental plant[233], it grows well in open woodland[200].

# 5.2.861 Solidago spathulata

Coast Goldenrod, Creeping Goldenrod 4 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Solidago spathulata is a PERENNIAL growing to 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: TeaLeaves and flowering stems - cooked[172]. Seed - used as a thickener in soups etc[172]. The seed is very small and fiddly to harvest[K]. A tea is made from the leaves and flowers[172].

tcanta Mustard, orange and brown dyes can be obtained from the whole plant [168].

dwatta Antiseptic Haemostatic SalveThe flowering stems are antiseptic, haemostatic and salve[168, 172]. An infusion of the dried powdered herb can be used as an antiseptic[168]. A poultice of the toasted, powdered leaves has been mixed with oil and used in the treatment of mumps[257].

nrakta Western N. America - California to Oregon. ksacta Found in a wide range of habitats from coastal sand dunes to inland and alpine areas[60].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Ground cover, Specimen, Woodland garden. Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. Judging by the plants native habitat, it is likely to be tolerant of maritime exposure[K]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. A rather greedy plant, it is apt to impoverish the soil[1]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will

help to control insect pests in the garden[201, 238]. Special Features: Attractive foliage, North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above.

#### 5.2.862 Ratibida columnifera

Prairie Coneflower, Upright prairie coneflower, Woolly Cinquefoil, Praire Coneflower, Mexican Hat 4 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ratibida columnifera is a PERENNIAL growing to 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: TeaA pleasant tasting tea is made from the leaves and flower heads[161, 177, 183, 257].

dwatta Analgesic FebrifugeThe leaves and stems are analgesic[257]. An infusion is used to relieve the pain of headaches and to treat stomach aches and fevers[257]. A decoction is used as a wash to relieve pain and to treat poison ivy rash[257]. The decoction is also used as a wash to draw the poison out of a rattlesnakes bite[257].

nrakta Western N. America - British Columbia to Montana, Nebraska, Texas, New Mexico and Mexico. ksacta Dry plains, prairies and ravines[43]. Sandy, silty, or rocky open ground in Texas[274].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame in early spring. Only just cover the seed and put the pot in a sunny position. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. Division in spring is possible but very difficult because the plant has a long taproot[200].

nwatta Landscape Uses:Border. Prefers a sunny well-drained border of fairly rich soil[1]. Established plants are extremely drought tolerant[200]. A very ornamental plant[1]. Although perennial, plants are sometimes grown as annuals, they flower in their first year from seed[200]. Special Features:North American native, Naturalizing, Suitable for cut flowers

#### 5.2.863 Hordeum jubatum

Foxtail Barley, Intermediate barley 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hordeum jubatum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The barbed awns around the seeds can work their way into the gums and digestive tract of animals when the seed is eaten, causing irritation and inflammation[212]. They can also work their way into the ears and eyes, sometimes causing blindness and even death[212].

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[2, 105, 161, 257]. The seed can be ground into a flour and used as a cereal in making bread, porridge etc[177, 183]. Native North Americans would eat the dry flour raw[257]. The seed is exceedingly small and fiddly to use[K]. The roasted seed is used as a coffee substitute[183].

dwatta The dry root can be wrapped, then moistened and used as a compress for styes in the eyes or on swollen eyelids[257].

#### 5.2.960 Geranium macrorrhizum

Bigroot Geranium

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat m hkuc

pcimhmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Geranium macrorrhizum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

tcanta Essential Pot-pourriThe very aromatic leaves have been used in the past as a source of geranium oil[187]. They are used in pot-pourri and perfumery[244]. A good dense ground cover plant[197, 200]. A very effective weed smotherer[187, 190]. Plants grow rampantly, rooting as they spread[208]. They should be spaced about 60cm apart each way[208].

dwatta AphrodisiacAphrodisiac[61].

nrakta C. Europe. A garden escape in Britain in S. Devon. ksacta Amongst limestone rocks, screes, in woods and scrub to 2100 metres[187]. Shady places, especially in mountains[50].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, virtually every bit of a divided plant, whether it has roots or not, will grow away and produce roots[190]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in dry or moist situations, in sun or light shade[187, 200]. Succeeds even in deep shade[208]. Tolerates a wide range of soil types, succeeding in any moderately fertile retentive soil[200]. Calcicole[50]. Established plants are drought resistant[190]. A very ornamental plant, there are many named varieties[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

# 5.2.961 Rhododendron ferrugineum

Alpenrose

hpa7tmwatli xre7t hionli

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat

drutta Rhododendron ferrugineum is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves and the galls are poisonous[61]. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities[183].

tcanta HerbicidePlants can be grown as ground cover when spaced about 1 metre apart each way[208]. Some substances in this plant have shown herbicidal activity, though more research needs to be carried out[7].

dwatta Antirheumatic Diaphoretic Diuretic HomeopathyThe flowers, leaves and the galls are antirheumatic, diaphoretic and diuretic[7, 9, 61]. It is used in the treatment of certain forms of arthritis and rheumatism, but can cause diarrhoea and vomiting so should only be used with expert supervision[9]. A homeopathic remedy is made from the plant[7]. It is used in treating a variety of complaints involving flatulence[7].

nrakta Europe. ksacta Mountain slopes in open woods or scrub, often dominant in the dwarf shrub zone[50].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively

sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in a most humus-rich lime-free soils except those of a dry arid nature or those that are heavy or clavey[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires[200]. A pH between 4.5 and 5.5 is ideal[1]. This species grows better in the midlands and north Britain, disliking the hotter conditions in the south[11]. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. Plants form a root ball and are very tolerant of being transplanted, even when guite large, so long as the root ball is kept intact[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 5.2.962 Euphorbia corollata

Wild Spurge, Flowering spurge

4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euphorbia corollata is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The sap contains a latex which is toxic on ingestion and highly irritant externally, causing photosensitive skin reactions and severe inflammation, especially on contact with eyes or open cuts. The toxicity can remain high even in dried plant material[200]. Prolonged and regular contact with the sap is inadvisable because of its carcinogenic nature[214].

tcanta This genus has been singled out as a potential source of latex (for making rubber) for the temperate zone, although no individual species has been singled out[141]. Dynamic accumulator.

dwatta Diuretic Purgative Skin UrinaryThe dried root is an excellent purgative, though it sometimes causes vomiting, it opens the body when other more violent purgatives fail to move it[4, 207, 222]. The plant has irritating and uncertain qualities and so is seldom used in herbal medicine[4]. A tea made from the leaves is used in the treatment of diabetes[222]. An infusion of the bruised roots has been taken in the treatment of urinary diseases[257]. The juice of the plant has been rubbed on the skin as a treatment for sores, eruptions etc, especially on children's heads[257]. A decoction of the plant, mixed with other herbs (these are not specified) has been used in the treatment of cancer[257].

nrakta Central N. America - Ontario to Massachusetts, Minnesota, Florida and Texas ksacta Dry soils[235] in fields and along roadsides[222]. Clay soils in Texas[274].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Prefers a light well-drained moderately rich loam in an open position[200]. Succeeds in dry soils[1]. Hybridizes with other members of this genus[200]. The ripe seed is released explosively from the seed capsules[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

# 5.2.963 Melanthium virginicum

Runchflower

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1.7 m hkuc

drutta Herniaria hirsuta is a ANNUAL/PERENNIAL. See 5.2.958 Nabalus serpentarius above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

tcanta SoapA good ground cover plant, allowing spring bulbs to grow through it[200]. An aqueous extract of the plant is a hand cleanser, making the skin soft and supple[240].

dwatta DiureticThe plant is diuretic[240]. It is used in the treatment of sore throats[240]. The plant contains coumarins and saponins, which are toxic, and so it should be used with some caution.

nrakta Central and Southern Europe to Africa and Asia. Naturalized in Britain. ksacta Sandy ground[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Grows well in hot dry soils[1]. Dislikes excessive moisture[1]. Succeeds in very poor soils[1]. Useful for covering rocks or as a carpet bedding[1], it makes a good ground cover for spring bulbs since they can grow through it easily[200].

#### 5.2.957 Dipsacus sativus

Fuller's Teasel Indian teasel 4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Dipsacus sativus is a BIENNIAL/PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

tcanta Brush DyeThe dried flower heads are used for carding wool and as a clothes brush for raising the nap on woollen cloth[7, 46, 74, 169]. They are harvested with about 20cm of stem as soon as the flowers wither and are dried for later use[4]. A blue dye is obtained from the dried plant, an indigo substitute[74]. It is water soluble[74]. The colour is yellow when mixed with alum[148].

dwatta Cancer Diaphoretic Diuretic Homeopathy Stomachic WartsThe root is diaphoretic, diuretic and stomachic[7]. An infusion is said to strengthen the stomach, create an appetite, remove obstructions of the liver and treat jaundice[4]. The root is harvested in early autumn and dried for later use[7]. The plant has a folk history of use in the treatment of cancer, an ointment made from the roots is used to treat warts, wens and whitlows[4, 218]. A homeopathic remedy is made from the flowering plant[7]. It is used in the treatment of skin diseases[7].

nrakta Of uncertain origin. An occasional escape from cultivation in Britain[17]. ksacta Not known in a truly wild condition

propta Seed - best sown in early spring in situ[115]. The seed can also be sown from February to May or from August to October. All but the earlier sowings can be made outdoors.

nwatta Succeeds in most soils[1] but prefers clay[17]. Prefers a deep rich soil[169]. Requires a sunny position[169]. A good butterfly plant[24]. Fuller's teasel is occasionally cultivated for its seed head, which is used for carding cloth[1]. 2, 46]. The flowering heads are also much prized by flower arrangers because they keep their colour almost indefinitely when dried[7].

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Nabalus serpentarius is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semishade (light woodland). It prefers moist soil.

tcanta RepellentThe juice of the plant repels snakes[207].

dwatta AntidoteThe plant is said to be an antidote for snake bites[207].

nrakta Eastern N. America - Massachusetts to New York, Florida, Alabama and Mississippi. ksacta Fields and thickets[235]

propta Seed - surface sow in a greenhouse in spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected

nwatta Succeeds in shade or semi-shade in a moist but well-drained humus-rich neutral to acid soil[200].

#### 5.2.959 Delphinium elatum

Candle larkspur, English Larkspur 4 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Delphinium elatum is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[65, 172]. The plant is most toxic when it is young[200].

tcanta The seed contains 1.7% alkaloids and is used as an insecticide[240].

dwatta Anthelmintic Aperient Diuretic EmeticThe whole plant, but especially the seeds, is anthelmintic, aperient, diuretic and emetic[240].

nrakta E. Asia - Western Himalayas from Kashmir to Kumaon, ksacta Temperate areas from 3000 - 3600 metres[240]. Grassy slopes at elevations of 1900 - 2100 metres in Tibet[266]

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°c[200]. Temperatures above 15°c inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Landscape Uses:Border, Foundation, Massing. Seashore, Specimen. Prefers a rich well-drained soil that stays moist in the summer[111, 187]. Dislikes water-logged soils[200], it is liable to die out in heavy soils over winter[111]. Requires an open sunny position[188]. This species is the main parent of the many tall hybrid forms of delphiniums that are commonly grown as garden ornamentals[200]. A variable species in the wild, varying in height from 40cm to 2 metres[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features: Attracts birds, All or parts of this plant are poisonous, Suitable for cut flowers, Suitable for dried flowers.

nrakta Most areas of N. America to Siberia. An occasional casual in Britain. ksacta Grassy bushy places below 2500 metres in California.

propta Seed - sow in situ in March or October and only just cover the seed. Make sure the soil surface does not dry out if the weather is dry. Germination takes place within 2 weeks. Division in spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Prefers a rather dry soil[1] and a sunny position[200]. Succeeds in most soils and in climates ranging from sub-arctic to sub-tropical[171]. Easily grown in light soils[162]. Established plants are drought resistant[190]. A very short-lived plant, it is often only an annual[162], though it often self sows a little[190].

#### 5.2.864 Iris setosa

Beachhead Iris, Canada beachhead iris, Wild flag 4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlut hpa7tli flatprikhsom hpa7tmwatli fyifxre7t hjonli

drutta Iris setosa is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: RootEdible Uses: CoffeeRoot yields an edible starch[2, 105, 177, 183]. Caution is advised, see the notes above on toxicity. Roasted and ground seed is a coffee substitute[46, 61, 183, 257].

tcanta DyeA dye is obtained from the petals, but the colour is not specified[257].

dwatta LaxativeA decoction of the root is used as a laxative[257].

nrakta Northwestern N. America, coastal regions of E. Asia to Japan, ksacta Wet peaty meadows, riversides and open woods, sometimes also in brackish bogs[187].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in September after flowering. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Container, Massing, Specimen. Prefers a well-drained moist soil[79] but succeeds in most soils[42]. Dislikes lime and dry soils[42, 79]. The form from N. Hokkaido does not require an acid soil[187]. Cultivated for its edible root in Japan[2]. Many named forms have been selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, North American native, Naturalizing, All or parts of this plant are poisonous. Suitable for cut flowers.

# 5.2.865 Lycopodium lucidulum

Shining Club Moss 4 tlin 8 cvuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Lycopodium lucidulum is a FERN growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy) and medium (loamy) soils

and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers

pcista Although no records of toxicity have been seen for this species, a number of other members of this genus are said to be toxic and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: The plant is edible[161, 177].

tcanta MordantThe plant can be used as a mordant in dyeing[172].

nrakta N. America - Newfoundland to British Columbia south to South Carolina, Iowa and Tennessee. ksacta Cool woods from Newfoundland to Ontario and southwards.

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. The spores are generally produced in abundance but are difficult to grow successfully[200]. Layering of growing tips[200].

nwatta Thrives in a rough spongy peat in a shady position[1]. Requires a humid atmosphere[200]. Terrestrial members of this genus are hard to establish. The roots are delicate and liable to rot, most water being absorbed through the foliage[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Although looking more like a moss, this genus is closely related to the ferns[200].

# 5.2.866 Tulipa gesneriana

Tulip, Didier's tulip

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tulipa gesneriana is a BULB growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The bulb and the flowers have been known to cause dermatitis in sensitive people, though up to 5 bulbs a day can be eaten without ill-effect[65].

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[22] 61]. It can be dried and ground into a powder and then mixed with cereals when making bread etc[46, 105]. Some caution is advised, see the notes above on toxicity.

tcanta PollutionPlants have been grown indoors in pots in order to help remove toxins from the atmosphere. It has been shown to help remove formaldehyde, xylene and ammonia[259].

nrakta The origin of this plant is obscure, though it is naturalized in S.W. Europe, ksacta In and around cultivated land[50]

propta Seed - best sown in a shady part of the cold frame as soon as it is ripe in early summer[1], or in the early autumn[200]. A spring sowing of stored seed in the greenhouse also succeeds[K]. Sow the seed thinly so that the seedlings can be grown on without disturbance for their first growing season - apply liquid feeds to the pot if necessary. Divide the bulbs once the plants have become dormant, putting 3 - 4 bulbs in each pot. Grow the on in the greenhouse for at least the next year, planting them out when dormant. Division of offsets in July. Larger bulbs can be planted out straight into their permanent positions, or can be stored in a cool place and then be planted out in late autumn. It is best to pot up smaller bulbs and grow them on in a cold frame for a year before planting them out when they are dormant in late summer to the middle of autumn.

nwatta Easily grown in a sunny position in a well-drained sandy soil with added leafmould[1]. The bulbs are very hardy, surviving soil temperatures down to about -12°c[214]. This is a complicated species, or perhaps a group of very closely related species, some members of which are probably native to Europe[50]. It is a parent of the cultivated garden tulips[50]. The flowers are sweetly scented[245]. Bulbs

can be harvested in June after they have died down and then at the feet and moves up the body. There is no pain, the stored in a cool dry place, being planted out again in October[1].

#### 5.2.867 Conjum maculatum

Hemlock, Poison hemlock

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Conium maculatum is a BIENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista A very poisonous plant, the toxins are especially concentrated in the seed[1, 7, 10, 19, 62, 76]. The stems contain up to 0.06% of the toxic alkaloids, the leaves between 0.03 and 0.8%, the flowers from 0.09 to 0.24% and the green fruit from 0.73 to 0.98%[240]. The toxins, however, are very volatile and decompose readily[65], especially when the plant is dried or cooked[4]. The toxins paralyse the respiratory nerves, causing death by suffocation[238]. Children have been known to die after using the hollow stems as blowpipes[200]. The poisonous nature of the plant varies considerably, with many people believing that the plant is less toxic when grown in cooler climates[268].

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked[105]. Although toxic, plants found in the south of England are comparatively harmless and the leaves are used as a pot-herb[2]. They can also be dried for later use. The toxic principle is said to be destroyed by thorough cooking or drying[4, 100]. Caution is advised, especially on the remarks about plants in southern England[K]. See the notes above on

dwatta Analgesic Antirheumatic Antispasmodic Cancer Emetic Epilepsy Galactofuge Homeopathy SedativeHemlock is a very poisonous plant that has a long history of medicinal use, though it is very rarely used in modern herbalism[238, 254]. It is a narcotic plant that sedates and relieves pain[238]. The plant contains coniine, an extremely toxic substance that can also cause congenital defects[254]. The whole plant is analgesic, antispasmodic, emetic, galactofuge and sedative[4, 7, 9, 21, 213, 222]. It is a traditional folk treatment for cancer[222] and was formerly widely used internally in very small doses to treat a variety of complaints including tumours, epilepsy, whooping cough, rabies and as an antidote to strychnine poisoning[232, 254]. It is still used externally, usually in ointments and oils, in the treatment of mastitis, malignant tumours (especially breast cancer) anal fissure and haemorrhoids[238]. The leaves and stems should be harvested when the first fruits are forming, since they are then at their most active medicinally[4]. The fruits are gathered either when fully ripe, or before they turn from green to yellow, and are then dried[4]. Because of the extremely toxic nature of this herb, it is seldom employed nowadays[232]. Use with extreme caution and only under the guidance of a qualified practitioner[21, 238]. See also the notes above on toxicity. A homeopathic remedy is prepared from a tincture of the fresh plant, harvested when in flower[232]. It is used for treating complaints such as dizziness, coughs, insomnia, exhaustion[232], arteriosclerosis and prostate problems[7].

nrakta Europe, including Britain, from Norway and Finland south and east to N. Africa and Iran. ksacta Waste ground and in damp places, avoiding acid soils and heavy

propta Seed - best sown in situ as soon as it is ripe in the late summer. It usually germinates in the autumn.

nwatta A fairly common weed in Britain, it succeeds in most soils in sun or light shade and avoids acid soils in the wild. It prefers a damp rich soil[238]. This is the plant that Socrates is said to have used to kill himself, though this is probably an error[207]. It requires a large dose if it is to be lethal (this contradicts with the notes above on toxicity[K]), and death from this plant can be very painful whilst Socrates is said to have died without pain[207]. Another report says that poisonous doses cause paralysis, which starts

mind remains clear and lucid until death, which is caused by asphyxia when paralysis reaches the chest[232]. The whole plant has a foetid smell[7].

# 5.2.868 Arabis lyrata

Rock Cress, Kamchatka rockcress, Lyrate rockcress 4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arabis Ivrata is a BIENNIAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

kcakta Edible Parts: LeavesEdible Uses: Young leaves raw or cooked[177]. Rosettes of the lobed leaves are added to tossed salads or served as a green vegetable [257].

nrakta N. America - Alaska and southwards, N.E. Asia ksacta Ledges, cliffs (basic or circumneutral), gravels and sands[43]. Rocky and sandy places[235].

propta Seed - it is best to surface sow the seed as soon as it is ripe in a light position in a cold frame[134]. Seed can also be sown in spring. It usually germinates in 2 - 3 weeks at 21°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering[111]. Very easy, the divisions can be planted out straight into their permanent positions if reguired. Cuttings in a shady border in summer[1].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. This species of rockcress is considered an important first brood nectar plant for 'Karner Blue' butterfly (Lycaeides melissa samuelis Nabokov), an endangered species in North America. The following notes are based on the general needs of the genus. Easily grown in ordinary well-drained soil[1]

# 5.2.869 Dicentra canadensis

Squirrel Corn

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatprik

hpa7tmwatli xre7t hjonli

drutta Dicentra canadensis is a PERENNIAL growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist

pcista The plant is potentially poisonous and can also cause skin rashes[222]

kcakta Edible Parts: RootEdible Uses: Root. No further details are given.

dwatta Alterative Diuretic Tonic VDThe dried tubers are alterative, diuretic and tonic[4, 46, 61]. The tubers are useful in the treatment of chronic cutaneous affections, syphilis, scrofula and some menstrual complaints[4, 213].

nrakta Eastern N. America - S. Quebec, Minnesota, N. Carolina, Tennessee. ksacta Rich woods[43]. Deciduous woods, often among rock outcrops, in rich loam soils from sea level to 1500 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[134]. Stored seed should be sown in early spring[175]. Germination usually takes place within 1 - 6 months at 15°c[175]. Two weeks warm stratification at 18°c followed by six weeks at 2°c can shorten up the germination time[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the

soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Two allergens producing strong skin reactions and a haemaglutinating action have been isolated from timothy pollen. The pollen contains several flavonol-glycosides. among them dactylin (isorhamnetin-31,4-diglucoside)[269].

tcanta Biomass Fodder HairThe stems have been used to make hair brushes[257]. The plant can yield up to 15 tonnes of plant material per hectare and is a potential source of biomass[269].

dwatta CancerStored sterile timothy extracts arrested the growth of Sarcoma 45 and other tumour types[269].

nrakta Britain, ksacta Common in meadows throughout Britain, though rare in the north[17].

propta Seed - sow spring in situ, only just covering the seed. If seed is in short supply, it can be surface sown in a pot in a cold frame. Ensure the pot does not dry out. When large enough to handle, prick the seedlings out into individual pots and plant out in the summer. Division in spring.

Standard Staple Crop: Balanced carbAn easily grown plant. it succeeds in a sunny position in any ordinary soil[200]. The plant is not drought tolerant[269]. Timothy grass is reported to tolerate an annual precipitation in the range of 35 to 176cm, an annual temperature range of 4.4 to 18.6°C, and a pH of 4.5 to 7.8[269]. The plant is best adapted to a cool, humid, temperate climate, growing best on rather heavy, deep and moist or even wet soils[269]. Yields are lower on light dry soils and sands[269]. The optimum temperature for growth is 18.3° - 21.6°C varying with day/night temperatures of 15°/10°C and 21°/15°C[269]. Timothy grass is a very variable species that is commonly grown as a hay grass. Several named forms have been develoed[17, 269]. A short-lived perennial it is a common cause of hayfever[257]. An attractive addition to the wild flower meadow, the inflorescence dries and dyes well so is used in dried flower displays[200]

# 5.2.954 Chamaecrista fasciculata

Golden Cassia, Partridge pea

4 tlin 8 cyuc 0 kcak 1 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chamaecrista fasciculata is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant is considered toxic for grazing animals[274].

tcanta Soil stabilizationPlants have an extensive root system and are used to stabilize soils. Grown as an ornamental or for honey production.

nrakta Eastern, Central and South-eastern N. America. ksacta Open woods and prairies, disturbed areas, often on sandy soils[274].

propta Seed - scarify and then pre-soak the seed for 2 - 3 hours in warm water before sowing it from early spring to early summer in a warm greenhouse[138]. The seed usually germinates in 1 - 12 weeks at 23°c[138]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse. Do not plant them out until the following spring[138]. Division as growth commences in spring[11]. Cuttings of moderately ripe wood, Iuly in a frame[1].

nwatta Succeeds in most well-drained soils but prefers an open sandy loam in a sunny sheltered position[1, 200]. Established plants are drought tolerant[200]. Succeeds in light shade, but the plant is much less vigorous when grown in dry shade[200]. Young plants should be mulched each winter until they are well established[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 5.2.955 Daphne genkwa

Lilac Daphne

4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Daphne genkwa is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista All parts of the plant are poisonous[76]. Skin contact with the sap can cause dermatitis in some people[200].

dwatta Abortifacient Anticoagulant Antiseptic Antitussive Antiviral Diuretic Purgative Stomachic VesicantThis plant has a history of herbal use going back over 3,500 nwatta Fodder: Pasture Management: Hay Management: years[238]. It is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. The flower buds are a bitter acrid herb that is used to control coughs. The buds are anticoagulant, antiseptic, antitussive, antiviral, diuretic, purgative and stomachic[147, 174, 175, 176, 178, 218]. They are used internally in the treatment of bronchitis, constipation, oedema and skin diseases[238]. The buds are also used as an abortifacient[238]. They are applied externally in the treatment of frostbite[238]. The buds are harvested and dried in the spring[238] and are used after they have been stored for several years[174]. The root is abortifacient, anticoagulant, diuretic, purgative and vesicant[218].

> nrakta E. Asia - N. and C. China, Korea. ksacta Margins of paddy fields, hillsides and valleys[11, 147]. Grassy hills and plains, limestone cliffs, on boulders, on conglomerate and in piles of stones removed from fields[184].

> propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at 20°c followed by 12 - 14 weeks at 3°c. Germination may still take another 12 months or more at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, December in a greenhouse.

> nwatta There is some disagreement over whether this species needs an acid or alkaline soil. According to some reports it requires a lime-free porous soil and semi-shade[1, 200] whilst another report says that it is probably best in a deep rubbly well-drained soil in a warm corner and kept well watered in a dry growing season[11]. Yet another report says that it grows best in a neutral to alkaline soil in sun or semi-shade[238]. A good sandy loam suits most members of this genus[11]. Plants are hardy to about -20°c, but they are short-lived and difficult to grow in cultivation in Britain[11, 184]. This might be because our summers are not warm enough for the plants to develop properly[11, 184], they seem to be fully hardy after hot summers[188]. It is tricky to get this plant to flower because the buds are formed in the autumn on wood of that year's growth and they may not survive our variable winters[11, 182]. Produces suckers when growing in its native habitat. Plants are best grown on their own roots, grafted plants tend to be unsatisfactory. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible[188].

# 5.2.956 Herniaria hirsuta

Hairy Rupture Wort

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

dwatta Diuretic Emetic Expectorant Tonic VermifugeA tea made from the roots is vermifuge and a tonic for general debility[4, 61, 222]. A tea made from the leaves is emetic, it has been used in the treatment of coughs, lung ailments and asthma[4, 61, 222]. A resin in the plant is diuretic[4, 61,

nrakta Eastern N. America - Ontario to Tennessee, Ohio and Indiana. ksacta Prairies, dry woods and glades[222,

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[188]. This is very difficult due to the deep and extensive root system.

nwatta Succeeds in any ordinary garden soil[1]. Prefers a deep moisture retentive moderately fertile soil that is not too nitrogen rich, in sun or dappled shade[200]. Succeeds in the wild or woodland garden[200]. Plants have a deep and extensive root system which makes transplanting difficult[200].

### 5.2.951 Coreopsis auriculata

Tickseed, Lobed tickseed, Mouse-eared Coreopsis, Eared

4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 1.5 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Coreopsis auriculata is a PERENNIAL growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta DyeLandscape Uses: Border, Container, Massing. An orange to red/orange dve is obtained from the flowers and stems[168]. Established plants are drought resistant[1]. Special Features: Attracts birds, North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers. The shorter cultivar Coreopsis auriculata 'Nana' (Dwarf Mouse-ear Tickseed, Lobed Tickseed 'Nana') is a good low ground cover performing best with consistent moisture.

nrakta South-eastern N. America - Florida and Louisiana, north to Virginia and Kentucky, ksacta Rich calcareous hardwoods and openings[43].

propta Seed - sow March in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer[111]. The seed can also be sown in an outdoor seedbed in mid spring. Once they are more than 15cm tall, plant the seedlings out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. Cuttings of young basal shoots, May/June in a frame[200]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1]. Prefers a fertile well-drained moisture retentive medium soil[111, 200]. Requires a sunny position[111, 200]. Established plants are drought resistant[1]. Plants are apt to die out overwinter if they are grown on clay soils[111]. A good bee plant[200]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size

shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2]. The shorter cultivar Coreopsis auriculata 'Nana' (Dwarf Mouse-ear Tickseed, Lobed Tickseed 'Nana') is useful for borders, edging, rock gardens and ground cover performing best with consistent moisture. It spreads by stolons but is not invasive. Height: 15-30 cm (6-12 in) Spread: 15-30 cm (6-12 in).

### 5.2.952 Verbascum nigrum

Dark Mullein, Black mullein

4 tlin 8 cyuc 0 kcak 2 tcan 3 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Verbascum nigrum is a BIENNIAL/PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Dynamic accumulator.

dwatta Anodyne Antiseptic Demulcent Diuretic Expectorant PectoralThe flowers and leaves are anodyne, antiseptic, astringent, demulcent, emollient, expectorant, pectoral and vulnerary[21, 238]. An infusion is used internally in the treatment of various respiratory complaints including coughs, bronchitis, asthma and throat irritations[238]. An infusion of the fresh or dried flowers in olive oil is used to treat earaches, sores, wounds, boils etc[238]. The plant is harvested when in flower and should be dried quickly and with care or it will lose its medicinal qualities[238].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, Siberia, Macedonia, Caucasus. ksacta Waysides and open habitats on banks etc, usually on dry calcareous soils[17, 200].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200]. Division in spring. This plant is a short-lived perennial that grows away very well from seed, so we do not try and divide

nwatta An easily grown plant, it succeeds in most welldrained soils, including dry ones, preferring a sunny position[111, 200]. Dislikes shade and wet soils[124, 200]. Plants only really thrive when they are grown on chalky soils[200]. Prefers a light soil[200]. This species is fairly reliably perennial[200], but only when grown on light or medium soils[111]. A very ornamental plant, it often selfsows[1, 111]. Hybridizes with other members of this genus. though the progeny are usually sterile[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen fibrous or tap root [2-1].

# 5.2.953 Phleum pratense

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phleum pratense is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) last expected frosts. Division in early spring[200]. Larger root stalks were used by some native North American Indian clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings 7 - 10cm long in sandy soil in a cold frame[200].

nwatta Easily grown in a rich light soil[1], preferably neutral to slightly acid[200]. Prefers light shade and a sheltered position according to one report[175] whilst another says that it prefers heavier shade[200]. Grows well in a sheltered corner of the rock garden. The seed is very difficult to harvest, it ripens and falls from the plant very quickly[134]. This species is closely related to D. cucullaria[270]. After fruit set, the bulblets of Dicentra canadensis remain dormant until autumn, when stored starch is converted to sugar. At this time also, flower buds and leaf primordia are produced below ground: these then remain dormant until spring[270]. Members of this genus are rarely if ever troubled by browsing deer[233]

# 5.2.870 Scabiosa fischeri

4 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Scabiosa fischeri is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked[105, 177].

nrakta E. Asia - E. Siberia to Manchuria. ksacta Dry meadows, grass plots in light coniferous forests, steppes, rubbly mountain slopes and riparian sands[74].

propta Seed - sow spring in a cold frame. The seedlings are subject to damping off[1] so water with care and make sure to give adequate ventilation. Prick out the seedlings into individual pots once they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer

nwatta Prefers a neutral or alkaline soil and a sunny position[200]. Succeeds in ordinary garden soil[1]. A very ornamental plant[1]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.871 Trillium ovatum

Wakerobin, Pacific trillium, Oettinger's trillium, Hibberson's

4 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0 4 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trillium ovatum is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.2 m (0ft 8in). See above for USDA hardiness It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: LeavesEdible Uses: The leaves are sometimes cooked for greens[212].

dwatta Birthing aid Ophthalmic SkinA decoction of the fresh or dried powdered root is used as a treatment for sore eyes[207]. The fresh root juice can be dripped into an afflicted eye[257]. The juice of the plant can be applied externally as a treatment for boils[257]. A poultice of the root can be used as a treatment for boils[257]. The thick underground tribes during childbirth[212].

nrakta Western N. America - Montana to British Columbia, south to California and Colorado. ksacta Rich woodlands[165]. Damp woods or boggy areas in partial shade, from low valleys to elevations of 2,000 metres[212].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 -3 months at 15°c. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138], whilst yet another report says that the seed can take 3 years to germinate[238]. The seedlings are prone to damp off and must therefore be watered with care and given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Prefers a deep well-drained woodland or humusrich soil in a somewhat shady position that remains moist in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open woodland[1]. Succeeds in deep shade[188]. Succeeds in a sunny position if the soil does not dry out[42]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233], though slugs are very fond of the leaves[238].

# 5.2.872 Carlina acanthifolia

4 tlin 8 cvuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Carlina acanthifolia is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowering head - cooked. Used as a globe artichoke substitute[2, 105, 177, 183], though they are considerably smaller and even more fiddly[K].

nrakta S. Europe. ksacta Stony places, pastures and rocks[100] on poor soils[200] in mountainous areas[50].

propta Seed - surface sow in a cold frame in the spring. The seed usually germinates in 4 - 8 weeks at 15°c[138]. As soon as they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in spring[111]. Difficult to do successfully because the plant resents root disturbance[138].

nwatta Succeeds in a sunny position in ordinary garden soil[111]. Prefers an alkaline soil[138]. Prefers a poor soil[200]. Plants are hardy to about -15°c[200]. A very ornamental plant[1]. This species resents root disturbance, it should be planted into its final position as soon as possible[138].

#### 5.2.873 Polystichum munitum

Giant Holly Fern, Western swordfern 4 tlin 8 cvuc 1 kcak 0 tcan 2 dwat m hkuc pcimhmim cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Polystichum munitum is an evergreen Fern growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year. Suitable for: light (sandy) and medium (loamy) soils. Suitable

pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: RootEdible Uses: Root - roasted[2, 105, 118, 161]. Peeled and then baked like potatoes[213]. The roots were generally viewed by the native North American Indians mainly as a famine food for use when little else was available[256]. The roots were generally harvested in the spring, before the plant came into growth then cooked and peeled before being eaten[256].

tcanta Hair LiningThe leaves are used for lining boxes, baskets, fruit drying racks etc and as a stuffing material in bedding[99, 118, 257]. A decoction of the rhizome treats dandruff[172]. Plants can be grown as a ground cover and are best spaced about 1 metre apart each way[208].

dwatta Antidandruff Birthing aid PoulticeAn infusion of the fronds has been used as a wash or poultice to treat boils and sores[213, 257]. The young shoots have been chewed and eaten as a treatment for cancer of the womb and to treat sore throats and tonsillitis[257]. The leaves have been chewed by women to facilitate childbirth[257]. The sporangia have been crushed and applied as a poultice to burns, sores and boils[213, 257]. A decoction of the rhizomes has been used in the treatment of dandruff[213, 257].

nrakta Western N. America - Alaska to California. ksacta There are two distinct varieties, var. munitum grows in moist coniferous woods, var. imbricans grows in rock crevices and rocky soils in dry coniferous soils[60]. Forms extensive colonies[187].

propta Spores - best sown as soon as they are ripe, though they can also be sown in the spring. Sow them on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division. This is best done in the spring.

nwatta Very hardy and easily grown in light shade in any reasonable soil[187]. Prefers a sandy humus-rich soil in a shady position that is moist even in winter[1]. Tolerates part sun for up to 6 hours a day if the soil remains moist[200]. It is possible that the var. imbricans will succeed in drier soils[K]. Prefers a pH in the range 6.5 to 7.5[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. A very ornamental plant[1], it is a robust clump-forming species[187]. Remove old fronds from the plant in the spring because they may harbour fungal diseases[200].

# 5.2.874 Dianthus barbatus

Sweet William

4tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dianthus barbatus is a PERENNIAL growing to 0.6 m (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: The flowers have a mild flavour and are used as a garnish for vegetable and fruit salads, cakes, desserts, cold drinks etc[183].

nrakta S. Europe. An occasional garden escape in Britain[17]. ksacta Meadows and woods[45].

propta Seed - sow May/June in a cold frame. The seed usually germinates in 2 - 3 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer or autumn[1]. The seed can also be sown thinly in an outdoor seedbed in late spring, the young plants being planted out in late spring or the autumn. Cuttings of half-ripe shoots, July in a frame[1]. Division in September[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Rock garden, Seashore, Specimen. Prefers a rich well-drained loamy soil in a sunny position, but succeeds in most soils including dry ones[1]. A very ornamental plant[1], its flowers are very attractive to butterflies and moths[17, 30]. The flowers have a strong clove-like scent[245]. Plants self-sow freely when grown in a suitable position[1]. Although the Sweet William is a perennial species, it is quite short-lived and degenerates after its second year. It is best treated as a biennial in the garden[200]. Special Features:Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers.

# 5.2.875 Gentiana scabra buergeri

4 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana scabra buergeri is a PERENNIAL growing to 0.5 m (IR 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light wooldand) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant and old leaves - cooked[105]. A famine food, used when all else fails[177, 179]

dwatta Anodyne Anthelmintic Antiinflammatory Antiseptic Bitter Cholagogue Eczema Emmenagogue Expectorant Febrifuge Pectoral Refrigerant Stomachic Tonic UrinaryThe root is antibacterial and stomachic[176]. It is used in the treatment of jaundice, leucorrhoea, eczema, conjunctivitis, sore throat, acute infection of the urinary system, hypertension with dizziness and tinnitus[176]. The root is harvested in the autumn and dried for later use. This species is one of several that are the source of the medicinal gentian root[4], the following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is guite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta E. Asia - China, Japan. ksacta Thickets, grassy places and wet meadows at low elevations and in the mountains of C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°c for a

pcista The plant is potentially poisonous[222]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274].

dwatta Emetic MiscellanyA tea made from the leaves is emetic[222]. A wash made from the stalks was used to treat neck and jaw sores[222]. A tea made from the root was used in the treatment of trembling limbs - it was applied to scratches made in the limb[222].

nrakta Eastern N. America - New Brunswick to Minnesota. ksacta Dry mostly sandy soils[235] in fields, meadows, glades and thickets[222].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Basal cuttings in spring[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering in moist sand, it forms roots at the nodes[200].

nwatta Requires a moist soil, succeeding in full sun or partial shade[111, 187, 200].

# 5.2.948 Astrantia major

Great Masterwort

4 tlin 9 cyuc 0 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Astrantia major is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles, insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Diuretic PurgativeA decoction of the root is purgative[7]. The root is harvested in summer to early autumn and can be dried for later use[7]. An infusion of the whole plant is a gentle diuretic[7].

nrakta C. and E. Europe. Naturalized in Britain. ksacta Moist woodlands and the banks of streams[7].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. Sow stored seed as early in the year as you can obtain it. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed then it can be sown in situ either as soon as it is ripe or in the following spring. Division in spring. Large clumps can be planted out straight into their permanent positions. Smaller clumps are best potted up and kept in a cold frame until they are growing away well and can then be planted out in the summer.

nwatta Landscape Uses:Alpine garden, Border, Massing, Seashore, Woodland garden. Prefers a fertile moisture retentive soil[200]. Succeeds in most well-drained soils[233] in full sun or part shade[200, 233]. Succeeds in an open woodland and along the sides of streams so long as the soil is well above the water level[200]. Plants are hardy to at least -17°c[200]. Plants spread by means of underground runners[233]. There are some named varieties, selected for their ornamental value[200]. The flowers are sometimes dried and used for winter decoration[200]. Special Features:Attractive foliage, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms.

#### **5.2.949** Aster novae

New England Aster

4 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hoa7tmwatli fyifxre7t hionli

drutta Aster novae-angliae is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower

from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta The root is analgesic, astringent, expectorant and febrifuge[257]. A poultice has been used in the treatment of pain, fevers and diarrhoea[257]. The ooze of the roots has been sniffed in the treatment of catarrh[257]. A decoction of the whole plant has been used in the treatment of all kinds of fevers and in the treatment of weak skin[257].

nrakta Eastern N. America. Naturalized in several areas of Britain[17]. ksacta Not known

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Container, Foundation, Massing, Rock garden, Seashore. Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but it also succeeds in partial shade[233]. Prefers a rich soil[1], but tolerates poor ones[233]. Plants are hardy to about -25°c[187]. A polymorphic species, there are many named varieties selected for their ornamental value[200]. Hybridizes freely with other members of this genus[200]. Plants need to be divided every few years, preferably in the spring, in order to keep the plant vigorous[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. Attracts butterflies and moths, it is also a good bee plant providing nectar in autumn[30]. Special Features: Attracts birds, North American native, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-21. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.950 Silphium terebinthinaceum

Prairie Dockm, Prairie rosinweed, Lucy Braun's rosinweed 4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Silphium terebinthinaceum is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

tcanta GumA gum or resin that is obtained from the stem can be chewed to cleanse the mouth and teeth[207].

tory of use as a medicinal herb, and has been widely cultivated to meet the demand for its use[4]. It is used extensively as a sedative and pain killer and is specifically used for pain affecting the urinary tract, especially when due to kidney stones[254]. Its sedative and antispasmodic effect makes it a valuable treatment for the symptoms of Parkinson's disease, relieving tremor and rigidity during the early stages of the disease[254]. This species is the form generally considered best for external use, whilst the white henbane (H. albus) is considered the most appropriate for internal use[4]. All parts of the plant, but especially the leaves and the seeds, can be used - they are anodyne, antispasmodic, mildly diuretic, hallucinogenic, hypnotic, mydriatic, narcotic and sedative[4, 9, 13, 21, 100, 165, 192, 218]. The plant is used internally in the treatment of asthma, whooping cough, motion sickness, Meniere's syndrome, tremor in senility or paralysis and as a pre-operative medication[238]. Henbane reduces mucous secretions, as well as saliva and other digestive juices[254]. Externally, it is used as an oil to relieve painful conditions such as neuralgia, dental and rheumatic pains[238, 254]. The leaves should be harvested when the plant is in full flower and they can then be dried for later use[4]. There is an annual and a biennial form of this species, both can be used medicinally but the biennial form is considered to be superior[4]. This is a very poisonous plant that should be used with great caution, and only under the supervision of a qualified practitioner[21, 238]. See the notes above on toxicity. The seed is used in the treatment of asthma, cough, epilepsy, myalgia and toothache[218]. The seeds are used in Tibetan medicine, they are said to have a bitter, acrid taste with a neutral and poisonous potency[241]. Anthelmintic, antitumor and febrifuge, they are used in the treatment of stomach/intestinal pain due to worm infestation, toothache, inflammation of the pulmonary region and tumours[241].

nrakta Much of Europe, including Britain, south and east to N. Africa and W. Asia. ksacta By the walls of fields, waste ground, near buildings and in stony places from lowlying ground near the sea to lower mountain slopes[7].

propta Seed - sow summer in a cold frame and pot on as soon as possible before the taproot is too long[200].

nwatta Prefers a sunny position[4] and a dry soil[19]. Succeeds in ordinary garden soil[1] but prefers an alkaline soil[200]. Plants succeed in sandy spots near the sea[4]. Cultivated commercially as a medicinal plant[57], only the biennial form is considered officinal[4]. Grows well in martitime areas, often self-sowing freely[200]. Older plants do not transplant well due to a brittle taproot[200]. The growing plant inhibits the growth of clover[18]. The flowers emit a sickly fishy smell[245].

#### 5.2.945 Nabalus albus

White Lettuce

4tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Nabalus albus is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

dwatta Antidote Diuretic GalactogogueThe powdered root is sprinkled on food to stimulate milk flow after childbirth[222]. A tea made from the roots is used as a wash for weakness[222]. A latex in the stems is diuretic, it is used in female diseases[222]. It is also taken internally in the treatment of snakebite[222]. A poultice of the leaves or roots is applied to snakebites, dog bites etc[222].

nrakta North-eastern N. America - Maine to Georgia, west to N. Dakota. ksacta Rich woods and thickets[222].

propta Seed - surface sow in a greenhouse in spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected freeth.

nwatta Succeeds in shade or semi-shade in a moist but well-drained humus-rich neutral to acid soil[200].

#### 5.2.946 Senecio jacobaea

Ragwort, Stinking willie

4 tlin 8 cyuc 0 koak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Senecio jacobaea is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous[4, 19]. The plant contains pyrrolizidine alkaloids, in isolation these substances are highly toxic to the liver and have a cumulative affect even when the whole plant is consumed[65, 254].

tcanta DyeA good green dye is obtained from the leaves, though it is not very permanent[4, 115]. A yellow dye is obtained from the flowers when alum is used as a mordant[4, 115, 168]. Brown and orange can also be obtained[168].

dwatta Antirheumatic Astringent Diaphoretic Diuretic Emmenagogue Expectorant HomeopathyThe plant is astringent, diaphoretic, diuretic, emmenagogue and expectorant[9, 21]. The plant is harvested as it comes into flower and is dried for later use[9]. Use with caution[21], when applied internally it can cause severe damage to the liver[9] See also the notes above on toxicity. An emollient poultice is made from the leaves[4]. The juice of the plant is cooling and astringent, it is used as a wash in burns, sores, cancerous ulcers and eye inflammations[4]. It makes a good gargle for ulcerated mouths and throats and is also said to take away the pain of a bee sting[4]. Caution is advised here since the plant is poisonous and some people develop a rash from merely touching this plant[K]. A decoction of the root is said to be good for treating internal bruises and wounds[4]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of dysmenorrhoea and other female complaints. internal haemorrhages and other internal disorders[9].

nrakta Europe, including Britain, south and east from Scandanavia to N. Africa, Caucasua and W. Asia. ksacta Waste ground and pastures on all but the poorest soils[4, 17]. It is often only an annual [17].

propta A noxious weed, it doesn't need any help in spreading itself about.

nwatta Succeeding on all but the poorest soils, this plant is a declared noxious weed in Britain spreading freely by seed. It should not be cultivated other than in controlled conditions for scientific research. Ragwort can be eradicated by pulling it up just before it comes into flower, or by cutting it down as the flowers begin to open (this latter may need to be repeated about six weeks later)[4]. Ragwort is a good food plant for the caterpillars of many butterfly and moth species, and is one of only two species that provide food for cinnabar moth caterpillars.

# 5.2.947 Lobelia spicata

Pale Spike, Palespike lobelia

4 tlin 8 cyuc 0 koak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lobelia spicata is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size. place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is happy in any reasonable soil[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. A very ornamental plant[1]. Plants are intolerant of root disturbance[200].

# 5.2.876 Artemisia glacialis

Glacier Wormwood

4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Artemisia glacialis is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: Edible Uses: CondimentThe herb is used as a flavouring in vermouth and liqueurs[183].

dwatta Digestive Expectorant Sedative StomachicClacier wormwood has similar medicinal properties to common wormwood, A, absinthum[7]. It is used locally where it grows wild. The whole plant is digestive, expectorant, sedative and stomachic[7]. An infusion of the herb has a marked effect upon mountain sickness[7]. A poultice of the plant is used as a first-aid remedy in the treatment of wounds[7].

nrakta C. Europe. ksacta Exposed rocky slopes in the Alps[190]. Schistose rocks and screes, 2000 - 3100 metres[50].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy

nwatta Requires a very well-drained light or medium soil and a sunny position[190]. Very intolerant of winter wet[190]. Established plants are drought tolerant[190]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Indiscriminate collection of this plant from the wild has made it an endangered species[7]. Members of this genus are rarely if ever troubled by browsing deer[233].

# **5.2.877** Lithospermum ruderale

Western Gromwell, Western Stoneseed 4 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 0.8 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lithospermum ruderale is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: The seeds have been used for food[257].

tcanta Beads DyeThe plant has been used as a dye and body paint[238]. No more details are given in the report, but it is likely that the root is used and the colour is some shade of red[K]. The hard, white, shiny seeds have been used as beads[257].

dwatta Antirheumatic Astringent Contraceptive Diuretic KidneyAn infusion or decoction of the root has been used as a diuretic in the treatment of kidney complaints and also to treat internal haemorrhaging, diarrhoea etc[61, 257]. A poultice of the dried powdered leaves and stems has been used to relieve the pain of rheumatic joints[257]. Some N. American Indian women drank a cold water infusion of the roots daily for six months to ensure permanent sterility[213]. Alcoholic extracts of the plant have been shown to eliminate the oestrus cycle and decrease the weight of the thymus and pituitary glands[213].

nrakta Western N. America - British Columbia to California. ksacta Open, fairly dry places from the foothills to moderate elevations[60].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings. Division.

nwatta Prefers a sunny position in a moderately fertile well-drained soil[200].

# 5.2.878 Chamaecyparis pisifera

Sawara cypress

4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 40 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Chamaecyparis pisifera is an evergreen Tree growing to 40 m (131ft) by 25 m (82ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It cannot tolerate atmospheric pollution.

pcista None Known

tcanta Agroforestry: Boundary, barrier or support. Pioneer. General: Ornamental tree. Limited as a source of timber, but widely cultivated as an ornamental, with many named cultivars. As of other members of the genus, the wood is valued in Japan for traditional construction work, but its relative scarcity and the often poor shape of layering trees limit its commercial use [1-7]. Wood Products: Containers including boxes, cases and cooperage. Furniture. Sawn or hewn building timbers. Beams For heavy and light construction. Shingles. Veneers. Musical instruments [1-7]. Good pioneer species with durable wood. Species and large growing cultivars for lawn specimen, shrub borders and screen. Dwarf cultivars for rock gardens, foundation plantings or specimen.

dwatta None Known

nrakta Native to central and southern Japan, on the islands of Honsh and Ky sh . ksacta Occurs where sympatric with the more ubiquitous C. obtusa, on wetter sites e.g. near mountain streams or in hollows with ground water near the surface. In those wet places trees can spread by the layering of branches to form small groves of clonal individuals. It is a minor constituent in mixed conifer/angiosperm forests. Its altitudinal range is from 280 m to 2600 m a.s.l. [1-7]

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Average, medium moisture, well-drained soils in full sun to part shade. Best in part shade. Prefers moist, fertile soils. Avoid wet, poorly-drained soils. Shelter from strong winds. Pruning is rarely needed. Winter Interest. Tolerates drought. Good pioneer species with durable wood. A number of varieties exist including: Chamaecyparis pisifera form. crassa Hayashi. Chamaecyparis pisifera form intermedia Hornib. Chamaecyparis pisifera var. filifera var. plumosa form. argenta Beiss. Chamaecyparis pisifera var. plumosa form. aurea Beiss. Chamaecyparis pisifera var. squarrosa form. leptoc Sieb. A large number of more compact cultivars including some dwarfs are available.

### 5.2.879 Populus x canadensis

Canadian Poplar, Carolina Poplar 4 tiin 9 cyuc 0 koak 3 tcan 1 dwat 40 m hkuc htut cyutli tcup hwicil hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Populus x canadensis is a deciduous Tree growing to 40 m (131ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Rooting hormone Shelterbelt WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. A fast-growing and wind resistant tree, it can be used in a shelterbelt planting[11]. 200]. In more exposed sites there is some wind-pruning[11]. The tree is late coming into leaf and so often escapes the spring storms[11]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11]. Wood - soft, moderately strong, easily worked, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11]. Used in making the staves of barrels and woodenware, it turns well. It makes an excellent fuel[99].

dwatta Anodyne Antiinflammatory FebrifugeAlthough no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, antiinflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta N. America. ksacta A group of naturally occurring hybrids between P. nigra and P. deltoidea[11].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in

the cold frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. This species is a hybrid and will not come true from seed. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78].

nwatta A very easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. This species is fairly wind resistant, though it does not do well in exposed upland sites[11]. It dislikes shade and is intolerant of root or branch competition[200]. A very fast growing tree, it grows for a longer period in the season than other poplars. This hybrid species contains a number of named forms, several of which have been selected for their ornamental value[11, 200]. Many of them are fast growing trees that are used in forestry and for shelterbelts[11, 200]. 'Serotina' and 'Robusta', in particular, are often used in shelter belt plantings. 'Serotina' is a male that responds well to pollarding but is slower in growth than some other cultivars[11]. 'Robusta' is a male and is freguently grown in forestry, as a screen and in shelterbelts[11]. The var. 'Regenerata' is tolerant of urban pollution[200]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms

# 5.2.880 Chamaecyparis obtusa

Japanese cypress

4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 40 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Chamaecyparis obtusa is an evergreen Tree growing to 40 m (131ft) by 25 m (82ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista None Known

tcanta Agroforestry: Shade and shelter. A good pioneer species. General-Ornamental. Materials: Essential oils, Pesticide, Wood/timber. Wood Products: Sawn or hewn building timbers, CarpentryJoinery (exterior/interior), For light construction. Shingles, Wall panelling [1-7].

dwatta None Known

nrakta Native to central Japan and widely cultivated in the temperate northern hemisphere. ksacta Occurs where sympatric with C. pisifera, on wetter sites e.g. near mountain streams or in hollows with ground water near the surface. In those wet places trees can spread by the layering of branches to form small groves of clonal individuals. It is a minor constituent in mixed conifer/angiosperm forests. Its altitudinal range is from 280 m to 2600 m a.s.l. [1-7]

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[KJ. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Prefers full sun on moist, well-drained soil, in areas of moderate to high humidity, and preferably where

(light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Large quantities of the plant are poisonous[19,

tcanta BasketryThe stems are used in basket making[7]. A very good ground cover for covering steep banks and shady places, spreading rapidly once established and forming a dense cover within 2 years[11, 28, 31, 190, 200]. It is less dense on dry or exposed sites[197]. Plants are best spaced about 60cm apart each way[208].

dwatta Antispasmodic Astringent Bitter Detergent Homeopathy Hypotensive Sedative Stomachic TonicThe plant is sedative and tonic[21, 53, 165]. It contains the alkaloid 'vincamine', which is used by the pharmaceutical industry as a cerebral stimulant and vasodilator[238]. Since the discovery of vincamine in the leaves, the plant has been used herbally to treat arteriosclerosis and for dementia due to insufficient blood supply to the brain[254]. The leaves are bitter, detergent and stomachic[7]. Taken internally, they are used in the treatment of internal bleeding, heavy menstrual bleeding and nosebleeds[254]. When crushed and applied to wounds they have astringent and healing properties[7]. A mouthwash is used to treat gingivitis, sore throats and mouth ulcers[254]. The leaves are gathered in the spring and dried for later use[7]. The root is antispasmodic and hypotensive[7, 19]. It is used to lower the blood pressure[19]. The root is gathered in the autumn and dried for later use[7]. The fresh flowers are gently purgative, but lose their effect on drying[4]. A homeopathic remedy is made from the fresh leaves[4]. It is used in the treatment of haemorrhages[4].

mrakta Europe, possibly also including Britain, from Denmark south and east to Spain and W. Asia. ksacta Fields, woodland edges, copses and hedgerows[7, 13, 17]. Ash and oak-hornbeam woods on better soils in central Europe[17].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if possible. Sow stored seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring just before active growth commences[78], or in autumn[1]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of mature wood of the current seasons growth, 5 - 10 cm long, October in a cold frame. Roots quickly. High percentage[78].

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Specimen. A very easily grown plant, it succeeds in almost any soil[200] but prefers those that are on the richer side[17]. It grows well in heavy clay soils. Plants are very shade tolerant but they do not flower so well in deep shade[11, 28, 31]. It grows well under deciduous trees[187], and in such a position it can succeed in dry soils[190]. Established plants are drought tolerant[190]. A very ornamental[1] and polymorphic plant[200], there are some named forms selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. This species rarely if ever sets seed in Britain[4]. It spreads rapidly by long trailing and rooting stems once it is established and will swamp out smaller plants[4]. Special Features: Attractive foliage, Not North American native, Naturalizing, Attractive flowers or blooms.

#### 5.2.942 Bromus ramosus

Hairy Brome

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bromus ramosus is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils.

It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Uncertainty', 'Despondency' and 'Dissatisfaction' [209].

nrakta Most of Europe south from Scandanavia, including Britain, to N. Africa and temperate Asia. ksacta Hedges and woods[17].

propta Seed - sow spring or autumn in situ and only just cover. Germination should take place within 2 weeks. If seed is in short supply it can be surface sown in a cold frame in early spring. When large enough to handle, prick out the seedlings into individual pots and plant them out in early summer. Division in spring. Large clumps can be planted out direct into their permanent positions whilst it is best to pot up smaller clumps and grow them on in a cold frame until they are ready to be planted out.

nwatta Succeeds in a sunny position in most well-drained soils[138, 200].

# 5.2.943 Stachys germanica

Downy Woundwort, German hedgenettle

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stachys 'germanica is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

dwatta Antiseptic PlasterThe leaves are densely covered with long white silky hairs, they have been used as a substitute for lint in dressing wounds[4]. The thick, lint-like leaves are both soft and strongly antiseptic[245].

nrakta Central and Southern Europe, including Britain, to N. Africa and the Orient. ksacta Pastures and hedge-banks[17], especially on limestone soils[4]. A very rare native of Britain, it is only found in Oxford, though is common in Europe[4, 17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into in dividual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Easily grown in any deep, well-drained and moderately fertile soil, preferring a position in full sun[200]. The plant is a short-lived perennial and is sometimes biennial[17]. Closely related to S. cretica and S. byzantina[200].

#### 5.2.944 Hyoscvamus niger

Henbane. Black henbane

drive away mice[207].

4 tlin 8 cyuc 0 kcak 0 tcan 4 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hyoscyamus niger is a ANNUAL/BIENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are very toxic[7, 10, 19, 65, 76]. Symptoms of poisoning include impaired vision, convulsions, coma and death from heart or respiratory failure[238]. tcanta RepellentThe leaves scattered about a house will

dwatta Anodyne Anthelmintic Antispasmodic Antitumor Diuretic Epilepsy Febrifuge Hallucinogenic Hypnotic Mydriatic Narcotic Sedative UrinaryHenbane has a very long his-

into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Requires a moist shady position[187]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Its roots are very difficult to eradicate[200]. It is best to only grow the male form in the garden to prevent unwanted seedlings popping up all over the place[200]. The growth is so dense and vigorous, with large leaves that can be 75cm or more across, that virtually no other plant is able to grow amongst this species[4]. Plants are a useful early nectar source for bees[200]. Dioecious, male and female plants must be grown if seed is required.

# 5.2.939 Dactylis glomerata

Cock's Foot, Orchardgrass, Ascherson's orchardgrass 4 tlin 8 cvuc 0 kcak 2 tcan 1 dwat 1 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hionli

drutta Dactylis glomerata is an evergreen Perennial growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to August, and the seeds ripen from Iuly to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista This plant is an important cause of hayfever[274]. tcanta Fodder Miscellany Soil stabilizationEnvironmental: Erosion control or dune stabilization. Land reclamation. Revegetation, Soil conservation. Plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200]. Having a deep root system, the plant is also useful for checking soil erosion[269]. The plant can be grown for biomass, annual productivity ranges from 2 to 37 tonnes per hectare[269]. If soil fertility is low, a large portion of the total production occurs in the spring, but if the soil is highly fertile, production is well distributed throughout the growing season[269]. Animal feed, fodder.

dwatta MiscellanyReported to be oestrogenic. the plant is a folk remedy for treating tumours, kidney and bladder ail-

nrakta Europe, including Britain, from Norway south and east to N. Africa and temperate Asia. ksacta Meadows, waste places, by roads and on downs[17].

propta Seed - surface sow in a cold frame in the spring and do not allow the compost to dry out[162]. Germination should take place within three weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. There is between 725,000 and 1,450,000 seeds per kilo[269]. If you have sufficient seed it can be sown outdoors in situ in the spring. Division in spring[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most good soils and also under the shade of trees[1, 115, 162]. Prefers a light well-drained soil, it does not thrive on heavy or poorly drained soils[200]. Plants tolerate an annual precipitation in the range of 31 to 176cm, an annual temperature range of 4.3 to 23.8°C and a pH in the range of 4.5 to 8.2[269]. The plant is adapted to humid temperate climates. It grows on almost any type of soil, but thrives best on heavier types, such as clays and clay loams. A drought-resistant plant, it will withstand high temperatures. Prefers areas with 480-750 mm annual rainfall, but will produce on rather poor dry soils[269]. Plants are hardy in all parts of Britain, though they are less winter-hardy than Phleum pratense or Bromus inermis and do not extend as far north in Europe[269]. A very variable plant[1]. There are both diploid and triploid forms[274]. Numerous strains have been developed, some coarse and stemmy, others good for hay and early grazing. Local ecotypes in the Mediterranean region are adapted to long hot dry summers. In Europe two types have been developed, one for pasture and one for hay. Pasture types produce more basal leaves and generally are more spreading than the hay types. Selections made in Canada. Sweden and Finland are improved for winter hardiness. Improved strains are more leafy, persistent and later flowering than unimproved commercial types[269]. An important food plant for the caterpillars of several lepidoptera species[30]. The plant is occasionally grown for lawns and is particularly well adapted for growing under shade[269]. However, this species does not make a good lawn grass because it is too coarse[1].

#### 5.2.940 Artemisia lactiflora

White Mugwort

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Artemisia lactiflora is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant might be poisonous in large doses[21]. Skin contact can cause dermatitis in some people[222].

dwatta Emmenagogue TonicWhite mugwort is a bitter aromatic tonic herb. The leaves and flowering stems are used internally in traditional Chinese medicine to treat menstrual and liver disorders[238].

nrakta E. Asia - China. ksacta Forest margins, shrublands, canyons, slopes, roadsides, river banks and thickets from low elevations to 3000 metres[266].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn. Basal cuttings in late spring. Harvest the young shoots when about 10 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted.

nwatta Landscape Uses:Border, Container, Seashore, Woodland garden. Easily grown in a well-drained circumneutral or slightly acid loamy soil, preferring a sunny position and a moisture-retentive soil[200]. Plants are tolerant of light shade[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. There are some named varieties selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Suitable for dried flowers

#### **5.2.941** Vinca minor

Lesser Periwinkle, Flower of Death, English Holly, Creeping Myrtle, Creeping Vinca, Common Periwink

4 tlin 9 cyuc 0 kcak 0 tcan 3 dwat m hkuc

pcimhmimhtut cyutli hgatkyuctcup hwicli hrasilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vinca minor is an evergreen Shrub growing to 0.2 m (Oft 8in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade

the trees can be protected from harsh winds. It is fairly free of pests and diseases. There are many cultivars, some quite dwarf. Other cultivars have excellent foliage coloration orunusual growth habit. Cultivars include:'Aurea' -golden foliage: 'Caespitosa' - rare, miniature, about six inches tall; 'Compacta' - dwarf, about three feet tall, dense, conical; 'Coralliformis' - branchlets reddish and contorted; 'Crippsii' - broad pyramid with spreading branches and golden foliage: 'Erecta' - columnar habit: 'Ericoides' - low, blue-gray foliage, 'Filicoides' -fern-like; 'Gracilis' - compact growth habit, tips of branchlets pendulous; 'Kosteri' - dwarf, three to four feet tall, branch tips curved: 'Mariesii' - dwarf, foliage variegated with yellowish white; 'Nana' - very dwarf, height and spread of two feet; 'Pygmaea' - dwarf, two feet tall, wider than tall; 'Stoneham' - slow, dwarf, tiered branching; 'Tetragona' - slow, dwarf, erect.

# 5.2.881 Betula schmidtii

4 tlin 8 cvuc 0 kcak 3 tcan 0 dwat 30 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Betula schmidtii is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The aromatic and aliphatic hydrocarbons in birch tar are irritating to the skin. Do not use in patients with oedema or with poor kidney or heart functions [301]

tcanta WoodWood - hard, heavy (it does not float). Used for rollers, mallets etc[151].

dwatta Antiseborrheic UrinaryThe German Commission E Monographs, a therapeutic guide to herbal medicine, approve Betula species for infections of the urinary tract, kidney and bladder stones, rheumatism (see [302] for critics of commission E)

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Temperate broad-leaved forests at elevations of 700 - 800 metres[266]

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position[78, 80, 134]. Spring sown seed should be surface sown in a sunny position in a cold frame[113, 134]. If the germination is poor, raising the temperature by covering the seed with glass can help[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it can be sown in an outdoor seedbed, either as soon as it is ripe or in the early spring - do not cover the spring sown seed. Grow the plants on in the seedbed for 2 years before planting them out into their permanent positions in the winter [78, 80, 113,

nwatta Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. Hybridizes freely with other members of this genus[50]. Trees are succeeding very well at Kew[11]. Trees are notably susceptible to honey fungus[200].

# 5.2.882 Populus 'Balsam Spire'

Tacatricho 32

4 tlin 8 cvuc 0 kcak 2 tcan 3 dwat 30 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Populus 'Balsam Spire' is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Pot-pourri Rooting hormone Shelterbelt WoodAn extract of the shoots can be used as a rooting hormone for all types of cuttings. It is extracted by soaking the chopped up shoots in cold water for a day[172]. The dried buds are used in pot-pourri[238]. Wood - soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion. Of low quality, it is mainly used as a source of pulp[11, 46].

dwatta Anodyne Antiinflammatory Antiscorbutic Antiseptic Balsamic Diuretic Expectorant Febrifuge Stimulant TonicThe leaf buds are covered with a resinous sap that has a strong turpentine odour and a bitter taste[213]. They also contain salicin, The buds are antiscorbutic, antiseptic, balsamic, diuretic, expectorant, stimulant and tonic[4, 21, 57, 165, 238]. They are taken internally in the treatment of bronchitis and upper respiratory tract infections. They should not be prescribed to patients who are sensitive to aspirin[238]. Externally, the buds are used to treat colds, sinusitis, arthritis, rheumatism, muscular pain and dry skin conditions[238]. They can be put in hot water and used as an inhalant to relieve congested nasal passages[213]. The buds are harvested in the spring before they open and are dried for later use[238]. Although no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a glycoside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta A hybrid, P. balsamifera x P. trichocarpa. ksacta Not known in the wild.

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. This species is a hybrid and will not come true from seed. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy, the cuttings grow away strongly and can be 2 metres tall by the end of their first year[K]. Suckers in early spring[78].

nwatta An easily grown plant, it grows well in a heavy cold damp soil[1]. It prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11] Reasonably wind tolerant, though it does not do well in exposed upland sites or in maritime exposure[11, K]. It dislikes shady positions, and is intolerant of root or branch competition[200]. A very fast growing hybrid, this plant is a female clone that is sometimes planted for forestry[11]. It comes into leaf early in the year[11]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required.

#### 5.2.883 Populus x canescens

Grev Poplar

4 tlin 9 cyuc 0 kcak 2 tcan 1 dwat 30 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Populus x canescens is a deciduous Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from February to March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

tcanta Shelterbelt WoodA fast growing tree, tolerant of salt winds, it can be grown in a shelterbelt[200]. Wood soft, rather woolly in texture, without smell or taste, of low flammability, not durable, very resistant to abrasion[11].

dwatta Anodyne Antiinflammatory FebrifugeAlthough no specific mention has been seen for this species, the bark of most, if not all members of the genus contain salicin, a gly-coside that probably decomposes into salicylic acid (aspirin) in the body[213, 238]. The bark is therefore anodyne, anti-inflammatory and febrifuge. It is used especially in treating rheumatism and fevers, and also to relieve the pain of menstrual cramps[238].

nrakta Europe, from Britain and France east to S. Russia, south to Italy and Macedonia. ksacta Probably native in damp woods in S. C. and E. England[17].

propta Seed - must be sown as soon as it is ripe in spring[113]. Poplar seed has an extremely short period of viability and needs to be sown within a few days of ripening[200]. Surface sow or just lightly cover the seed in trays in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame. If sufficient growth is made, it might be possible to plant them out in late summer into their permanent positions, otherwise keep them in the cold frame until the following late spring and then plant them out. Most poplar species hybridize freely with each other, so the seed may not come true unless it is collected from the wild in areas with no other poplar species growing[11]. This species is a hybrid and will not come true from seed. Cuttings of mature wood of the current season's growth, 20 - 40cm long, November/December in a sheltered outdoor bed or direct into their permanent positions. Very easy. Suckers in early spring[78]. Layering[200]. Root cuttings in winter[200].

nwatta An easily grown plant, it does well in a heavy cold damp soil[1]. Prefers a deep rich well-drained circumneutral soil, growing best in the south and east of Britain[11, 200]. Growth is much less on wet soils, on poor acid soils and on thin dry soils[11]. Plants are reasonably wind tolerant, though they do not grow well in exposed upland sites[11]. They also tolerate salt-laden winds but not saline soils[200]. They dislike shade and are intolerant of root or branch competition[200]. This species is a spontaneous natural hybrid, P. alba x P. tremula[200]. There are several named forms selected for their ornamental value[200]. Poplars have very extensive and aggressive root systems that can invade and damage drainage systems. Especially when grown on clay soils, they should not be planted within 12 metres of buildings since the root system can damage the building's foundations by drying out the soil[11]. Dioecious. Male and female plants must be grown if seed is required. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms

#### 5.2.884 Taxodium distichum

Swamp Cypress, Bald cypress, Common Bald Cypress 4 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 30 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli

drutta Taxodium distichum is a deciduous Tree growing to 30 m (98ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay)

soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water. It can tolerate atmospheric pollution.

tcanta Fibre WoodThe bark has been used to make cordage[257]. Wood - light, soft, not strong, moderately hard, easily worked, straight grained, very durable in damp soil, takes a good polish. It weighs 28lb per cubic foot[227]. The wood is not given to excessive warping or shrinking[227], it is used for construction, water pipes, vats etc[1, 46, 61, 82, 149, 171, 227].

dwatta AnalgesicThe resin in the cones is used as an analgesic for wounds[149, 227].

nrakta South-eastern N. America - New Jersey to Florida and Texas. ksacta Wet sites that are under water for at least part of the year[82], and often overlying calcareous soils[43]. Often found where the water is brackish[200].

propta Seed - sow late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If sowing a lot of seed you could sow it in early spring in an outdoor seedbed[78]. Allow the plants to grow on in the seedbed for two years and then plant them into their permanent positions in late autumn or early spring. Cuttings in the late summer.

nwatta Landscape Uses:Firewood, Pest tolerant, Massing, Screen, Specimen, Street tree. Although this plant can be grown in wet soils and shallow water, it thrives in any soil and trees actually grow faster in normal unflooded soils[81]. Established plants succeed in standing water up to 60cm deep[200] - in such a situation the roots develop 'knees', curious cone-shaped structures that grow above the ground[227]. Tolerates the high pH of chalk streams[200]. Tolerates atmospheric pollution[200]. Fairly cold-tolerant, but branches can be damaged by temperatures below -10°c[200]. A fairly vigorous tree, it can grow up to 45cm in a year with up to 4cm increase in girth[185]. It has been planted for its timber in S. Europe, especially on alluvial soils[50]. Buds often begin to break in March, but trees do not come properly into leaf until June and growth in height rarely starts before June[185]. A very healthy species in Britain, rarely seen in anything but good health. It seems to be a very long-lived tree in this country with several specimens more than 250 years old[185]. Trees are thought to live for over 1,000 years in the wild[227]. Plants grow best in areas with warm summers[200]. They only produce fertile seeds after long hot summers[200]. The branches are brittle and subject to wind damage, but the tree usually recovers well[81]. Unlike most conifers, this species responds well to coppicing[81]. Special Features: North American native, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms.

## 5.2.885 Salix amygdaloides

Peach Leaved Willow

4tlin8cyuc0kcak3tcan2dwat20m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik

hpa7tmwatli nyanhjen hjonli

drutta Salix amygdaloides is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pft: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet

tcanta Basketry Charcoal Dye Pioneer Soil stabilization Tannin WoodThe bark is a source of tannin[226]. A light brown dye is obtained from the bark[226]. The young stems are very flexible and can be used in basket making[257]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The tenacious root

### 5.2.936 Dirca palustris

Leather Wood, Eastern leatherwood 4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dirca palustris is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Contact with the plant can cause severe dermatitis with redness, blistering and sores in some people[222].

tcanta Basketry Fibre Hair Paper StringThe tough flexible shoots are used in basket making and as a tying material[1, 11, 43, 46, 95]. A rope can be made from the bark fibres[1, 11, 46, 61]. The bark fibres are also used in making paper[189]. The stems are harvested in summer, the leaves are removed and the stems steamed until the fibres can be stripped. The outer and inner barks are separated by scraping or peeling. The fibres are cooked for 2 hours or less with soda ash and then beaten with mallets or put through a blender. The paper is greenish cream in colour[189]. A compound infusion of the roots has been used as a wash to strengthen the hair and make it grow[257].

dwatta Emetic Laxative Pectoral Poultice VDLeatherwood was employed medicinally by a number of native North American Indian tribes who used it to treat a wide variety of ailments[257]. It is little used in modern herbalism and any use should be carried out with caution since even minute doses can cause salivation and burning of the tongue[222]. A tea made from the bark is laxative[222]. Another report says that it is purgative and emetic, and can produce violent vomiting[235, 257]. An infusion of the roots has been used in the treatment of pulmonary problems[257]. A decoction of the branches has been applied as a poultice to swellings on the limbs[257]. The plant is a folk remedy for toothaches, facial neuralgia and paralysis of the tongue, venereal disease, and has also been used to try and induce pregnancy[222, 257].

nrakta Eastern N. Ámerica - New Brunswick to Florida, west to Louisiana and Minnesota. ksacta Rich deciduous or mixed woods[43] in moist situations, often on calcareous soils[200].

propta Seed - best sown in a cold frame as soon as it is ripe[113]. Remove the fruit flesh since this can inhibit germination[113]. Dried seed will require 2 - 3 months cold stratification[113]. The seed usually germinates in 1 - 6 months at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering.

nwatta Thrives in a moist peaty soil[1, 11] and a sheltered position[175]. Prefers a reasonably moist humus-rich limy soil according to another report[182]. The flowers are produced in early spring and they are often damaged by frost[1, 200]. They have a soft sweet perfume[245]. The species D. occidentalis A.Gray. is very closely related to this plant[200], so it might have the same uses[K].

#### 5.2.937 Gillenia stipulata

American Ipecacuanna, American ipecac 4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 1.2 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Gillenia stipulata is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil.

dwatta Cathartic Diaphoretic Emetic Expectorant Odontalgic Stings TonicThe dried powdered root bark is cathartic, slightly diaphoretic, a mild and efficient emetic, expectorant and tonic[4, 61, 213, 238]. Minute doses are used internally in the treatment of colds, chronic diarrhoea, constipation, asthma and other bronchial complaints [238, 257]. The roots have been used externally in the treatment of rheumatism[257]. A cold infusion of the roots has been given, or the root chewed, in the treatment of bee and other stings[257]. The roots are harvested in the autumn, the bark is removed and dried for later use[213, 238]. A tea made from the whole plant is strongly laxative and emetic[222]. Minute doses are used internally in the treatment of colds, indigestion, asthma and hepatitis[222]. A poultice or wash is used in the treatment of rheumatism, bee stings and swellings[222]. A decoction or strong infusion of the whole plant has been taken a pint at a time as an emetic[257]. A poultice of the plant has been used to treat leg swellings[257]. The plant has been used in the treatment of toothaches[257].

nrakta Eastern N. America - New York to Indiana and Kansas, south to Georgia, Louisiana and Oklahoma. ksacta Woods, thickets and rocky slopes[43].

propta Seed - sow spring or autumn in a cold frame[200]. Prick out the seedlings when they are large enough to handle and grow on for the first year in a lightly shaded area of the greenhouse or cold frame. Plant out in late spring and protect from slugs until well established. Division in spring or autumn[238].

nwatta Easily grown in a rather moist but well-drained lime-free peaty soil in semi-shade[4, 200]. Succeeds in a sunny position but requires shade at the hottest part of the day[200].

### 5.2.938 Petasites hybridus

Butterbur, Pestilence wort

4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 1 m hkuc pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Petasites hybridus is a PERENNIAL growing to 1 m (3ft 3in) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from April to December, in flower from March to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Analgesic Antispasmodic Appetizer Cardiotonic Diaphoretic Diuretic Homeopathy UrinaryButterbur is widely considered to be an effective cough remedy and recent experiments have shown it to have remarkable antispasmodic and pain-relieving properties [244]. It acts specifically on the bile ducts, stomach and duodenum[254]. The plant contains pyrrolizidine alkaloids, in isolation these are toxic to the liver[254]. The root and the leaves are analgesic, antispasmodic, cardiotonic, diaphoretic and diuretic[4, 9]. A decoction is taken as a remedy for various respiratory problems such as asthma, colds, bronchitis and whooping cough and also other complaints such as fevers and urinary complaints[4, 254]. It is also very effective in the treatment of gastrointestinal complaints and biliary dyskinesia[244, 254]. Externally it can be used as a poultice to speed the healing of wounds and skin eruptions[254]. The leaves are harvested in early summer, the root in late summer to autumn. Both can be dried for later use[9]. Because the plant contains potentially toxic alkaloids its internal use cannot be recommended[254]. A homeopathic remedy is made from the roots[4]. It is used in the treatment of severe and obstinate neuralgia[4]

nrakta Europe, including Britain, from Scandanavia south and east to Spain, north and west Asia. Ksacta Wet meadows and copses by streams to 1500 metres[17]. The female form is rare or absent from much of Britain[17].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct

the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is polinated by Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains saponins[13]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Do not use for more than 2 weeks. Avoid during pregnancy.

tcanta SoapA soap can be obtained by boiling the whole plant (but especially the root) in water[6, 13]. It is a gentle effective cleaner[7, 95], used especially on delicate fabrics that can be harmed by modern synthetic soaps (it has been used to clean the Bayeaux tapestry). It effects a lustre in the fabric[171]. The best soap is obtained by infusing the plant in warm water[169]. The roots can be dried and stored for later use[169]. The plant is sometimes recommended as a hair shampoo, though it can cause eye irritations[238]. The plant spreads vigorously and can be used as a ground cover when planted about 1 metre apart each way[208].

dwatta Alterative Antipruritic Antirheumatic Antiscrophulatic Cholagogue Cytotoxic Depurative Diaphoretic Diuretic Expectorant Purgative Skin Sternutatory TonicSoapwort's main medicinal use is as an expectorant. Its strongly irritant action within the gut is thought to stimulate the cough reflex and increase the production of a more fluid mucus within the respiratory passages[254]. The whole plant, but especially the root, is alterative, antiscrophulatic, cholagoque, depurative, diaphoretic, mildly diuretic, expectorant, purgative, sternutatory and tonic[4, 7, 9, 13, 21, 218]. A decoction of the whole plant can be applied externally to treat itchy skin[4, 201, 238]. The plant has proved of use in the treatment of jaundice and other visceral obstructions[4], but is rarely used internally in modern herbalism due to its irritant effect on the digestive system[238]. When taken in excess, it destroys red blood cells and causes paralysis of the vasomotor centre[238]. See also the notes above on toxicity[4, 7]. The root is harvested in the spring and can be dried for later use[7]. One of the saponins in this plant is proving of interest in the treatment of cancer, it is cytotoxic to the Walker Carcinoma in vitro[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Saponaria officinalis Soapwort. Bouncingbet for coughs/bronchitis (see [302] for critics of commission E)

nrakta Europe, including Britain, from Scandanavia south and east to Spain and temperate Asia. ksacta Fields, roadsides and along the banks of streams[7].

propta Seed - best if given a short cold stratification. Sow autumn or late winter in a cold frame. The seed usually germinates within 4 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. Division in spring or autumn. Very easy, it can be successfully done at any time in the growing season if the plants are kept moist until they are re-established. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Rock garden. Succeeds in any moderately fertile well-drained soil in sun or semi-shade[200]. Prefers a neutral to alkaline soil[238]. Hardy to about -20°c[187]. A very ornamental plant[1], soapwort is often grown in the herb garden and is sometimes cultivated for the soap that can be obtained from the roots. There are some named forms, usually with double flowers, that have been selected for their ornamental value[187]. Plants can be very invasive when grown in good conditions[K]. Soapwort should not be grown next to a pond with amphibians or fish in it since if the plant trails into the water it can cause poisoning[238]. The flowers are slightly scented with a sweet

aroma that has an undertone of clove[245]. Hybridizes with other members of this genus[200]. A good moth plant[13, 24]. Special Features: Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

### 5.2.934 Corvdalis vaginans

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Corydalis vaginans is a ANNUAL/BIENNIAL. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention has been seen for this species, there is a report that Corydalis species are potentially toxic in moderate doses[222].

dwatta OphthalmicThe sap of the plant is used in the treatment of eye diseases[240].

nrakta E. Asia - North-western Himalayas from Kashmir to Sikkim. ksacta Not known

propta Seed - surface sow in situ in the spring[222].

nwatta Prefers a moist, well-drained rather light soil, thriving in semi-shade[1]. Grows well in a woodland garden or peat bed. Plants in this genus seem to be immune to the predations of rabbits[233].

# 5.2.935 Herniaria glabra

Rupture Wort, Smooth rupturewort 4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat m hkuc htut cyutli hgatkyuctcup hwicii hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Herniaria glabra is a BIENNIAL/PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

tcanta CleanserA good ground cover plant, allowing spring bulbs to grow through it[200]. An aqueous extract of the plant is a hand cleanser, making the skin soft and supple[240].

dwatta Antirheumatic Astringent Diuretic Expectorant-The whole plant, gathered when in flower, is astringent, very actively diuretic and expectorant[4, 9, 61, 240, 254]. It appears to have an antispasmodic effect upon the bladder and is used in the treatment of dropsy, catarrh of the bladder, cystitis and kidney stones[240, 254]. It has also gained a reputation for treating hernias[4, 9, 61]. Externally, it has been used as a poultice to speed the healing of ulcers[254].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and temperate Asia. ksacta A rare and local plant of dry sandy areas in south Devon and eastern England[9, 17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Grows well in hot dry soils[1]. Dislikes excessive moisture[1]. Succeeds in very poor soils[1]. Useful for covering rocks or as a carpet bedding[1], it makes a good ground cover for spring bulbs since they can grow through it easily[200]. The leaves emit a musky smell when they are handled[245].

system of this tree makes it very useful for preventing soil erosion along the banks of rivers etc[226]. It is also a good pioneer species, readily invading any cleared-out area if there is sufficient moisture[226, 229]. It is short-lived and not very shade tolerant and so, having provided good conditions for other woodland trees to become established, it is eventually out-competed by them[K], Wood - light, close-grained, soft, weak[82, 226, 229, 235]. It weighs 28lb per cubic foot[235]. It is sometimes cut for timber which is used for fence posts, but its uses are mainly limited to charcoal and firewood[226, 229]. Dynamic accumulator.

dwatta Anodyne Antispasmodic Astringent FebrifugeAn infusion of the bark shavings has been used in the treatment of diarrhoea and stomach ailments[257]. A poultice of the bark has been applied to bleeding cuts[257]. A decoction of the branch tips has been used as a soak for treating cramps in the legs and feet[257]. The fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta N. America - British Columbia to New York, south to Texas. ksacta Along muddy streambanks and in low wet woods bordering rivers, to 2100 metres[229].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. A fast-growing but relatively short-lived species in the wild[229]. A good bee plant, providing an early source of nectar[11]. Trees are impatient of root disturbance and should be moved regularly before being planted in their permanent positions, which is best done whilst the plants are young[11]. The root system is rather aggressive and can cause problems with drains[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.886 Juniperus chinensis

Chinese Juniper, Sargent juniper 4 tlin 10 cyuc 0 koak 0 tcan 2 dwat 15 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus chinensis is an evergreen Tree growing to 15 m (49ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Parasiticide ParasiticideA number of cultivars are suitable for use as a ground cover, though they are rather slow-growing[208]. They should be spaced about 90cm apart each way[208]. 'Parsonsii' can grow up to 2 metres across, with its branches horizontal to and about 5cm above the ground but never touching the ground[208].

dwatta Antirheumatic Haemostatic Hepatic Parasiticide Parasiticide ResolventThe stems are used in the treatment of parasitic skin problems and rheumatism[218]. The fruit is used in the treatment of convulsions, excessive sweating and hepatitis[218]. The root is used in the treatment of burns and scalds[218]. The resin, mixed with the resin of Pinus species, is used as a resolvent on tumours[218].

nrakta E. Asia - N.E. China, Japan, Mongolia. ksacta Near seashores in C. and S. Japan [58].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Screen. Succeeds in most soils if they are well drained, preferring a neutral or slightly alaine soil[1, 11, 200]. Succeeds in chalky soils[200]. Established plants are drought tolerant, succeeding in hot dry positions[200]. A slow growing and rather short-lived tree[185]. The plants produce new growth from early May to the end of August and can make 50cm a year increases in height when young[185]. A very ornamental plant[1], there are many named varieties[200]. The crushed foliage has a rather sour resinous scent[185]. Trees are usually dioecious but occasional monoecious trees occur[11]. Male and female flowers are required if fruit and seed is to be produced. Special Features: Fragrant foliage, Not North American native, Inconspicuous flowers or blooms.

#### 5.2.887 Chamaecyparis nootkatensis

Nootka Cypress, Nootka Cypress, Yellow Cypress, Alaska Cedar

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 15 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Chamaecyparis nootkatensis is an evergreen Tree growing to 15 m (49ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from March to April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

tcanta Fibre Hedge Hedge Miscellany Tinder Wood-Plants can be grown as a tall hedge[200] They are very tolerant of clipping so long as this does not extend into the brown barked wood since trees cannot regenerate from this[200]. Any trimming should be done in the summer[200]. The fibre of the inner bark is fine and soft, it is pounded and spun then used for making blankets, clothing, capes, mats etc[99, 226, 257]. Torn into pieces, it can be used as bandages or for washing babies[226]. The finely shredded inner bark can be used as a tinder[257]. Wood - hard, very durable, fragrant with an agreeable resinous odour, close grained, has low-shrinkage, is somewhat brittle, but does not splinter. Easily worked, it is used for carving, cabinet work, making boats, implements etc[1, 46, 61, 82, 99, 171, 226].

dwatta Antirheumatic Miscellany Poultice SkinThe plant has been used in sweat baths for treating rheumatism and arthritis[257]. An infusion of the branch tips has been used as a wash for sores and swellings[257]. A poultice of the crushed leaves has been applied to sores[257]. The soft bark has been used as a cover for poultices[257].

nrakta Western N. America - Alaska to Oregon. ksacta Woodlands from sea-level to 1,000 metres[60, 82]. The best specimens are found in the deep soil of cool wet coastal forests[226].

propta Seed - sow March/April in a seedbed out-doors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one

month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Landscape Uses:Screen. Succeeds in most soils and situations, but prefers a moist deep loamy soil and a sheltered position[1, 11]. Grows well in heavy clay soils. Survives on dry alkaline soils[200]. Does not grow well on peat or shallow chalky soils[11]. Growth of trees is hardly affected by a lack of phosphate in the soil. Plants are moderately shade tolerant, especially when young[81, 200]. Plants are tolerant of atmospheric pollution according to one report[200], whilst another says that they do not do well in a polluted atmosphere[1]. Plants are hardy to about -35c. they also tolerate low summer temperatures[200]. A very polymorphic species, there are many named varieties[200]. This species establishes well and grows fairly quickly when young[11]. Trees can reach 20 metres tall in 35 years but growth slows as the trees get older[185]. It is cultivated as a timber tree in Europe[50]. Trees in the wild can live for 1,000 years or longer[226], one specimen is believed to be 3,500 years old[229]. This longevity is probably due to the presence of toxic chemical compounds from microscopic fungi concentrated in the heartwood[226]. The wood and foliage have an acrid odour[226]. The bruised foliage releases a smell of turpentine[245]. Favoured by many birds for roosting, high cover and especially for nesting, large specimens of this tree help to attract songbirds to the garden[200]. Trees are notably susceptible to honey fungus[200]. Special Features:North American native, Inconspicuous flowers or blooms.

# 5.2.888 Rhus potaninii

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 12 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus potaninii is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

pcista There are some suggestions that the sap of this species can cause a skin rash in susceptible people, but this has not been substantiated. See also notes in 'Cultivation

tcanta Dye Ink Mordant OilThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. An indelible black ink is obtained from galls on the leaves[46, 61]. The report does not say if the galls are used before or after the insect leaves them.

dwatta Antiseptic Astringent HaemostaticAn excrescence produced on the leaf by an insect Melaphis chinensis or M. paitan is antiseptic, astringent and haemostatic[176]. It is used in the treatment of persistent cough with blood, chronic diarrhoea, spontaneous sweating, night sweats, bloody stool, urorrhoea and bloody sputum. It is used applied externally to burns, bleeding due to traumatic injuries, haemorrhoids and ulcers in the mouth[176].

nrakta E. Asia - C. and W. China. ksacta Thickets and in woods on slopes at elevations of 900 - 2500 metres[109,

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. This soak water can be drunk and has a delicious lemonflavour. The stored seed also needs hot water treatment and

can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 2001. Suckers in late autumn to winter[200].

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. The young growth in spring can be damaged by late frosts. A very ornamental plant[1], but it rarely flowers in Britain[11]. This species is very closely related to R. puniabensis[109]. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.889 Campsis radicans

Trumpet Vine, Trumpet creeper 4 tlin 10 cyuc 0 kcak 1 tcan 1 dwat 12 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Campsis radicans is a deciduous Climber growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf from June to October, in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There have been isolated cases reported of people suffering from dermatitis after handling the leaves[274].

tcanta Can be used as a ground cover plant in a sunny position[188]. They can be allowed to scramble on the ground and will form an effective ground cover, rooting at intervals along the branches[208]. They should be planted about 2.5 metres apart each way[208]. The form C. radicans f. flava has gained the Royal Horticultural Society's Award of Garden Merit.

dwatta Diaphoretic VulneraryThe root is diaphoretic and vulnerary[61, 218].

nrakta Southeast N. America - Florida to Texas and north to New Jersey and Michigan.. ksacta Low woods and thickets[43]. An aggressive weed of arable fields[200].

propta Seed - sow spring in a greenhouse at 10°c. Two months stratification at 5°c assists germination[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of almost ripe wood, 7 - 10cm long, July/August in a frame. Slow to root but a fair percentage [78, 200]. Root cuttings 5cm long in December. Fair to good percentage[78]. Suckers, removed in the dormant season.

nwatta Landscape Uses: Arbor, Seashore, Woodland garden. Succeeds on a warm wall in a good loamy soil[1] in full sun[166] or light shade[200]. Plants can become rampant when growing in rich soils[200]. A very ornamental plant[1], it is hardy to about -20°c according to some reports[184, 200] whilst another says that it is not hardy in all parts of the country but it succeeds in more open positions such as a pergola or an old tree in the southern part of England[1]. Plants reguire the extra warmth of a sunny wall to induce better flowering[184]. Plants are self-clinging by aerial roots like ivy but are best if given some support[1, 166]. Any pruning is best done in the spring[188]. The seed only ripens outdoors in Britain in hot summers[11]. There are some named forms selected for their ornamental value[202]. Hybridizes freely

seed and keep the soil moist. Sow stored seed as soon as and the seeds ripen from June to August. The species is possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 20°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first year in a lightly shaded place in a greenhouse. When large enough, plant them out into their permanent positions in the spring. Division in March just before active growth commences. Root cuttings[200].

nwatta Succeeds in ordinary garden soil but prefers a rich sandy loam[1]. Requires a moist fertile soil in dappled shade[200]. Hardy to at least -20°c[187]. A very ornamental plant[1], it grows well in a woodland garden[200]. Plants can be far spreading by means of underground stolons[187]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 5.2.931 Gillenia trifoliata

Indian Physic, Bowman's root 4 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Gillenia trifoliata is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Cathartic Diaphoretic Emetic Expectorant Odontalgic Stings TonicThe dried powdered root bark is cathartic, slightly diaphoretic, a mild and efficient emetic, expectorant and tonic[4, 61, 213, 238]. Minute doses are used internally in the treatment of colds, chronic diarrhoea, constipation, asthma and other bronchial complaints[238, 257]. The roots have been used externally in the treatment of rheumatism[257]. A cold infusion of the roots has been given, or the root chewed, in the treatment of bee and other stings[257]. The roots are harvested in the autumn, the bark is removed and dried for later use[213, 238]. A tea made from the whole plant is strongly laxative and emetic[222]. Minute doses are used internally in the treatment of colds, indigestion, asthma and hepatitis[222]. A poultice or wash is used in the treatment of rheumatism, bee stings and swellings[222]. A decoction or strong infusion of the whole plant has been taken a pint at a time as an emetic[257]. A poultice of the plant has been used to treat leg swellings[257]. The plant has been used in the treatment of toothaches[257].

nrakta Eastern N. America - Ontario and New York, east to Michigan and south to Georgia and Missouri. ksacta Rocky open woods[187]. Rich woods[43].

propta Seed - sow spring or autumn in a cold frame[200]. Prick out the seedlings when they are large enough to handle and grow on for the first year in a lightly shaded area of the greenhouse or cold frame. Plant out in late spring and protect from slugs until well established. Division in spring or autumn[238].

nwatta Landscape Uses:Border, Rock garden, Specimen, Woodland garden. Easily grown in a rather moist but well-drained lime-free peaty soil in semi-shade[4, 200]. Succeeds in any well-drained soil[188]. Succeeds in a sunny position but requires shade at the hottest part of the day[200]. A very ornamental plant, but it can be difficult to establish due to slug damage[187]. The stems usually require support[188]. Special Features: North American native, Natural-

#### 5.2.932 Daphne mezereum

Mezereon, Paradise plant, February Daphne 4 tlin 7 cvuc 0 kcak 0 tcan 2 dwat m hkuc hmim cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Daphne mezereum is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from February to March, hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are highly toxic[7, 10, 19, 65]. Skin contact with the sap can cause dermatitis in some people[65, 200].

tcanta Dye OilA yellow to greenish-brown dye is obtained from the leaves, fruit and bark[13]. The seed contains up to 31% of a fatty oil[74]. No further details are given.

dwatta Antirheumatic Antiseborrheic Cancer Cathartic Diuretic Emetic Homeopathy Rubefacient Stimulant VesicantMezereum has been used in the past for treating rheumatism and indolent ulcers, but because of its toxic nature it is no longer considered to be safe[238]. The plant contains various toxic compounds, including daphnetoxin and mezerein, and these are currently being investigated (1995) for their anti-leukaemia effects[238, 254]. The bark is cathartic, diuretic, emetic, rubefacient, stimulant and vesicant[4, 7, 9, 21, 46]. The root bark is the most active medically, but the stem bark is also used[4]. It has been used in an ointment to induce discharge in indolent ulcers[4] and also has a beneficial effect upon rheumatic joints[254]. The bark is not usually taken internally and even when used externally this should be done with extreme caution and not applied if the skin is broken[4, 21, 254]. The bark is harvested in the autumn and dried for later use[7]. The fruits have sometimes been used as a purgative [4]. A homeopathic remedy is made from the plant[7]. It is used in the treatment of various skin complaints and inflammations[7, 9].

nrakta Europe, including Britain, from Scandanavia to Spain, east to Macedonia and temperate Asia. ksacta Damp deciduous mixed woodlands and on rich calcareous soils[7, 17, 268].

propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at 20°c followed by 12 - 14 weeks at 3°c. Germination may still take another 12 months or more at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Layering.

nwatta Landscape Uses:Border, Foundation, Specimen. A good sandy loam suits most members of this genus[11]. Prefers a good heavy soil and some shade[31, 49]. Prefers a calcareous soil[13, 17, 19] and cool moist conditions[11, 49]. There is no evidence to suggest it requires a calcareous soil, but all members of this genus do well on acid soils[11]. A very ornamental plant[1], it is hardy to about -30°c[184]. Plants tend to be short-lived in cultivation, probably due to excessive seed bearing[11, 200]. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible [188]. They also resent being cut and so should not be pruned unless it is essential[245]. A good bee plant, providing a source of nectar very early in the year[108]. The flowers have a delicious sweet perfume[245]. Special Features: Attractive foliage, Not North American native. Naturalizing, All or parts of this plant are poisonous. Fragrant flowers, Attractive flowers or blooms.

#### 5.2.933 Saponaria officinalis

Soapwort, Bouncingbet 4 tlin 8 cvuc 0 kcak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Saponaria officinalis is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to September, and

# 5.2.928 Dipsacus fullonum

Teasel. Fuller's teasel

4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1.8 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Dipsacus fullonum is a BIENNIAL/PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta DveA blue dve obtained from the dried plant is an indigo substitute[74]. It is water soluble[74]. A yellow is obtained when the plant is mixed with alum[148]. Teasels are also occasionally grown as ornamental plants, and the dried heads are used in floristry. The seeds are an important winter food resource for some birds, notably the European goldfinch. Teasels are often grown in gardens and encouraged on some nature reserves to attract them. A rich source of pollen and nectar for bees and other insects. Formerly widely used in textile processing, providing a natural comb for cleaning, aligning and raising the nap on fabrics, partic-

dwatta Cancer Diaphoretic Diuretic Homeopathy Skin Stomachic WartsTeasel is little used in modern herbalism, and its therapeutic effects are disputed[254]. Traditionally it has been used to treat conditions such as warts, fistulae (abnormal passages opening through the skin) and cancerous sores[254]. The root is diaphoretic, diuretic and stomachic[7]. An infusion is said to strengthen the stomach, create an appetite, remove obstructions of the liver and treat iaundice[4 254] The root is harvested in early autumn and dried for later use[7]. An infusion of the leaves has been used as a wash to treat acne[257]. The plant has a folk history of use in the treatment of cancer, an ointment made from the roots is used to treat warts, wens and whitlows[4, 218]. A homeopathic remedy is made from the flowering plant[7]. It is used in the treatment of skin diseases[7].

nrakta Europe, including Britain, from Norway south and east to N. Africa and W. Asia. ksacta Copses, stream banks, roadsides, rough pasture etc, especially on clay

propta Seed - best sown in early spring in situ[115]. The seed can also be sown from February to May or from August to October. All but the earlier sowings can be made outdoors.

nwatta Succeeds in most soils[1] but prefers clay[17]. Prefers a deep rich soil[169]. Requires a sunny position[169] A good butterfly plant[24]. This is the true wild species of teasel, its bracts are too flexible to be used for combing cloth[17]. The flowering heads are much prized by flower arrangers because they keep their colour almost indefinitely when dried[7].

# 5.2.929 Veratrum album

White Hellebore, White false hellebore 4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Veratrum album is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are highly poisonous[7, 10,

tcanta InsecticideThe dried and powdered root contains pyrethrums and is used as an insecticide and a parasiticide[1, 7. 19. 201. It is also effective against caterpillars and mammals so great caution is advised[1, 19, 20].

dwatta Analgesic Anthelmintic Antiemetic Cathartic Emetic Errhine Expectorant Hypnotic SternutatoryThe root

is analgesic, anthelmintic, cathartic, emetic, errhine, expectorant, hypnotic and sternutatory[4, 7, 9, 178, 192]. The root is very poisonous, with a paralyzing effect on the nervous system, and is scarcely if ever used internally[4, 7], though the alkaloids it contains are used in the pharmaceutical industry[9]. It is occasionally used externally as a local analgesic, though even this is not without its dangers since it can be absorbed through broken skin[4, 7]. It is also used in veterinary medicine[244]. The root is harvested in early autumn and is dried for later use[7].

nrakta Europe. E. Asia - Siberia. N. Africa. ksacta Moist grassy sub-alpine meadows and open woods[187].

propta Unless stored in damp sand at around 4°c the seed has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in the greenhouse as soon as it is ripe[200]. Stored seed needs to be stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°c but can be much longer[200]. The plant produces just one seedleaf in its first year, this forms an over-wintering bulb. It takes up to 10 years for the plant to reach maturity [200]. Sow the seed thinly so there is no need to thin or transplant them, and grow the seedlings on undisturbed in the pot for their first two years of growth. Apply a liquid feed at intervals through the growing season to ensure the plants do not become nutrient deficient. At the end of the second year plant out the dormant plants into individual pots and grow them on in light shade in the greenhouse for a further year or two before planting them out into their permanent positions in late spring or early summer. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Division is best carried out in the autumn because the plants come into growth very early in the spring[233]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils[42]. Grows best in a cool woodland garden or a north facing border[42]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants are long-lived and can be left in the same position for years without atten-

#### 5.2.930 Anemone vitifolia

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anemone vitifolia is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of this plant contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270]. The plant is toxic to maggots[147].

tcanta Insecticide TinderWoolly hairs from the achenes are used as a tinder[51, 272]. The root has insecticidal properties[218]

dwatta Anodyne Antirheumatic Dysentery Odontalgic VermifugeThe fresh root is antirheumatic and vermifuge[218]. The juice from the roots is taken internally in the treatment of dysentery[272]. It is also applied to aching teeth to relieve the pain and to the forehead to relieve headaches[218, 272]. A paste made from the roots is used externally to treat scabies[272]. The leaves are powdered and rubbed into the scalp to treat head lice[272].

nrakta E. Asia - Himalayas in Nepal, ksacta Damp open woodland and amongst shrubs up to 3000 metres[51, 200].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the with other members of this genus[200]. Special Features: Attracts birds, North American native, Invasive, All or parts of this plant are poisonous, Attracts butterflies, Attractive flowers or blooms

# 5.2.890 Chamaecyparis thyoides

White Cypress, Atlantic white cedar, Coast White Cedar, Southern White Cedar, White Cypress 4 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli hjonli

drutta Chamaecyparis thyoides is an evergreen Tree growing to 10 m (32ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

tcanta Hedge Hedge WoodPlants can be grown as a tall hedge[200] They are very tolerant of clipping so long as this does not extend into the brown barked wood since trees cannot regenerate from this[200]. Any trimming should be done in the summer[200]. Wood - soft, not strong, close grained, very durable, easily worked, light, slightly fragrant. It weighs 21lb per cubic foot. It is commonly used for woodenware, cooperage, fence posts, interior finish of houses etc[43, 46, 61, 82, 171, 235]. Wood found buried in swamps for hundreds of years is perfectly sound and not water-logged[11].

dwatta A decoction of the leaves has been used as a herbal steam for treating headaches and backaches[257]. A poultice made from the crushed leaves and bark has been applied to the head to treat headaches[257].

nrakta Eastern N. America - Maine, south to Florida and west to Mississippi, ksacta Cold, swampy often inundated ground, frequently forming dense pure forests[11, 43, 81, 82]. The best specimens are found in acid peat beds[229].

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Succeeds in most soils and situations, but prefers abundant moisture and a deep loamy soil and a sheltered position[1, 11]. Grows well in heavy clay soils. Survives on dry alkaline soils[200]. Growth of trees is hardly affected by a lack of phosphate in the soil. Plants are moderately shade tolerant, especially when young[81, 200]. Plants are tolerant of atmospheric pollution according to one report[200], whilst another says that they do not do well in a polluted atmosphere[1]. This species is especially well adapted for planting in cold wet places[1]. Plants are hardy to about -35°c[200]. A long-lived tree in the wild with specimens more than 1.000 years old[229]. It is slow growing in cultivation[200], trees rarely grow more than 20cm in a year[185]. The branches become brittle with age[1]. A very polymorphic species, there are many named varieties[200]. The crushed foliage has a rather gingery hot aroma[185]. Favoured by many birds for roosting, high cover and especially for nesting, large specimens of this tree help to attract songbirds to the garden[200]. Trees are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Wetlands plant, Inconspicuous flowers or blooms.

#### 5.2.891 Phellodendron chinense

Chinese Cork Tree

4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 10 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Phellodendron chinense is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

dwatta Antibacterial Bitter Cholagogue Diuretic Dysentery Expectorant Hypoglycaemic Ophthalmic Skin Stomachic Urinary VasodilatorThis species is used in Chinese herbalism in the same way as P. amurense[238, 254]. These uses are as follows:- Amur cork tree, called Huang Bai in China, is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs, but one that should be used with care[218, 254]. A strongly bitter remedy, the bark acts strongly on the kidneys and is regarded as a detoxicant for hot damp conditions[238]. Recent research has shown that the plant is useful in the treatment of meningitis and conjunctivitis[254]. Huang Bai should only be used under professional supervision and should not be take during pregnancy[254]. The bark is alterative, antibacterial, antirheumatic, aphrodisiac, bitter stomachic, cholagoque, diuretic, expectorant, febrifuge, hypoglycaemic, ophthalmic, skin, vasodilator and tonic[4, 61, 174, 176, 178, 281, 238]. It is taken internally in the treatment of acute diarrhoea, dysentery, jaundice, vaginal infections including Trichomonas, acute urinary tract infections, enteritis, boils, abscesses, night sweats and skin diseases[238, 254]. It is commonly used in conjunction with Scutellaria baicalensis and Coptis chinensis in a preparation called 'injection of three yellow herbs'[238]. It is given intramuscularly for upper respiratory tract infections[238]. The bark of 10 year old tress is harvested in the winter or spring and dried for later use[238, 254]. The fruit is expectorant[218].

nrakta E. Asia - Central China. ksacta Not known

propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 2 months cold stratification, sow in late winter in a cold frame[78, 113]. Germination is usually good. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 -10cm with a heel, July/August in a frame. Pot up in autumn and over winter in a cold frame. Fair to good percentage[78]. Root cuttings - obtain in December and store in leafmold in a warm place for 3 weeks. Cut into 4cm lengths and plant horizontally in pots. Grow on in a warm greenhouse. Good percentage[78].

nwatta Prefers a moisture retentive well-drained deep rich loam in full sun[11, 200]. Prefers a neutral to alkaline soil[238]. Succeeds on shallow chalky soils[245]. Grows best in areas with long hot summers[200]. Plants are gross feeders and require a rich soil if they are to perform well[11]. Dormant plants are fully hardy in Britain, tolerating temperatures down to at least -20°c[188, 200], but the young growth is liable to damage from late spring frosts[11, 188, 200]. The leaves are aromatic[188]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.892 Celastrus angulatus

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 7.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli nvanhien hionli

drutta Celastrus angulatus is a deciduous Climber growing to 7.3 m (24ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from November to

February. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta InsecticideThe plant has insecticidal proper-

dwatta CancerMany plants in this genus contain compounds of interest for their antitumour activity[218].

nrakta E. Asia - N., W. and C. China. ksacta Mountainous thickets and slopes at elevations of 1000 - 2500 metres[266].

propta Seed - gather when ripe, store in dry sand and sow February in a warm greenhouse[78]. Three months cold stratification leads to a higher germination rate[113]. Remove the flesh of the fruit since this inhibits germination[113]. Germination rates are usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[188]. Layering in August of the current seasons growth. Takes 12 months[78]. Root cuttings, 6mm thick 25mm long in December. Plant horizontally in pots in a

nwatta Prefers a deep loamy soil[1] but succeeds in most soils so long as they are not too shallow[202]. Succeeds in full or partial shade [188]. Plants flower more freely if their top-growth is in the sun[182]. Requires a humus-rich soil if it is to be at its best[219]. A rampant climber, it requires ample space and is best grown into an old tree[1, 200. It climbs by means of twining and also by the young stems having prickles[182]. Plants do not normally require pruning[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants are dioecious, male and female plants must be grown if seed is required[200].

# 5.2.893 Cephalanthus occidentalis

Button Bush, Common buttonbush, Button Willow, Honey Bells, Buttonbush

4 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 7 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Cephalanthus occidentalis is a deciduous Shrub growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The leaves contain glucosides and can be toxic in large doses. Symptoms include vomiting, convulsions, chronic spasms and muscular paralysis[274].

tcanta WoodWood - light, tough. Of no commercial value[229].

dwatta Astringent Diaphoretic Diuretic Dysentery Emetic Febrifuge Laxative Malaria Odontalgic Ophthalmic TonicButton bush was often employed medicinally by native North American Indian tribes who used it to treat a range of ailments[257]. It is little used in modern herbalism. A tea made from the bark is astringent, emetic, febrifuge and tonic[61, 222]. A strong decoction has been used to treat diarrhoea and dysentery, stomach complaints, haemorrhages etc[257] It has been used as a wash for eye inflammations[222]. A decoction of either the roots or the fruits have been used as a laxative to treat constipation[257] The leaves are astringent, diaphoretic, diuretic and tonic[61, 222]. A tea has been used to check menstrual flow and to treat fevers, kidney stones, pleurisy etc[222]. The plant has a folk reputation for relieving malaria[222]. The inner bark has been chewed in the treatment of toothaches[222].

nrakta Eastern N. America - Nova Scotia to Florida, west. to Minnesota and California ksacta A lowland species, growing along the edges of streams, rivers, lakes, swamps and wet floodplains[229].

propta Seed - we have no details on this plant but would suggest sowing the seed as soon as it is ripe in an acid compost in a cold frame. Sow stored seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of soft or semi-ripe wood, July in a frame[200]. Layering.

nwatta Landscape Uses:Border, Massing. An easily grown plant[1], it prefers an open position in a moisture retentive or wet neutral to acid humus-rich soil[200]. Dislikes dryness at the roots[11]. A calcifuge plant, it dislikes alkaline soils[200]. Requires a sunny position[184]. Plants are hardy to about -25°c[184]. A fast-growing but short-lived species in the wild[229]. The flowers, and the dried leaves, have a soft sweet fragrance like newly mown hav[245]. A good bee plant[149]. Plants are sometimes evergreen[200]. Special Features: North American native, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Fragrant flowers. Attractive flowers or blooms.

#### 5.2.894 Lonicera sempervirens

Trumpet Honeysuckle, Coral Honeysuckle 4 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lonicera sempervirens is an evergreen Shrub growing to 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Antiasthmatic Cathartic Emetic StingsThe fruit is emetic and cathartic[207]. The expressed juice of the plant is beneficial in the treatment of bee stings [207]. The leaves have been dried and smoked as a treatment for asthma[213].

nrakta Eastern and Southern N. America - Connecticut to Florida and Texas. ksacta Borders of woods and thickets[213].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 -10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel. November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Landscape Uses:Arbor, Specimen. Succeeds in most soils but prefers a good moist soil in a sunny position[182]. Does not fruit so well when grown in the shade[200]. Plants are very hardy, tolerating temperatures down to -15°c or lower[260], though they can be deciduous in cold winters[219]. Special Features: Attracts birds. North American native, Wetlands plant, Attracts butterflies, Extended bloom season in Zones 9A and above, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

good pioneer species and, except in wetter and moorlandtype soils, will eventually be largely out-competed by the other woodland trees. Its main disadvantage as a pioneer plant is that it has an extensive root system and is quite a greedy plant, thus it will not help as much in enriching the soil for the other woodland plants as other pioneer species such as the alders, Alnus species[K]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta Europe, including Britain, from Norway south and east to Portugal, Black Sea, Crimea and Macedonia. ksacta Damp woods, heaths, rocks by streams and on moors etc. on light acid or slightly basic soils, to 780 metres[17].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Thriving in the most adverse conditions, it is a useful plant for populating dry barren sites[199]. Closely related to S. caprea and S. cinerea[11]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. When inhaled near to, a scent of white jasmine can be discerned from the flowers[245]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 5.2.926 Aster novi

Michaelmas Daisy, New York Aster 4 tlin 8 cyuc 0 kcak 2 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hyishrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aster novi-belgii is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Landscape Uses: Woodland Garded :Border. Rock garden, Seashore. A forest garden plant that can be grown in dappled shade. Attracts wildlife

nrakta Eastern N. America. Naturalized in Britain[17]. ksacta Damp thickets, meadows and shores, usually within 100 miles of the sea[43, 187].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but it also succeeds in partial shade[233]. Prefers a rich soil[1], but tolerates poor

for the establishment of woodland plants. Thus it makes a ones[233]. Plants are hardy to about -25°c[187]. A polymorphic species, there are many named varieties selected for their ornamental value[1]. Hybridizes freely with other members of this genus[200]. Plants need to be divided every few years, preferably in the spring, in order to keep the plant vigorous[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. Attracts butterflies and moths, it is also a good bee plant providing nectar in autumn[30]. Special Features: Attracts birds, Naturalizing. Attracts butterflies. Suitable for cut flowers.

#### 5.2.927 Echinacea pallida

Cone Flower, Pale purple coneflower 4 tlin 8 cyuc 0 kcak 0 tcan 5 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Echinacea pallida is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Possible suppression of immunity with habitual use. High doses over 1000 mg may cause dizziness. Use of herb for 10-14 days recommended followed by a short break.

dwatta Adaptogen Alterative Antiseptic Appetizer Depurative Diaphoretic Digestive Sialagogue UrinaryPlants in this genus were probably the most frequently used of N. American Indian herbal remedies, though this species is considered to be less active than E. angustifolia[222]. They had a very wide range of applications and many of these uses have been confirmed by modern science. The plant has a general stimulatory effect on the immune system and is widely used in modern herbal treatments[222]. There has been some doubt over the ability of the body to absorb the medicinally active ingredients orally (intravenous injections being considered the only effective way to administer the plant) but recent research has demonstrated significant absorption from orally administered applications[222]. In Germany over 200 pharmaceutical preparations are made from Echinacea[222]. The roots and the whole plant are considered particularly beneficial in the treatment of sores, wounds, burns etc, possessing cortisone-like and antibacterial activity[222]. The plant was used by N. American Indians as a universal application to treat the bites and stings of all types of insects[213]. An infusion of the plant was also used to treat snakebites[213]. The plant is adaptogen, alterative, antiseptic, depurative, diaphoretic, digestive, sialagogue[4, 21, 61, 165, 213]. It is harvested in the autumn and dried for later use[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Echinacea for common cold, cough and bronchitis, fevers and cold, urinary tract infections, inflammation of the mouth and pharynx, increase resistance to infection, wounds and burns (see [302] for critics of commission E).

nrakta N. America - Michigan to Nebraska and south to Texas. ksacta Dry soils[235] on prairies and barrens[43]. Sandy open woods and prairies in Texas[274].

propta Seed - sow March/April in a greenhouse and only just cover the seed[175, K]. Diurnal temperature fluctuations aid germination[175]. The seed usually germinates in 10 - 21 days at 25°c[175]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for the first summer. Plant them out in the late spring or early summer of the following year and give them some protection from slugs at least until they are established[K]. Division in spring or autumn[111]. Larger clumps can be replanted direct into their permanent. positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings, October in a frame[200]

nwatta Succeeds in ordinary garden soil[111] but prefers a deep rich loam with plenty of leafmold[1] and a sunny position[175]. Slugs love this plant[K].

pots in a shaded frame before planting them out[200]. Division is best carried out in the autumn because the plants come into growth very early in the spring[233]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils[42]. Grows best in a cool woodland garden or a north facing border[42]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants are long-lived and can be left in the same position for years without attention[233].

# 5.2.923 Osmunda regalis

Royal Fern, Flowering Fern 4 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcuphia7n hwicli hrasilutnyik hpa7tli frus-

flatpriklwis hpa7tmwatli hionli

drutta Osmunda regalis is a FERN growing to 2 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 2. The seeds ripen from June to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

tcanta Compost FibreThe hairs of the plant are mixed with wool and are used in making cloth[46, 61]. The roots are the source of 'Osmunda fibre', this was once widely used for potting orchids and other epiphytes[200]. Plants can be grown as a ground cover when spaced about 1 metre apart each way[208]

dwatta Astringent Diuretic Tonic VulneraryThe root is astringent, diuretic, tonic and vulnerary[4, 7, 21]. It is useful in the treatment of jaundice and removing obstructions of the viscera[4]. The fronds are used to make compresses for external application to wounds and rheumatic joints - for which purposes they are fairly effective[7]. An infusion of the fronds, combined with wild ginger roots (Asarum species) has been used in the treatment of children with convulsions caused by intestinal worms[257].

nrakta Europe, including Britain, from Norway south and east to N. Africa, Asia, N. and S. America. ksacta Swampy areas, fens and damp woodland[187].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wiry roots[200].

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Specimen, Woodland garden. An easily grown plant[4, 187], it prefers a soil of swamp mud and loamy or fibrous peat, sand and loam[1, 4]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Plants are hardy to at least -20°c, they are evergreen in warm winter areas but deciduous elsewhere[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Transplants well, even when quite large[4]. Some named forms have been selected for their ornamental value[187]. Special Features: Attractive foliage, North Amer-

ican native, Naturalizing, Wetlands plant, There are no flow-

# 5.2.924 Andropogon gerardii

4 tlin 8 cyuc 0 kcak 2 tcan 1 dwat 2 m hkuc

htut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Andropogon gerardii is a PERENNIAL growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Good forage for horses and cattle, and can also be cut and used for hay. A desirable and ecologically important grass by cattle ranchers and rangeland ecologists. Due to its drought tolerance it is used in wildlife gardens, natural landscaping, and grassland habitat restoration projects. A potential feedstock for ethanol production.

dwatta Analgesic Carminative DiureticThe plant is analgesic, carminative and diuretic[222]. A decoction of the roots is used in the treatment of stomach-aches and flatulence[222]. 257]. A tea made from the leaves is used as a wash to relieve fevers and general debility[222, 257].

nrakta Eastern and Central N. America - Maine to Saskatchewan, south to Florida, Arizona and Mexico. ksacta Dry soils, prairies, open ground and open woods[222, 236].

propta Seed - surface sow in early spring in a greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on for the first winter in a cold greenhouse. Plant out in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Requires a light porous sandy soil in full sun[200]. A very ornamental plant, it forms large clumps, spreading by short stolons[200]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

#### 5.2.925 Salix aurita

Eared Sallow

4 tlin 8 cyuc 0 kcak 3 tcan 2 dwat 2.5 m hkuc

htut cyutli kyuctcuphia7n hwicli hyishrasilutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix aurita is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry moist or wet soil.

tcanta Basketry PioneerPlants have an extensive root system and are used to stabilize waste tips and old slag heaps[199]. The seeds are very light and so can travel some distance in the wind. The plant is therefore able to find its way to areas such as cleared woodland where the soil has been disturbed. Seedlings will grow away guickly, even in exposed conditions and the plant will provide good shelter

# 5.2.895 Clematis liquisticifolia

White Clematis, Western white clematis, California clematis, 4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Clematis ligusticifolia is a deciduous Climber growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

tcanta Fibre Hair Insulation Miscellany TinderThe seed floss makes an excellent tinder for starting fires, a spark from a flint will guickly ignite it[212]. The seed floss can be used as an insulation in shoes etc[212]. It has also been used in baby's nappies[257]. The stems have been used to make a string[257]. A shampoo made from the roots can be used as a hair shampoo[257].

dwatta Analgesic Contraceptive Eczema Febrifuge Miscellany Odontalgic Poultice Skin Stomachic Tonic VDWhite clematis was employed medicinally by a number of native North American Indian tribes who used it to treat a variety of complaints, but especially as an external application on sores etc[257]. It is rarely used in modern herbalism but probably merits investigation[K]. A decoction of the plant is used to treat colds and sore throats[212, 257]. It has also been used as a general tonic when feeling out of sorts[257]. An infusion of the white bark has been used as a febrifuge[213, 257]. An infusion of the roots has been used to treat headaches and stomach aches[257]. A poultice of the foliage has been used to treat chest pains and rheumatic joints[257]. An infusion of the plant has been used as a wash for skin eruptions, sores, wounds, backaches, swollen limbs, tired feet, syphilitic sores, eczema etc[257]. The stalks and roots have been used to make a woman's contraceptive[257]. A poultice made from the cut stems has been applied to the teeth for treating toothache[257]. A poultice of the mashed, moistened seeds has been applied to severe burns[257].

nrakta Western N. America - Alberta and British Columbia south to California and New Mexico. ksacta Grows over trees and shrubs along rivers, creek banks and canyon bottoms[212].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm was ter and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

# 5.2.896 Fraxinus bungeana

Xiao Ye Oin

4 tlin 8 cvuc 0 kcak 0 tcan 2 dwat 5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Fraxinus bungeana is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Wax Weather protectionA commercial insect wax is produced on the branches[178]. We are not sure how the wax is produced, one report says that it is as a result of eggs being laid by insects. Another report says that the wax is produced by the plant due to the stimulation of the feeding insects. Yet another report says that the wax is produced from secretions of the insects[178]. The wax is used for making candles and as a polish for earthenware pots, book edges etc[178]. The plant (extract?) is said to be used as a barrier to protect the skin from ultra-violet light[176].

dwatta Analgesic Antiinflammatory Antitussive Diuretic Dysentery ExpectorantThe bark is analgesic, antiinflammatory, antitussive, diuretic and expectorant[176, 238]. It controls bacterial infections and coughs[238]. It is used in the treatment of diarrhoea, dysentery, cataracts. cough and asthma[176]. The bark contains aesculin, this has anti-inflammatory, anticoagulant and analgesic actions[176]. The bark also contains fraxetin. This has an inhibitory effect on the central nervous system, is a stronger and safer anodyne than aspirin and has some antibacterial activity[176].

nrakta E. Asia - N. China. ksacta Dry sandy soils, rock crevices at elevations of 0 - 1500 metres in Anhui, Hebei, Henan, Liaoning, Shandong and Shanxi[266],

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. A very ornamental plant[1]. This species might be dioecious, in which case male and female plants must be grown if seed is required.

#### 5.2.897 Iuniperus squamata

4 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 4 m hkuc htut cyutli hgatkyuctcup hwicli hrasilutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus squamata is an evergreen Shrub growing to 4 m (13ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

be used as a ground cover plant in a sunny position [188]. The wood is very fragrant, it is used as a fuel and an incense[51, 158, 272]. The leaves are used as incense[272].

dwatta SkinThe powdered plant is soaked for half an hour in water and then used for washing skin diseases[272]. nrakta E. Asia - China, Himalayas, Afghanistan. ksacta Inner valleys of the Himalayas, 3000 - 4500 metres from

Afghanistan to S.W. China[51]. Forests, thickets, valleys and roadsides in mountain areas from 1600 - 4500 metres[266].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78. 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Cascades, Erosion control, Ground cover, Massing, Rock garden. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11] and succeeding on chalk[200]. A drought tolerant plant once established, succeeding in hot dry positions[200]. This species is closely allied to J. recurva[11]. There are many named forms, selected for their ornamental value[188]. The type species is very slow growing in Britain[185] but the cultivar 'Meyeri' is somewhat faster and more successful. Dioecious. Male and female plants must be grown if seed is required. Special Features:Attractive foliage, Fragrant foliage, Not North American native, There are no flowers or blooms.

# 5.2.898 Miscanthus x giganteus

Giant Miscanthus

4 tlin 9 cyuc 0 kcak 4 tcan 0 dwat 4 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Miscanthus x giganteus is a PERENNIAL growing to 4 m (13ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta None Known

tcanta FodderCarbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials. chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Very few perennial industrial crops have been properly domesticated. Those that have show significantly increased yields. Miscanthus x giganteus is partly domesticated [1-1]. An outstanding biomass producer in temperate climates needing very little nitrogen fertilizer. Most giant Miscanthus is used as biofuel but could also serve as a feedstock for any number of biobased materials [1-1]. Fodder: bank. A possible good candidate for contour hedgerows in agroforestry. An excellent wind break. A popular ornamental - Outstanding fall color with persistent winter interest.

dwatta None Known

nrakta Origin: Hybrid of Asian species. ksacta Hybrid propta Vegetative propagation methods are necessary since giant Miscanthus does not produce viable seed. Rhi-

Hay New Perennial CropClimate: cold temperate to subtropical. Humidity: humid. A sterile (non-invasive) hybrid of M. sinensis and M. sacchariflorus. A very fast growing to 4m in 15 months - but manageable plant. Dry to average water needs - sensitive to too much water on roots. Drought

tcanta Fuel Incense WoodThe cultivar 'Blue Carpet' can Tolerant, well-drained soil, Full sun, Carbon Farming Solutions - Cultivation: new crop. Management: hay (Describes the non-destructive management systems that are used in cultivation) [1-1].

### 5.2.899 Juniperus sabina

Savine, Tam Juniper

4 tlin 7 cyuc 0 kcak 4 tcan 2 dwat 4 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus sabina is an evergreen Shrub growing to 4 m (13ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The whole plant is poisonous and can produce abortions[4].

tcanta Essential Hedge Hedge Insecticide Parasiticide RepellentLeaves are used as an insect repellent, a decoction of them is used against lice[46, 61]. An essential oil from the leaves and shoots has strong diuretic properties and is also used in perfumery[1, 61]. Yields of around 4% are obtained, this oil is also used as an insecticide[7]. A good dense ground cover plant, though it is slow to cover the ground[197]. The species type eventually forms a high ground cover, but there are many named forms that are lower-growing[208]. The sub-species I, sabina tamariscifolia has been particularly recommended[188]. Plants should be spaced about 1.2 metres apart each way[208]. The taller forms of this species make a good hedge[245].

dwatta Abortifacient Diuretic Emetic Emmenagogue Irritant Parasiticide WartsThe young shoots are abortifacient. diuretic, emetic, powerfully emmenagogue and irritant[4, 7]. The plant is rarely used internally but is useful as an ointment and dressing to blisters etc in order to promote discharge[4]. The powdered leaves are also used in the treatment of warts[1, 4, 7, 21]. The shoots are harvested in spring and dried for later use[4]. Use with great caution and never during pregnancy[4, 21], see notes above on toxicity.

nrakta C. and S. Europe to N. America. ksacta Dry stony places in mountains[50], usually on limestone[11], at elevations of 1000 - 2300 metres.

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78]. 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Lavering in September/October. Takes 12 months[78].

nwatta Landscape Uses: Alpine garden, Erosion control, Ground cover, Massing, Rock garden. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11]. Prefers a limestone soil[1]. Succeeds in poor soils and in light shade[197]. Established plants are drought tolerant, succeeding in hot dry positions[200]. Tolerates maritime exposure[200]. A very ornamental plant[1]. nwatta Fodder: Bank Industrial Crop: Biomass Managemethere are many named varieties [188]. All parts of the plant have a powerful pungent smell[245]. Plants can be dioecious or monoecious. Male and female plants must be grown if fruit. and seed are required. The plant is sometimes attacked by a rust, this is a fungus with an aecidial stage on the leaves of pear trees[1]. Plants are resistant to honey fungus[88].

neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

tcanta Attracts wildlife

dwatta Febrifuge VulneraryAn infusion of the plant. combined with another unnamed plant, has been used in the treatment of fevers[257]. A decoction of the plant has been used to dress wounds[257]. The dried and powdered plant has been used as a salve on abrasions[257]. Smoke from the crushed blossoms has been inhaled in the treatment of nosebleeds[257].

nrakta N. America. Naturalized in eastern and southern Britain[17]. ksacta Low areas in Texas[274].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200], but it also succeeds in partial shade[233]. Prefers a rich soil[1], but tolerates poor ones[233]. There are some named varieties, selected for their ornamental value[257]. Plants need to be divided every few years, preferably in the spring, in order to keep the plant vigorous[187]. Most species in this genus seem to be immune to the predations of rabbits[233]. The flowers attract butterflies and moths, it is also a good bee plant providing nectar in autumn[30].

### 5.2.921 Macleava cordata

Plume Poppy

4 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Macleaya cordata is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The sap is very poisonous[178].

tcanta Insecticide MusicalThe dried hollow stems can be used as whistles[178]. Kills insects and mosquito larvae[147]. The flowers are used to kill maggots whilst the whole plant is used to kill larvae and insects[218].

dwatta Carminative Depurative Diuretic StingsThe whole plant is analgesic, antioedemic, carminative, depurative and diuretic[218]. The juice from the stems of the leaves is used to treat insect bites[4]. A decoction of the leaves and stems is used in the treatment of ringworm[218]. The poisonous sap is used to counter poisonous sores[218].

nrakta E. Asia - E. China, Japan. ksacta Grassy places, open meadows and the grassy floors of Cryptomeria plantations[187].

propta Seed - we have no information on this species but suggest sowing the seed as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown in the early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the dormant season[200]. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Cuttings from the

axils of larger leaves in early summer[200]. Root cuttings in the winter[188].

nwatta Landscape Uses:Border, Massing, Specimen. Requires a well-drained deep soil[1] preferring a sunny sheltered position but tolerating light shade[200]. Easily grown in sun or partial shade[187]. Hardy to about -15°c[187]. A very ornamental plant, it can be grown as an isolated specimen in a lawn[1]. An excellent plant for sub-tropical bedding[1]. Plants have spreading underground rhizomes[187] and can be invasive[200]. Special Features: Attractive foliage, Invasive, Naturalizing.

#### 5.2.922 Veratrum californicum

California False Hellebore

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Veratrum californicum is a PERENNIAL growing to 2.5 m (8ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are highly poisonous[155, The flowers are poisonous to insects, including bees[155].

tcanta Disinfectant InsecticideThe dried and powdered root is used as an insecticide and a parasiticide [172]. It is also effective against caterpillars and mammals so great caution is advised[1, 19, 20].

dwatta Analgesic Contraceptive Disinfectant Febrifuge Poultice SalveAlthough a very poisonous plant, California false hellebore was often employed medicinally by a number of native North American Indian tribes who used it mainly as an external application to treat wounds etc[257]. It also had guite a reputation as a contraceptive [257]. It is little, if at all, used in modern herbalism. Any use of this plant, especially internal use, should be carried out with great care and preferably only under the supervision of a qualified practitioner. The root is analgesic, disinfectant and febrifuge[257]. A decoction has been used in the treatment of venereal disease[257]. The roots have been grated then chewed and the juice swallowed as a treatment for colds[257]. A poultice of the mashed raw root has been used as a treatment for rheumatism, boils, sores, cuts, swellings and burns[257]. The dried and ground up root has been used as a dressing on bruises and sores[257]. A poultice of the chewed root has been applied to rattlesnake bites to draw out the poison[257]. The powdered root has been rubbed on the face to allay the pain of toothache[257]. A decoction of the root has been taken orally by both men and women as a contraceptive[61, 257]. A dose of one teaspoon of this decoction three times a day for three weeks is said to ensure permanent sterility in women[207, 254].

nrakta South-western N. America - Washington to California, west to Nevada, New Mexico, Wyoming. ksacta Swamps, creek bottoms, moist woodlands and meadows. from lowland to the sub-alpine zone[60].

propta Unless stored in damp sand at around 4°c the seed has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in the greenhouse as soon as it is ripe[200]. Stored seed needs to be stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh, it usually takes place within 3 - 12 months at 15°c but can be much longer[200]. The plant produces just one seedleaf in its first year, this forms an over-wintering bulb. It takes up to 10 years for the plant to reach maturity [200]. Sow the seed thinly so there is no need to thin or transplant them, and grow the seedlings on undisturbed in the pot for their first two years of growth. Apply a liquid feed at intervals through the growing season to ensure the plants do not become nutrient deficient. At the end of the second year plant out the dormant plants into individual pots and grow them on in light shade in the greenhouse for a further year or two before planting them out into their permanent positions in late spring or early summer. Division in March/April or in October. Establish the plants in

potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Succeeds in a well-drained fertile soil in full sun[200]. Plants do not require a rich soil[11]. The young growth in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. This species is closely related to R. toxicodendron[1]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200], Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.918 Rudbeckia hirta

Black Eyed Susan, Coneflower, Gloriosa Daisy, Marguerite

4 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rudbeckia hirta is a BIENNIAL/PERENNIAL growing to 2 m (6ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, hoverflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista This plant is reputed to be poisonous to cattle, sheep and pigs[155].

tcanta A yellow dye is obtained from the flowers[257]. dwatta An infusion of the roots has been used in the treatment of colds, dropsy and worms in children[257]. A warm infusion of the root has been used as a wash on sores and snake bites[257]. The ooze from the roots has been used as drops to treat earaches[257].

nrakta N. America. An occasional garden escape in Britain[17], ksacta Disturbed soils in Texas[274].

propta Seed - sow April in a greenhouse. Only just cover the seed. Germination should take place within 2 weeks, prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer[K]. The seed can also be sown in situ[111].

nwatta Landscape Uses:Border, Ćontainer, Foundation, Specimen. Succeeds in an ordinary medium soil in sun or shade[111]. Requires a moist soil[1]. Prefers a well-drained soil[188]. Dormant plants are hardy to about -25°c[187]. This species is a biennial or short-lived perenial[200]. Some named forms have been selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: North American native, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Suitable for cut flowers.

#### 5.2.919 Rhus radicans

Poison Ivy

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 2.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus radicans is a deciduous Climber growing to 2.5 m (8ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable

pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant contains toxic substances and skin contact with it can cause severe irritation to some people[11]. The sap is extremely poisonous[11]. The sap contains 3-N pentadecycatechnol. Many people are exceedingly sensitive to this, it causes a severe spreading dermatitis. The toxins only reach the skin if the plant tissues have been damaged, but even indirect contact can cause severe problems[200].

tcanta Dye Ink Mordant OilThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. An excellent marking ink is obtained from this plant[11].

dwatta Hepatic Skin TonicPoison ivy has occasionally been used medicinally, though it is an extremely poisonous plant and great caution should be exercised. Any herbal use should only be undertaken under the supervision of a qualified practitioner. See also the notes above on toxicity. This plant has been used in the past by physicians in the treatment of paralysis and liver disorders[222]. A decoction of the leaves has been used as a tonic and rejuvenator[257]. The whole or the broken leaves have been rubbed over the skin to treat boils and skin eruptions[257]. The leaves have been rubbed on skin that has been affected by a poison ivy reaction[257].

nrakta Eastern N. America - Quebec to Florida, west to Texas.. ksacta Woods, on rocky slopes and in wooded swamps[43]

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. The young growth in spring can be damaged by late frosts. A fast-growing but short-lived species in the wild[22]. It has brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. The plant has a semiclimbing habit and produces aerial roots[11], and occasionally reaches the size of a small tree[229]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 5.2.920 Aster lanceolatus

White Panicle Aster

4 tlin 8 cyuc 0 kcak 2 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aster lanceolatus is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid,

Special Features: Not North American native, Inconspicuous flowers or blooms. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

# 5.2.900 Rhododendron campanula-

4tlin 8 cyuc 0 kcak 0 tcan 1 dwat 4.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Rhododendron campanulatum is an evergreen Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves are considered to be poisonous[211]. The flowers of many species can cause intoxication in large quantities[183].

tcanta Fuel MiscellanyAn excellent fuel wood is obtained from this plant[272].

dwatta MiscellanyThe leaves are mixed with tobacco and used as a snuff in the treatment of colds and headaches that affect only one side of the head[240]. The juice of the leaves is also used in the treatment of chronic rheumatism, sciatica and syphilis[240, 272]. The dried twigs and wood are used in the treatment of phthisis and chronic fevers[240].

nrakta E. Asia - Himalayas from Kashmir to Bhutan. ksacta Found on open slopes in the alpine zone at elevations between 2,800 and 4,400 metres[272]. Rhododendron thickets on mountain slopes[266].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in most humus rich lime free soils except those of a dry arid nature or heavy or clayey[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires[200]. Requires a pH between 4.5 and 5.5[200]. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. There are many named varieties selected for their ornamental value[200]. Plants form a root ball and are very tolerant of being transplanted, even when quite large, so long as the root ball is kept intact[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 5.2.901 Clematis columbiana

Rock Clematis

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Clematis columbiana is a deciduous Climber growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

tcanta Hair Insulation TinderThe seed floss makes an excellent tinder for starting fires, a spark from a flint will quickly ignite it[212]. The seed floss can be used as an insulation in shoes etc[212]. An infusion of the leaves alone, or the leaves and stems, has been used as a hair wash to prevent gray hair[257].

dwatta Eczema Foot care Salve SkinA poultice of the pounded, dampened leaves has been applied to the feet to treat sweaty feet[257]. A cold infusion of the plant can be used as a lotion on swollen knees and ankles[257]. The plant has been used as a head wash and to treat scabs and eczema[257].

nrakta Western N. America - British Columbia to Colorado and Oregon. ksacta Dry to moist soils of woods and thickets, from valleys to around 2,500 metres in the mountains[212].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an obiect, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 5.2.902 Buddleia davidii

Butterfly Bush, Summer Lilac, Butterflybush 4 tlin 8 cyuc 0 kcak 1 tcan 0 dwat 3 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Buddleia davidii is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to October, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric nollution

tcanta DyeBlack or green dyes can be obtained from the flowers, leaves and stems combined[168]. An orange-gold to brown dye can be obtained from the flowers[168]. An extremely popular garden plant due to its low maintenance, long flowering season, colourful and fragrant flowers, and its attractiveness to butterflies. The flowering B. davidii has been closely linked with butterflies, moths and humming-birds [1d].

nrakta E. Asia - China. Naturalized in Britain[17]. ks-acta Found in rocky riverside habitats 1300 - 2600 metres in

 $China [200]. \ Waste \ places, \ often \ on \ brick \ walls \ in \ Britain [17].$ 

propta Seed - cold stratify for 4 weeks at 4°c[138] and surface sow the seed in February/March in a greenhouse[78, 113]. Germination usually takes place within 3 - 4 weeks at 21°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Seedlings are inclined to damp off and so should be watered with care and kept well-ventilated[78]. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Use short side-shoots[78]. Very high percentage[113]. Cuttings of mature wood of the current season's growth, 15 - 20cm long, October/November in a frame[200].

nwatta Landscape Uses:Border, Container, Pest tolerant, Massing, Standard, Specimen. Requires a sunny position[11, 182]. Prefers a rich loamy well-drained soil[11, 200]. Very tolerant of alkaline soils, atmospheric pollution and maritime exposure[200]. Grows best on dry soils of low fertility, where it can seed itself freely[182]. Plants are hardy to about -15°c[184], they resprout from the base if cut back by cold weather[200]. A very ornamental plant[1], it hybridizes freely with other members of this genus. Polymorphic, there are many named varieties, developed for their ornamental value[182]. The flowers emit a musk-like fragrance like heather honey[245]. Plants flower mainly on the current years growth so a hard pruning in spring will encourage better flowering[200]. An excellent plant for bees and butterflies[30]. Special Features: Attracts birds. Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms.

### 5.2.903 Magnolia liliiflora

Mu-Lan, Woody Orchid, Lily Magnolia 4 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Magnolia illiiflora is a deciduous Shrub growing to 3 m (9ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

dwatta Analgesic Anodyne Carminative Febrifuge Sedative TonicThe flowers and unopened flower buds are analgesic, anodyne, carminative, febrifuge, sedative and tonic[147, 218]. The main effect of this herb is to constrict blood vessels in the nasal passages and so it is taken internally in the treatment of sinusitis, allergic rhinitis and colds with a runny nose or catarrh[238]. In excess it can cause dizziness[238]. This herb is incompatible with Astragalus membranaceus[238]. The flowers are harvested in the spring and can be used fresh or dried[238].

nrakta E. Asia - C. China. ksacta Slopes and forests edges at elevations of 300 - 1600 metres in Fujian, Hubei, Sichuan and NW Yunnan Provinces[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200].

nwatta Landscape Uses:Border, Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Prefers a neutral to acid soil but tolerates alkaline soils so long as they are deep and rich in humus[188]. Plants cannot be grown on limy or chalky soils[219]. The branches are brittle so a sheltered position is required[200]. This species is said to be fairly wind tolerant[200]. It is very tolerant of atmospheric pollution[200]. Plants are hardy to

about -20°c[200], but they require the protection of a wall when grown in northern Britain[11]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. The flowers, which start to be produced when the plant is less than a metre tall, are deliciously scented[245]. The young wood is aromatic[219]. Special Features:Attractive foliage, Extended bloom season in Zones 9A and above, Fragrant flowers, Blooms are very showy.

#### 5.2.904 Cotoneaster simonsii

Simons' cotoneaster

4 tlin 8 cyuc 0 kcak 2 tcan 0 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cotoneaster simonsii is an evergreen Shrub growing to 3 m (9ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. Can be grown as a medium to tall informal hedge[1, 11, 29, 200]. When close trimmed it makes an excellent dense hedge[182].

nrakta E. Asia - Himalayas, in Assam. Naturalized in many places in Britain[17]. ksacta Scrub, hedgerows and rocky places on calcareous soils[200].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°c and then 3 months cold stratification at 4°c[164]. The seed usually germinates within 1 - 18 months at 15°c but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy plant, tolerating temperatures down to about -20°c[184]. A fairly fast-growing species[202]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaving fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 5.2.905 Cornus rugosa

Round-Leaved Dogwood 4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flat-

priklwis hpa7tmwatli xre7t hjonli drutta Cornus rugosa is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: used as an alterative when taken internally in the treatment of a range of skin diseases, it is also used in the treatment of arthritis, rheumatism, bronchial congestion, heart ailments, ulcerative colitis and jaundice[4, 218, 238]. Externally, the plant is used to treat skin eruptions, ulcers, rheumatism and cellulite[238]. Two to three year old stems are harvested in the spring, or after the leaves have fallen in the autumn, and dried for later use[238]. The fruits are marinated in vinegar and applied to cancerous sores and other swellings[218]. A decoction of the root is used in the treatment of cancer and swellings[218]. The root is harvested in the autumn and dried for later use[238]. A homeopathic remedy is made from the fresh, green, still pliant stems and leaves, harvested as the plant begins to flower[232]. This is used in treating a variety of complaints including backaches, cough, diarrhoea, eye inflammations and joint pains[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Solanum dulcamara for eczema, furuncles (boils), acne, warts (see [302] for critics of commission E).

nrakta Europe, including Britain, south and east from Norway to N. Africa and temperate Asia. ksacta Hedgerows and woody areas, avoiding acid soils[17]. Also found on moist banks by the edges of swamps[232].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. If you have sufficient seed then it can be sown outdoors in situ in the spring. Division in spring.

nwatta An easily grown plant, it succeeds in most soils[1, 202]. Prefers a damp shady position and a neutral to alkaline soil[10, 238]. Succeeds in full sun to light shade[202]. If being grown for its medicinal uses, the plant is best placed in a dry and exposed position[4]. Hardy to at least -15°c[202]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing, All or parts of this plant are poisonous

# 5.2.916 Apocynum pictum

Kendyr

Kendyr 4 tlin 9 cyuc 0 kcak 3 tcan 2 dwat 2 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli hjonli

drutta Apocynum pictum is a PERENNIAL growing to 2 m (6ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known

tcanta Agroforestry Uses: The fragrant flowers are a good source of honey for bees[266]. Other Uses: The strong bast fibres obtained from the inner bark are used in making cloth, strings, sails, fishing nests, and high-quality paper[266]. The leaves yield up to 5% gum, which is used for making rubber[266]. Carbon Farming: Industrial Crop: fiber. The dogbane-milkweed family Asclepias, Apocynum, Calotropis, and Trachomitum spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed fiber or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-11].

dwatta The leaves yield up to 5% gum (?latex), which is used for making a medicine used as a sedative and to treat hypertension[266]. The species has fragrant flowers and is grown as a honey plant[266].

nrakta Central Asia - Tajikistan, Kyrgyzstan, Kazakhstan, western China, Mongolia ksacta Salt-barren areas, desert margins, riversides[266].

propta Seed - best sown as soon as it is ripe in late summer and overwintered outdoors. The seed requires a period of cold stratification if it is to germinate well[238]. Prick out the seedlings when large enough to handle and grow them on in a cold frame for their first winter, planting out in late spring of the following year[K]. Division in spring just before

active growth begins[200]. Plants can also be divided in the autumn[238].

nwatta Industrial Crop: Fiber Management: Hay Regional CropSpecies in this genus generally succeed in sun or shade in most well-drained but moisture-retentive soils[1, 200]. The species has fragrant flowers and is grown as a honey plant[266]. Apocynum species are used as food plants by the larvae of some Lepidoptera species, including the mouse moth and the Queen butterfly. Climate: cold to warm temperate. Humidity: arid to semi-arid. Carbon Farming - Cultivation: regional crop. Management: hay.

#### 5.2.917 Rhus diversiloba

Western Poison Oak, Pacific poison oak 4 tlin 8 cvuc 0 kcak 0 tcan 2 dwat 2.5 m hkuc

htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus diversiloba is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is polinated by Bees. The plant is not self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant contain resinous phenolic compounds known as urushiols. Direct contacr with the plant, exposure to smoke or fumes from a burning plant or even contact with pets or animals that have touched the plant can cause severe allergic dermatitis in some individuals. There is usually a latent period of about 12 - 24 hours from the moment of contact, this is followed by a reddening and severe blistering of the skin. Even plant specimens 100 or more years old can cause problems[274].

tcanta Basketry Dye Ink Mordant OilThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn briliantly, though they emit a pungent smoke[4]. The supple stems are used as the warp in basket making[92]. Slender stems are used as circular withes in basket making[257]. An excellent black dye is obtained by exposing the sap to air[92].

dwatta Antidote Contraceptive Eczema Ophthalmic WartsWestern poison oak was employed medicinally by some native North American Indian tribes who used it to treat various complaints[257]. In view of the potential toxicity of the plant, extreme caution is advised in any use of it. See the notes above on toxicity. A leaf has been swallowed in the spring as a contraceptive [257]. A tincture of the fresh leaves has been used in the treatment of eczema and skin diseases[4]. It is also used in the treatment of warts, ringworm etc[92]. A poultice of the fresh leaves has been applied to rattlesnake bites[257]. The leaf buds have been eaten in the spring in order to obtain immunity from the plant poisons[257] A moxa of the plant has been used in the treatment of warts and ringworm[257]. The juice of the plant has been used as a treatment for warts[257]. An infusion of the dried roots has been taken in order to give immunity against any further poisoning[257]. A decoction of the roots has been used as drops in the eyes to heal tiny sores inside the eyelids and to improve vision[257].

nrakta Western N. America - Vancouver to California. ksacta Thickets and wooded slopes in foothills, along streams, in washes and hedgerows below 1500 metres[71, 92].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in frame[200]. Root cuttings 4cm long taken in December and

-20°c[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. An important herb in Chinese medicine, it is widely cultivated there[238] and is used as a ginseng substitute[4, 174]. A climbing plant, supporting itself by twining and scrambling over other plants[219]. Plants resent root disturbance and should be planted out into their permanent position as soon as possible[164]. Plants are very susceptible to the ravages of slugs. The young shoots in spring are particularly at risk, though older growth is also eaten[K].

# 5.2.913 Spiraea douglasii

Steeplebush, Rose spirea, Menzies' spirea 4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Spiraea douglasii is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta The branches have been used to make brooms[257].

dwatta An infusion of the seeds has been used in the treatment of diarrhoea[257].

nrakta Western N. America. Rarely naturalized in Britain[17]. ksacta Almost always found in wet soils in redwood and red fir forests from sea level to elevations of 2100 metres[276].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Prefers a moist lime-free soil[182], plants quickly become chlorotic on chalk soils[200]. A very cold hardy plant, tolerating temperatures down to about -25°c[200]. Hybridizes freely with other members of this genus[11]. A rampant suckering shrub, it quickly produces dense thickets and can be used for large-scale naturalistic plantings[200]. It is apt to get thin and poor unless divided up fairly regularly and replanted in fairly good soil[1].

#### 5.2.914 Cotoneaster divaricatus

Spreading Cotoneaster

4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cotoneaster divaricatus is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. Plants are often used in informal hedging[200].

nrakta E. Asia - China. Naturalized in southern England. ksacta Rocky slopes, gullies, forests, shrubwoods and thickets at elevations of 1600 - 3400 metres [266].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°c and then 3 months cold stratification at 4°c[164]. The seed usually germinates within 1 - 18 months at 15°c but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. A very hardy species, tolerating temperatures down to at least -15°c[202]. Fairly fast-growing[202]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 5.2.915 Solanum dulcamara

Bittersweet. Bittersweet Nightshade, Climbing nightshade, Bittersweet, Deadly Nightshade, Poisonous 4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Solanum dulcamara is a PERENNIAL CLIMBER growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista All parts of the plant, including the fruit, are poisonus[4, 7, 10, 13, 19], though only mildly so[21, 65]. Adverse effects include: nausea, vomiting, diarrhoea and dilated pupils. The stem contains only low concentrates of alkaloids and therefore toxicity. Overdose may cause paralysis of the central nervous system, slow heart and respiration, low temperature, vertigo, delirium, convulsions and death [301].

dwatta Alterative Anodyne Cancer Depurative Diuretic Eczema Emetic Expectorant Hepatic Homeopathy Narcotic PurgativeBittersweet is a poisonous plant that has a long history of use in the treatment of skin diseases, warts, tumours, felons etc[238]. It should be used with caution and only under the supervision of a qualified practitioner, this is a poisonous plant that, in excess, paralyzes the central nervous system, slows the heart and respiration, and lowers temperature, causing vertigo, delirium, convulsions and death[21, 238]. See also the notes above on toxicity. All parts of the plant are alterative, anodyne, depurative, mildly diuretic, emetic, expectorant, hepatic, mildly narcotic and purgative[4, 7, 9, 13, 21, 165]. The dried stem, usually collected in the autumn and preferably from the ends of branches 2 - 3 years old, is the part that is most valued medicinally, though the leaves are also used[4]. The plant is chiefly

light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

dwatta Cathartic Febrifuge Kidney TB TonicThe bark is cathartic, febrifuge and tonic[61, 257]. A decoction of the roots has been used in the treatment of kidney complaints and TB[257].

nrakta Eastern N. America - Quebec to Manitoba and south to Virginia and Illinois. ksacta Dry woods and rocky slopes[43].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 1131. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in poorly drained soils[200]. Succeeds in full sun or light shade[[188]. A very ornamental[1] and free-flowering plant[182]. Plants in this genus are notably resistant to honey fungus[200].

# 5.2.906 Ligustrum vulgare

Privet, European privet , Common Privet 4 tlin 7 cyuc 0 kcak 3 tcan 1 dwat 3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Ligustrum vulgare is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft) by 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Poisonous[10], though the toxicity is of a very low order and normally the consumption of the fruit leads to vomiting or no symptoms at all[65].

tcanta Basketry Charcoal Dye Ink WoodA yellow dye is obtained from the leaves[6], from the bark, according to other reports[46, 61]. A bluish-green dye is obtained from the berries[6, 46, 61]; it is more permanent than most greens[115]. A black dye can also be obtained from the fruit[61] and an ink[46, 61]. Wood - hard, close-grained. It is valuable for turning if it reaches sufficient size[115] and can also make small tools[46, 61]. The wood is a source of charcoal[46, 61]. The young twigs are used in basketry and hurdle making[46, 61, 100]. Landscape Uses Border, Hedge, Screen, Superior hedge. Naturalizing, Attractive flowers or blooms

dwatta Astringent Bitter Detergent VulneraryThe leaves are astringent, bitter, detergent, vulnerary[7, 21]. Internal use of this plant should be avoided since it can produce allergic symptoms[7]. Externally it is a safe and effective treatment[7]. The bark has been used as a stomachic[7], though this is not really recommended.

nrakta Central and southern Europe, including Britain, to N. Africa. ksacta Open woodland, hedges and scrub, often by the sea and usually on calcareous soils[10, 17, 50].

propta Sow the seed in spring in a cold frame. Stored seed germinates better if it is stratified,[113]. Remove any fruit flesh from around the seed before it is sown since this can inhibit germination[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can also be sown in outdoor seed beds in the autumn. You can leave the plants to grow on in the seedbed for up to 4 years before planting them out into their permanent positions in the winter. Cutings of half-ripe wood, 5 - 10cm with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood, 20 - 30cm in a sheltered outdoor bed in November/December[78]. The cuttings can also be placed in situ if required. High percentage[78].

nwatta A very tolerant and easily grown plant, it succeeds in any soil that is not very impoverished[11]. Grows well in heavy clay soils. Prefers a calcareous soil and succeeds in thin dry soils[186]. Grows well in light woodland or the full shade of a wall but flowers and fruits best in a sunny position[186]. Tolerant of atmospheric pollution, once established they also tolerate drought but are intolerant of waterlogging[186]. A suckering shrub, forming dense thickets and making good bird cover[186]. An important food plant for many caterpillars, including the larvae of the privet hawk moth[186]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, Invasive, Naturalizing, Attractive flowers or blooms.

### 5.2.907 Menispermum canadense

Canada Moonseed, Common moonseed 4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 3.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Menispermum canadense is a deciduous Climber growing to 3.6 m (11ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[21, 95, 159, 222]. The fruit has been known to cause death in children[207].

dwatta Bitter Diuretic Laxative Purgative TonicCanada monseed has occasionally been used in the past for its medicinal virtues, though it is little, if at all, used in modern herbalism. The roots are a bitter tonic, diuretic, laxative, nervine, purgative (in large doses), stomachic and tonic[4, 21, 46, 218]. A tea made from the root has been used in the treatment of indigestion, arthritis, bowel disorders and as a blood cleanser[222]. The root is applied externally as a salve on chronic sores[222]. Use with caution[21], see notes above on toxicity.

nrakta Eastern N. America - Quebec and New England to Georgia, west to Arkansas and Oklahoma. ksacta Moist woods and hedges near streams[43]. Deciduous woods and thickets, along streams, bluffs and rocky hillsides, fencerows, shade tolerant from sea level to 700 metres[270].

propta Seed - sow late winter in a greenhouse[78, 113]. Two months cold stratification speeds up germination[113] so it might be better to sow the seed as soon as it is ripe in a cold frame[K]. Germination is usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood, autumn in a frame[200]. Division of suckers in early spring[78, 113]. The suckers can be planted out direct into their permanent positions, though we prefer to pot them up and grow them on in light shade in a greenhouse or cold frame until they are established[K].

nwatta Succeeds in any moderately fertile soil that does not dry out excessively in summer, in sun or partial

shade[200]. Prefers a position in full sun[219]. This species is hardy to about -30°c, but, due to a lack of summer heat, the plants usually produce soft growth in mild maritime areas and this can be cut to the ground at temperatures around -5 to -10°c[200]. The plants do not require pruning, but can benefit from being cut back to ground level every 2 -3 years in order to keep them tidy[219]. A vigorous and fast-growing climbing plant that twines around supports, it also spreads freely by underground suckers[11, 182, 219]. Dioccious. Male and female plants must be grown if seed is required.

#### 5.2.908 Kalmia latifolia

Mountain Laurel, Calico Bush, Ivy 4 tlin 8 cyuc 0 koak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Kalmia latifolia is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft) at a slow rate. See above for USDA hardness. It is hardy to UK zone 4. It is in leaf all year, in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The foliage is poisonous to animals[21, 65, 76]. The whole plant is highly toxic[222]. Cases of poisoning have occurred when livestock or game birds have been eaten after they have ingested this plant[238].

tcanta Dye Hedge Hedge WoodA yellow-tan dye is obtained from the leaves[106]. The plant can be grown as an informal hedge[200]. Wood - heavy, hard, strong but rather brittle. It weighs 44lb per cubic foot and is used for making small implements, tool handles etc[21, 46, 61, 82, 235]. The roots are used to make spoons etc, these are fashioned when the wood is green and soft, when dry they become very hard and smooth[207]. The wood is a good fuel[46, 61].

dwatta Analgesic Antifungal Antipsoriatic Antiviral Astringent Narcotic Salve Sedative SkinMountain laurel is a very poisonous narcotic plant the leaves of which were at one time used by some native North American Indian tribes in order to commit suicide[4]. Because of its toxicity, it is a remedy that is seldom used in modern herbalism[238], but the leaves have been used externally in herbal medicine and are a good remedy for many skin diseases and inflammation[4]. The leaves are analgesic, astringent, disinfectant, narcotic, salve and sedative[257]. An infusion of the leaves is used as a disinfectant wash and liniment to treat pain. scratches, rheumatism, inflammations and to get rid of body parasites[257]. Used internally, the leaves have a splendid effect in the treatment of active haemorrhages, diarrhoea and flux[4, 21, 61]. They are also used in the treatment of syphilis, inflammatory fevers, neuralgia, paralytic conditions, tinnitus and angina[238]. The leaves should be used with great caution however, and only under the guidance of a qualified practitioner[238]. Excess doses cause vertigo, headache, loss of sight, salivation, thirst, nausea, palpitations, slow pulse and difficulty in breathing[238]. See also the notes above on toxicity. Antifungal [303].

nrakta Eastern N. America - New England to New York south to W. Florida. ksacta Rich rocky, or dry gravelly woods in the shade of deciduous trees, and swamps in acid soils[43]. Prefers sandy or rocky soils[235].

propta Seed - surface sow in late winter in a cool greenhouse in light shade[78, 113]. Prick out the young seedlings into individual pots as soon as they are large enough to handle. The seedlings are rather sensitive to damping off, so water them with care, keep them well-ventilated and perhaps apply a fungicide such as garlic as a preventative. Grow the young plants on in light shade and overwinter them in the greenhouse for their first winter[78]. Plant them out into their permanent positions in early summer. The seed is dust-like and remains viable for many years[113]. Cuttings of half-ripe wood, August in a frame. Very poor results unless the cuttings are taken from very young plants[11, 78]. Layering in August/September. Takes 18 months[78]. The plants can also be dug up and replanted about 30cm deeper in the soil to cover up some of the branches. The plant can then be dug up

about 12 months later when the branches will have formed roots and can be separated to make new plants[200].

nwatta Landscape Uses:Border, Foundation, Rock garden, Specimen. Requires an acid humus-rich soil, succeeding in part shade[182] or in full sun in cooler areas. Prefers almost full sun[11]. Dislikes dry soils[182], requiring cool, permanently moist conditions at the roots[21]. Succeeds in open woodland or along the woodland edge[200]. Plants are very cold-hardy, tolerating temperatures down to about -30°c[184]. A very ornamental plant[11], there are many named varieties[182]. This species is not very easy to grow well in Britain, it probably prefers a more continental climate[11]. This species is the state flower of Connecticut[238]. Slow to rejuvenate if the plant is cut back[200]. Special Features: Attracts birds, North American native, All or parts of this plant are poisonous, Blooms are very showy.

### 5.2.909 Menispermum davuricum

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 3.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Menispermum davuricum is a deciduous Climber growing to 3.6 m (11ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is poisonous[218].

dwatta Antirheumatic Cancer SkinThe root is antirheumatic and is also used in the treatment of cancer[218]. The whole plant is used to alleviate skin allergies and is also used in the treatment of cancer[218].

nrakta E. Asia - Siberia to N. China. ksacta Sparse forests ad bushes at the road[266].

propta Seed - sow late winter in a greenhouse[78, 113]. Two months cold stratification speeds up germination[113] so it might be better to sow the seed as soon as it is ripe in a cold frame[K]. Germination is usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood, autumn in a frame[200]. Division of suckers in early spring[78, 113]. The suckers can be planted out direct into their permanent positions, though we prefer to pot them up and grow them on in light shade in a greenhouse or cold frame until they are established[K].

nwatta Succeeds in any moderately fertile soil that does not dry out excessively in summer, in sun or partial shade[200]. Prefers full sun[219]. This species is hardy to about -30°c, but, due to a lack of summer heat, the plants usually produce soft growth in mild maritime areas and this can be cut to the ground at temperatures around -5 to -10°c[200]. The plants do not require pruning, but can benefit from being cut back to ground level every 2 - 3 years in order to keep them tidy[219]. Closely related to M. canadense, differing mainly in its annual or rarely persistent aerial stems[200]. A twining plant, it spreads freely by means of underground suckers[11, 182]. Dioecious. Male and female plants must be grown if seed is required.

# 5.2.910 Philadelphus lewisii

Mock Orange, Lewis' mock orange 4 tlin 8 cyuc 0 keak 0 tcan 1 dwat 3.6 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Philadelphus lewisii is a deciduous Shrub growing to 3.6 m (11ft 10in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Soap WoodThe leaves and flowers are rich in saponins, when crushed and mixed with water they produce a lather that is an effective cleaner, used on the body, clothes etc[99, 169, 257]. You can wash your hands by merely picking a couple of leaves or a bunch of blossom, wetting your hands and then rubbing the plant material vigorously as if it was a bar of soap[K]. This soap is a very gentle cleaner that does not remove the body's natural oils, but does remove dirt. It is not very effective against oil[K]. An infusion of the bark can also be used[99, 169]. The stems can be used in making fine coiled baskets[257]. Wood - strong, very hard. Used for tool handles[99].

dwatta Antihaemorrhoidal Antirheumatic Eczema Poultice SkinThe dried powdered leaves, or the powdered wood, has been mixed with pitch or oil and used as a rub on sores and swollen joints[257]. A poultice of the bruised leaves has been used to treat infected breasts[257]. A strained decoction of the branches, sometimes with the flowers, has been used as a soaking solution in the treatment of sore chests, eczema and bleeding haemorrhoids[257].

nrakta Western N. America - British Columbia to Oregon. ksacta Gullies, water courses, rocky cliffs, talus slopes and rocky hillsides of sagebrush deserts[60].

propta Seed - best if given 1 months cold stratification[113]. Sow February in a light position in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long side-shoots, July/August in a shaded frame. Plant out in spring. High percentage[78]. Cuttings of mature wood of the current year's growth, 15 - 25cm with a heel, December in a sheltered bed outdoors. Fair to good percentage[78]. Layering in summer. Very easy.

nwatta An easily grown plant, succeeding in any moderately fertile soil, and also in thin soils over chalk[200]. Tolerates poor soils[200]. Grows well in heavy clay soils. Succeeds in semi-shade but prefers a position in full sun where it will flower more freely[182, 200]. Plants are hardy to about -15°c. Some named forms have been developed for their or namental value[182]. Plants are very tolerant of pruning, one third of the stems can be cut down to the ground each year in order to promote fresh growth and heavier flowering[202]. A very ornamental plant with aromatic flowers[182, 200]. This plant is the State flower of Idaho[212].

#### 5.2.911 Baccharis halimifolia

Bush Groundsel, Eastern baccharis, High Tide Bush, Sea Myrtle, Salt Bush

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 3.5 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwissliohsom hpa7tmwatli nyanhien hionli

drutta Baccharis halimifolia is a deciduous Shrub growing to 3.5 m (11ft) by 3.5 m (11ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The plant is potentially toxic to livestock[274]. tcanta Fuel Hedge Hedge Soil stabilizationA good fast-growing hedge for exposed maritime conditions[11, K]. It retains its leaves into the new year but is rather bare in late winter[K]. Plants have an extensive root system and can be grown on sand or thin coastal soils in order to bind the soil[200]. Resinous secretions on the leaves and wood make this a useful fuel[11]. It is a fairly small plant though and would not be a very productive source.

dwatta DemulcentThe plant is used as a palliative and demulcent in consumption and cough[207].

nrakta Eastern N. America - Massachusetts to Florida and Texas. ksacta Open woods, thickets and borders of marshes near the coast[43], often in saline soils[235].

propta Seed - no pre-treatment is required[113]. Surface sow in pots a cold frame in the spring, do not let the compost dry out. Germination usually takes place within 1 - 2 weeks[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy[K]. Cuttings of mature wood of the current seasons growth, November in a frame. Easy[K].

nwatta Landscape Uses:Seashore. Succeeds in a sunny position in any well-drained soil[11, 188], from heavy clays to pure sands[113]. Tolerates saline conditions and dry soils[188, 200]. A useful shrub for coastal situations, resisting maritime exposure[11]. Plants are hardy to about 15°c[200]. A fast-growing plant, it is very tolerant of pruning and can be cut right back to the base if required[K]. The presence of this plant growing wild was supposed to indicate areas where oil might be found[207]. Dioecious. Male and female plants must be grown if seed is required. Special Features:North American native, All or parts of this plant are poisonous, Wetlands plant, Attractive flowers or blooms.

# 5.2.912 Codonopsis tangshen

Chuan Dar

4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Codonopsis tangshen is a PERENNIAL CLIMBER growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Adaptogen Aphrodisiac TonicThis species is an important herb in Chinese medicine, the root is widely used as a substitute for ginseng[4, 174, 238]. It is a sweet, warm, soothing herb that is taken as an energy tonic[238]. It acts mainly on the spleen, lungs and stomach, raising secretion of body fluids and blood sugar levels, lowering the blood pressure and stimulating the immune system[238]. The root and the whole plant are adaptogen, aphrodisiac and tonic[46, 61, 174, 176, 218]. It is taken internally in the treatment of low energy, poor appetite and digestion, anaemia, shallow breathing and debility after illness[238]. It is often cooked with rice until it is glutinous as a tonic food[238]. The roots of plants at least three years old are harvested in the autumn and can be used fresh or dried[238].

nrakta E. Asia - W. China. ksacta Alpine brush and rocky slopes[200]. Upland fields[238].

propta Seed - surface sow in spring to early summer in an ericaceous compost in a greenhouse. Do not allow the compost to dry out. The seed usually germinates in 1 - 6 weeks at 20°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in a greenhouse for their first winter. Plant out in late spring or early summer and protect them from slugs until the plants are well established[K]. Division in spring, with care, since the plant resents root disturbance[200]. We have found it best to take small divisions that are teased out from the sides of the main clump so as to cause the least possible disturbance to the plants and to avoid having to dig up the clump. These small divisions need to be potted up and placed in light shade in a greenhouse until they are rooting well. They can be planted out into their permanent positions in the summer if they are large enough, otherwise in the following spring[K].

nwatta Prefers a well-drained fertile light soil in full sun or semi shade[1, 200]. It only succeeds in full sun if the soil remains moist during the growing season[200]. Prefers a slightly acid soil[164]. Dormant plants are hardy to about

Division of suckers in the winter[249]. If growing named varieties, it is of course necessary to ensure they are growing on their own roots if the suckers are to be true to type[249].

nwatta Landscape Uses: Arbor, Espalier, Pollard, Standard. Prefers a good loamy soil in a sunny south or southwest facing position, sheltered from cold winds and from early morning sun on frosty mornings[11, 200]. Succeeds in partial shade. Plants can become chlorotic on alkaline soils[200]. A soil that is too rich results in excessive foliage at the expense of flowering[200]. Hardy to about -15°c[184, 2001. Plants can take a few years to settle down after planting out[219]. Too much shade or too rich a soil are normally the culprits, some form of root restriction can be beneficial[219]. There are several named forms selected for their ornamental value [188]. Sparrows and other birds frequently eat the young buds of this plant and this is the commonest cause of poor flowering on established plants[184]. Plants sometimes have a second season of flowering in August[219]. The plants flower mainly on short spurs so, if removing unwanted side-branches, it is best to cut them back to 2 - 3 leaves rather than removing them completely since this will encourage the formation of flowering spurs[249]. Any drastic pruning is best carried out in the spring, immediately after flowering[249]. Plants are very tolerant of even the most drastic pruning and will re-grow even if cut right back to the base[249]. A climbing plant supporting itself by twining around other plants, the shoots twine in an anticlockwise direction[182]. Very tolerant of pruning, plants can regenerate from old wood[202]. Plants in this genus are notably susceptible to honey fungus[200]. Closely related to W. floribunda[126]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plants also form a symbiotic relationship with a mycorrhizal fungus which makes more water, phosphorus and other minerals available to the plants[249]. Special Features:Not North American native, Invasive, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Fragrant flowers, Blooms are very showy.

# 6.1.20 Alnus tenuifolia

Mountain Alder, Thinleaf alder tfo2n5 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 9 m hkuc hmimhtut cyutli tcuphja7n1 hwicli hyisjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Alnus tenuifolia is a deciduous Tree growing to 9 m (29ft 6in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 2. It is in flower in March, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The freshly harvested inner bark is emetic but is alright once it has been dried[172].

kcakta Edible Parts: FlowersEdible Uses: Catkins - raw or cooked. A bitter taste[172].

tcanta Pioneer Soil stabilization Tannin WoodThis is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc[226]. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K]. The tree has an extensive root system and can be planted to control banks from erosion[226]. The bark and the strobils are a source of tannin[82]. A dark dye is obtained from the bark[226]. The colour can range from

orange through red to brown[257]. Wood - soft, straight-grained, very durable in water[82]. It is of no commercial value, though it is used locally as a fuel[229].

dwatta Anodyne Astringent Emetic Febrifuge Haemostatic Stomachic TonicThe bark is astringent, emetic, haemostatic, stomachic and tonic[172]. The bark also contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226]. The outer bark is astringent and is applied as a poultice to bleeding wounds, it also reduces swellings[226].

nrakta Western N. America - Alaska to California and New Mexico. ksacta Moist soils by swamps, streams, ponds and lakes in foothills to well up in the mountains [60, 229].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Landscape Uses: Erosion control. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. A fastgrowing but short-lived tree[229]. There is some confusion over the correct name of this tree with one authority citing the European species A, incana as the correct name [60]. Another report says that this species is closely related to A. incana, but distinct[229]. Some modern works treat it as a subspecies (Alnus incana tenuifolia). This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native. Wetlands plant, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 6.1.21 Lathyrus latifolius

Perennial Sweet Pea, Perennial pea tfo2n 5 tlin 9 cyuc 1 kcak 2 tcan 0 dwat 2 m hkuc hmimhtut cyutli hgatkyuctup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lathyrus latifolius is a PERENNIAL CLIMBER growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no records of toxicity have been found for this plant, the seed of some species in this genus contain a toxic amino acid that can cause a severe disease of the nervous system known as 'lathyrism' if they are eaten in large amounts (although small quantities are said to be nutritious)[65, 761. Great caution is advised.

kcakta Edible Parts: Leaves Seed SeedpodEdible Uses: Seed - cooked[105, 177]. Some caution is advised, see the notes above on toxicity. Young seedpod - cooked[105, 177]. Young plant - cooked[105, 177].

tcanta Plants can be grown without supports when they will sprawl on the ground and can be used as a ground cover plant in a sunny position[188, 202]. They should be spaced

nrakta Most of Europe, including Britain, to N. Africa, western and central Asia. ksacta By streams, in low damp sites and in woods, avoiding acid soils[7, 13].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. If you have sufficient seed it can be sown outdoors in situ. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta An easily grown plant[233], it succeeds in ordinary garden soil in sun or part shade[200]. Prefers a rich moist soil[187]. Grows well in marshy soils[21]. Plants are hardy to about -25°c[187]. A very ornamental plant[1], it has a pleasant aromatic smell when cut[4]. Often found as a weel in British gardens, it can be allowed to naturalize in short grass in the wild garden[233]. Plants seem to be immune to the predations of rabbits[233]. An excellent bee and butterfly plant[24, 108].

#### 5.2.966 Aconitum hemslevanum

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Aconitum hemsleyanum is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1].

dwatta A widely used herbal remedy in China, where it is cultivated for its root[4]. This is harvested in the autumn as the plant dies down and is then dried before being used. The root is anaesthetic, analgesic, anti-inflammatory, antirheumatic, cardiotonic, stimulant and vasodilator[4]. Use with caution, the plant is very poisonous and should not be used internally[218].

nrakta E. Asia - C. and W. China. ksacta Forests, forest margins, scrub, mountains and grassy slopes at elevations of 1700 - 3500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to A. fischeri and considered to be part of that species by some botanists[1].

#### 5.2.967 Verbascum densiflorum

Mullein

4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 1.2 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Verbascum densiflorum is a BIENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Dynamic accumulator.

dwatta Ånodyne Antirheumatic Antiseptic Astringent Demulcent Diuretic Emollient Expectorant Pectoral VulneraryThe flowers and leaves are anodyne, antiseptic, astringent, demulcent, emollient, expectorant and vulnerary[4, 9, 13, 21, 46, 53, 165, 238]. An infusion is used internally in the treatment of various respiratory complaints including coughs, bronchitis, asthma and throat irritations[9, 238]. An infusion of the fresh or dried flowers in olive oil is used to treat earaches, sores, wounds, boils etc[238]. The plant is harvested when in flower and should be dried quickly and with care or it will lose its medicinal qualities[9, 238].

nrakta C. Europe. Occasionally naturalized in Britain[17]. ksacta Waste places, railway embankments and similar dry sunny localities[9].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta Succeeds in most well-drained soils, including dry ones, preferring a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. Plants are hardy to about -20°c[187]. This species is closely related to V. phlomoides[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200].

# 5.2.968 Artemisia campestris

Field Southernwood

4 tlin 8 cyuc 0 kcak 1 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli hjonli

drutta Artemisia campestris is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

tcanta EssentialThe pulverized roots are aromatic and have been used as a perfume[257].

dwatta Abortifacient Anthelmintic Antiseptic Cholagogue Deobstruent Eczema Emmenagogue Ophthalmic Poultice Stomachic TonicRelated to the southernwood, A. abrotanum, this species has similar though milder medicinal properties[4]. The herb is anthelmintic, antiseptic, cholagogue, deobstruent, emmenagogue, stomachic and tonic[4]. 7. 1651. The main use of this herb is as an emmenagogue. it is also a good stimulant tonic and has some nervine principle[4]. The leaves have been chewed in order to treat stomach problems[257]. The plant was used by some native North American Indian tribes as an abortifacient to terminate difficult pregnancies[257]. Externally, the plant has been crushed and applied to rheumatic joints, eczema, bruises and sores[257]. A poultice of the crushed leaves has been applied to sore eyes[257]. An infusion of the roots has been used, especially on children, as a hair tonic and to treat scalp infections[257]. It has been taken internally to promote urination and bowel movements[257].

nrakta Temperate regions throughout the northern hemisphere, including Britain. ksacta A very local plant in Britain, confined to the breckland heaths of eastern Britain[17].

propta Seed - surface sow from late winter to early summer in a greenhouse. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they rarely if ever troubled by browsing deer[233].

# 5.2.969 Aconitum japonicum

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Aconitum japonicum is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 174].

dwatta Analgesic AntirheumaticThis is a widely used herbal remedy in China, where it is cultivated for its root[218]. The root is analgesic, antirheumatic, cardiotonic and stimulant[174, 218]. Used in the treatment of neuralgia[174]. Use with caution, and only under the supervision of a qualified practitioner. The plant is very poisonous and should not be used internally[218].

nrakta E. Asia - China, Japan. ksacta Forests, forest margins, by streams at elevations of 500 - 1500 metres in Liaoning province[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. A very ornamental plant[233], it grows well in open woodlands[1]. 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to A chinensis[1]

#### **5.2.970** Artemisia ludoviciana gnaphalodes

White Sage

4 tlin 8 cvuc 0 kcak 0 tcan 2 dwat 1 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Artemisia ludoviciana gnaphalodes is a PEREN-NIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some peo-

tcanta Incense Miscellany MiscellanyBunches of the plants have been used as towels[257]. The plant can be burnt as an incense[257].

dwatta Antirheumatic Febrifuge Foot care Miscellany Miscellany Ophthalmic Poultice VulneraryAn infusion of the plant is used to treat stomach problems, coughs, colds, headaches etc[61, 257]. A decoction of the leaves is used as a bath to treat fevers and can be applied as a wash to sores, rashes, itches, skin eruptions etc[257]. An infusion of the leaves has been used as an eyewash[257]. The powdered leaves can be applied to the nostrils to stop nose bleeds, sprinkled on sores they will hasten the healing process[257]. The crushed plant can be rubbed on the body as a liniment

are grown in a poor dry soil[245]. Members of this genus are to treat rheumatic joints, soreness or stiffness[257]. The plant can be placed in the shoes to keep the feet from sweating[257].

> nrakta N. America - Ontario and Illinois to Alberta, Missouri, Texas and Mexico. ksacta Prairies, plains and dry open soils[43, 235].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about 10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Slugs are attracted to the young shoots in spring and have been known to destroy even well-established plants[K]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.971 Eryngium yuccifolium

Button Eryngo

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Eryngium yuccifolium is an evergreen Perennial growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

dwatta Diaphoretic Diuretic Emetic Expectorant Febrifuge Infertility SialagogueThe plant is diaphoretic, diuretic, emetic (in large doses), expectorant and febrifuge[46, 61]. A decoction of the roots has been found useful in cases of exhaustion from sexual depletion, with loss of erectile power, seminal emissions and orchitis[207]. A tincture of the roots is used in the treatment of female reproductive disorders[222]. The pounded roots are used as a diuretic[213]. An infusion of them is used to reduce fevers[213]. Chewing the root increases the flow of saliva[222]. The plant is used as an antidote to snakebites[257]. The roots are chewed and applied as a poultice to the bite[213, 274].

nrakta Eastern N. America - Connecticut to Florida, west to Texas and Minnesota ksacta Dry to moist open woods, thickets and prairies[43].

propta Seed - best sown as soon as it is ripe in early autumn on the surface of a well-drained compost in a cold frame[200]. The seed can also be sown in spring. It usually germinates in 5 - 90 days at 20°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring or autumn. Take care since the plant resents root disturbance[200]. Root cuttings in autumn or winter[200].

nwatta Requires a well-drained soil and a sunny position[1]. Prefers a light sandy soil but tolerates most soil types including lime and poor gravels[200]. Plants should be put in their final position whilst small since they resent root disturbance[200]. Where this species is found growing wild in N. America, it is an indicator of native prairie[274].

#### 5.2.972 Amianthium muscitoxicum

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat m hkuc

the autumn. When they are large enough to handle, prick very tough and the plant gained its common name of 'Rest the seedlings out into individual pots and plant them out in late spring[200]. Division just before new growth begins in spring[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings. September in a cold frame[111].

nwatta Prefers a sunny position in a well-drained neutral to alkaline soil[200]. Succeeds on the tops of walls and on dry banks[200]. Similar to O. spinosa, but this species is rhizomatous[200]. It can spread rapidly when well sited[1] and has become an obnoxious weed in some areas[245]. Mature roots are very tough and the plant gained its common name of 'Rest Harrow' because ploughs and harrows would be unable to break through it (in the days before heavy machinery was used on the land!). The whole plant emits a delicious resinous odour when bruised[245]. A food plant for the common blue butterfly[200]. Dislikes root disturbance[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.18 Ononis spinosa

Spiny Rest Harrow

tfo2n 5 tlin 9 cyuc 2 kcak 3 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Ononis spinosa is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Young shoots - cooked[2, 105]. Used as a potherb[183]. Roots - chewed for their liquorice-like flavour[183]. Flowers - raw. They are used as a decoration on salads[7].

tcanta Nitrogen Fixer

dwatta Antirheumatic Antitussive Aperient Diuretic LithontripicThe roots, leaves and flowers are antitussive, aperient, diuretic and lithontripic[7, 9, 13, 21, 46]. The root contains a fixed oil that is anti-diuretic and an essential oil that is diuretic. If the diuretic action is required then the root should be infused and not decocted or the essential oil will be evaporated[254]. An infusion is used in the treatment of dropsy, inflammation of the bladder and kidneys, rheumatism and chronic skin disorders[9]. The roots are used occasionally, they are harvested in the autumn, cut into slices and carefully dried for later use[9]. The young shoots are more commonly used, either fresh or dried[9]. They can be harvested throughout the summer[9]. A cough mixture is made from the bark[13].

nrakta Most of Europe, including Britain, to N. Africa and temperate Asia. ksacta Chalk and limestone grassland, stony hillsides and open pine forests[187], mainly on dry stony ground[7].

propta Scarify or pre-soak the seed for 24 hours in warm water and sow the seed in the middle of spring in situ[200]. The seed can also be sown in a cold frame in the autumn. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring[200]. Division just before new growth begins in spring[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings, September in a cold frame[111].

nwatta Prefers a sunny position in a well-drained neutral to alkaline soil[200]. Succeeds in poor soils, the plant often becoming spiny in such a situation[17]. Similar to O. repens but this species is not rhizomatous[200]. Mature roots are Harrow' because ploughs and harrows would be unable to break through it (in the days before heavy machinery was used on the land!). The whole plant is pleasantly scented when bruised[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 6.1.19 Wisteria sinensis

Chinese Wisteria

tfo2n 5 tlin 9 cvuc 1 kcak 3 tcan 1 dwat 25 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik

hpa7tmwatli xre7t hjonli

drutta Wisteria sinensis is a deciduous Climber growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neu-

pcista The seed of all members of this genus is poisonous[200]. The bark contains a glycoside and a resin that are both poisonous[218]. The seed and seedpod contains a resin and a glycoside called wisterin. They have caused poisoning in children of many countries, producing mild to severe gastro-enteritis[249].

tral soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers SeedEdible Uses: TeaSeed cooked[105, 177, 183]. Some caution is advised, see notes on toxicity at the top of the page. Flowers - cooked. They are thoroughly washed and then boiled or made into fritters[105, 177, 179, 1831. The flowers are also cured in sugar then mixed with flour and made into a famous local delicacy called 'Teng Lo'[249]. The leaves contain allantoic acid[218]. They are used as a tea substitute[218]. The young leaves have also been eaten[249].

tcanta PaperA fibre from the stems can be used to make paper, the fibre is about 1.3 - 3.7mm long[189]. Stems are harvested in the summer, the leaves removed and the stems steamed until the fibre can be stripped. The fibres are cooked for 2 hours with lye and then put in a ball mill for 3 hours. The paper is a buff colour[189]. Nitrogen Fixer.

dwatta Cardiac DiureticThe seed is diuretic[178, 218]. It is used in the treatment of heart ailments[178, 218]. One report says that the stems and flowers are also used in Chinese medicine, but gives no more information[249].

nrakta E. Asia - China. Locally naturalized in Europe in France[50], ksacta Clambering over cliffs and trees on woodland edges at low altitudes in W. China[109].

propta The seed does not exhibit any dormancy habits. It can be sown as soon as it is ripe in a cold frame and should germinate in the spring. Pre-soak stored seed for 24 hours in warm water and then sow in a greenhouse in early spring. The seed can also be sown in an outdoor seedbed in late spring[126]. Germination should take place in the first spring, though it can sometimes be delayed for another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Plants are very slow from seed and can take up to 20 years to come into flower[200]. Basal cuttings of side-shoots in early to mid summer in a frame[200]. Take the cuttings as soon as the new growth has hardened sufficiently, each cutting should have 2 - 3 leaves[249]. It can also help to remove a shallow slice of bark from the bottom 15mm of the cutting to expose extra cambium, since this will encourage more callusing and better rooting[249]. When kept in a mist frame with a bottom heat of  $27 - 30^{\circ}$ c, they will root within 4 weeks and produce well-established plants by the autumn[249]. Layering in spring. Simply lay any convenient long shoot along the ground and cover it with a shallow layer of soil. The shoot will readily produce roots at intervals along the stem. When these are well formed, the shoot can be divided up into a number of plants. These should be potted up and kept in a lightly shaded position in a greenhouse until well established and can then be planted out as required.

#### 6.1.15 Indigofera decora

Chinese indigo

tfo2n 5 tlin 7 cyuc 2 kcak 3 tcan 1 dwat 1 m hkuc htut cyutli tcup hwicli hrasilut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Indigofera decora is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed cooked[105, 177]. It can also be dried and ground into a powder then mixed with wheat flour or other cereals when making bread, cakes etc[179].

tcanta MiscellanyNitrogen Fixer.

dwatta MiscellanyA broth made from the leafy shoots is used in the treatment of cough, dyspepsia, haemorrhage and poisoning[218].

nrakta E. Asia - China, Japan. ksacta River banks and old stone walls in C. and S. Japan[58].

propta Pre-soak the seed for 12 hours in warm water and sow February in a warm greenhouse. The germination can be variable. Prick out the seedlings when large enough to handle and overwinter the young plants in a greenhouse for the first winter, planting out in late spring or early summer after the last expected frosts[78]. Cuttings of half-ripe wood, 5 - 8cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Overwinter the young plants in a greenhouse for the first winter and plant out in late spring or early summer[11]. Root cuttings 3cm long in December. Good percentage[78]. Suckers. Remove them in the dormant season, preferably towards the end of winter, and plant out into their permanent positions.

nwatta Landscape Uses:Border, Foundation, Massing, Specimen. Requires a light or medium well-drained soil and a warm sunny position[11, 200, 260]. Succeeds on chalk[11]. Prefers growing in areas with warm summers[260]. Plants are hardy to about -10°c[260]. The top-growth is not very winter-hardy however, the stems are often cut back by cold weather but new shoots are produced in spring and these flower in late summer[182]. A very ornamental plant[1], it is closely related to I. fortunei[182]. The flowers, which are borne over a period of about 20 weeks, have a vanilla scent[245]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, Attracts butterflies, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

# 6.1.16 Lathyrus linifolius montanus

tfo2n 5 tlin 9 cvuc 2 kcak 3 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Lathyrus linifolius montanus is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July,

and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed contains a toxic amino-acid which, in large quantities, can cause a very serious disease of the nervous system known as 'lathyrism'. The seed is said to be perfectly safe and very nutritious in small quantities, but should not comprise more than 30% of the diet[65, 76].

kcakta Edible Parts: Root SeedEdible Uses: Seed cooked[2, 177]. Used as a vegetable, they are served in the same manner as sweet chestnuts[2]. Some caution is advised in the use of this seed, see the notes above on toxicity. Root cooked[5, 61, 105]. Boiled or roasted, they have a sweet flavour and are very nutritious[2, 115].

tcanta Nitrogen fixer.

nrakta Most of Europe, including Britain, but absent in far north and rare in southeast. ksacta Woods, hedges and thickets in hilly country avoiding chalk[17].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should be taken[200].

nwatta An easily grown plant, succeeding in any moderately good garden soil but preferring a position in full sun[200]. Formerly cultivated for its edible seed[2]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous.

#### 6.1.17 Ononis repens

Rest Harrow, Common restharrow

tfo2n 5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ononis repens is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September. and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Drink-Root - raw or cooked. A liquorice substitute[5, 66]. Soaked in cold water it makes a refreshing cold drink[66]. The young shoots were at one time much used as a vegetable, being boiled, pickled or eaten in salads[4].

dwatta LithontripicThe whole herb has been used in the treatment of bladder stones and to subdue delirium[4].

nrakta Western Europe in Britain, France and Belgium. ksacta Dry grassland on calcareous soils[5, 17].

propta Scarify or pre-soak the seed for 24 hours in warm water and sow the seed in the middle of spring in situ[200]. The seed can also be sown in a cold frame in hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli hpa7tmwatli dyatxre7t hjonli

drutta Amianthium muscitoxicum is a BULB growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are highly toxic, containing the alkaloids jervine and amianthine[200, 270]

tcanta InsecticideRoot extracts mixed with molasses or honey have been used as a housefly insecticide[270].

dwatta SkinNative Cherokee used the plant as a dermatological cure for itch[270].

nrakta Southeastern N. America - New York to Florida. ksacta Dry or mesic wooded slopes, meadows and savannas from sea level to 1500 metres [270].

propta Seed - best sown as soon as it is ripe in a cold frame[134]. The seed can also be sown in a cold frame in spring[134]. It usually germinates in 1 - 6 months at 15°c, but it can be erratic[138]. Sow the seed thinly so that it does not need to be thinned and allow the seedlings to grow on undisturbed for their first year. Give an occasional liquid feed to ensure that the plants do not become nutrient deficient. When the plants are dormant in late summer, pot up the small bulbs putting 2 - 3 bulbs in each pot. Grow them on for another one or two years in a cold frame before planting them out when dormant in late summer.

nwatta Prefers a deep rich moisture-retentive soil in partial shade[200]. Plants like plenty of moisture in the spring and summer when they are in full growth[200]. Grows well in a woodland garden[200].

# 5.2.973 Stratiotes aloides

4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stratiotes aloides is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta The herb has had a high reputation for treating wounds, especially when these are made by an iron implement. It is applied externally[4]. The plant is also said to be of use in the treatment of St. Anthony's Fire and also of bruised kidneys[4].

nrakta Europe, including Britain, to northwestern Asia. ksacta Broads, ponds and ditches in calcareous districts[17]. It is very local and probably diminishing[17].

propta Seed - best sown in situ as soon as it is ripe. The seed is seldom if ever produced in Britain[17]. Division at almost any time of the year, though spring is best.

nwatta A water plant, it requires a neutral to alkaline water[200]. The herb is submerged at most times of the year, rising to the surface only when it is flowering[17]. The leaves accumulate calcium carbonate and by the autumn this makes them heavy enough to sink to the bottom of the pond. The new leaves in spring do not have this calcium carbonate and so rise to the surface[200]. A vigorous-growing plant, it will tend to swamp out other plants when grown in a small pond[200]. Plants are dioecious, male and female plants must be grown if seed is required[17]. Only the female plant occurs naturally in Britain, though plants with hermaphrodite flowers are also found occasionally [17]. Seed is never set in Britain, the plants increasing mainly by off-

#### 5.2.974 Peucedanum oreoselinum

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis

drutta Peucedanum oreoselinum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade It prefers moist soil

pcista Although no mention of toxicity has been seen for this species, skin contact with the sap of a number of members in this genus is said to cause photo-sensitivity and/or dermatitis in some people[65, 218]. They are also said to contain the alleged 'psychotroph' myristicine[218].

tcanta EssentialThe plant yields an essential oil[61]. No further details on use or what part of the plant the oil is obtained from

dwatta DiureticDiuretic[61].

nrakta Europe. ksacta Not known

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though since its native range is all of Europe except the islands and extreme north and south, it should succeed outdoors in this country. The following notes are based on the general needs of the genus. An easily grown plant, it succeeds in any moistureretentive soil in a sunny position[200]. Suitable for group plantings in the wild garden[200].

# 5.2.975 Digitalis purpurea

Foxglove, Purple foxglove, Common Foxglove 4 tlin 8 cyuc 0 kcak 2 tcan 4 dwat 1.2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Digitalis purpurea is a BIENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

pcista All parts of the plant are highly poisonous[9, 10, 19, 65, 76, 222]. Unsafe for self-medication. Monitoring by a physician to determine correct dose recommended. For overdose give activated charcoal. Can be fatal especially to children [301]

tcanta Dye PreservativeAn infusion of the plant prolongs the life of cut flowers[54]. Root crops growing near this plant store better[54]. An apple-green dye is obtained from the flowers[168]. Cut flower. Cultivars have gained the Royal Horticultural Society's Award of Garden Merit.

dwatta Cardiac Diuretic Homeopathy Stimulant Tonic-The foxglove is a widely used herbal medicine with a recognised stimulatory effect upon the heart. It is also used in allopathic medicine in the treatment of heart complaints. It has a profound tonic effect upon a diseased heart, enabling the heart to beat more slowly, powerfully and regularly without requiring more oxygen[254]. At the same time it stimulates the flow of urine which lowers the volume of the blood and lessens the load on the heart[254]. The plant contains cardiac glycosides (including digoxin, digitoxin and lanatosides). Digitoxin rapidly strengthens the heartbeat but is excreted very slowly. Digoxin is therefore preferred as a longterm medication[254]. The leaves are cardiac, diuretic, stimulant and tonic[4, 9, 21, 46, 171]. The leaves should only be harvested from plants in their second year of growth, picked when the flowering spike has grown and about two thirds of the flowers have opened[4]. Harvested at other times, there is less of the medically active alkaloid present[4]. The seed has also been used in the past[4]. The leaves also have a very beneficial effect on the kidneys, they are strongly diuretic and are used with benefit in the treatment of dropsy[4].

Great care should be exercised in the use of this plant, the therapeutic dose is very close to the lethal dose[222]. See also the notes above on toxicity. A homeopathic remedy is made from the leaves[9]. It is used in the treatment of cardiac disorders[9].

nrakta Western Europe, including Britain, from Norway to Spain and Sardinia. ksacta Acid soils in woods, heaths, mountain grasslands etc[9, 17].

propta Seed - surface sow early spring in a cold frame. The seed usually germinates in  $2 \cdot 4$  weeks at  $20^{\circ} (2175]$ . When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can be sown outdoors in situ in the spring or autumn.

nwatta Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. Easily grown in ordinary garden soil, especially if it is rich in organic matter[1]. Prefers a light dry soil in semi-shade[17] but succeeds in full sun if the soil is moist[200]. Grows well in acid soils[17]. Plants are hardy to about -25°c[187]. The foxglove is a very ornamental plant that is easily naturalized in the semi-shade of a woodland[1]. It contains glycosides and forms the basis of an important heart medicine for which it is cultivated commercially[4]. This species is commonly used by herbalists, whereas D. lanata is more commonly grown for supplying the pharmaceutical industry[238]. The plant contains much greater concentrations of the medically active ingredients when it is grown in a sunny position[115]. The flowers are very attractive to bees[4, 24]. Individual plants can produce up to 2 million seeds[4]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A good companion plant, it stimulates the growth of nearby plants, growing well with pine trees[18, 20, 54]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1].

#### 5.2.976 Digitalis ferruginea

Rusty Foxglove

4 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Digitalis ferruginea is a BIENNIAL/PERENNIAL growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista All parts of the plant are poisonous[7, 65]. dwatta Cardiac Stimulant TonicThe leaves are cardiac, stimulant and tonic[46, 61]. They are often used in the treatment of certain heart complaints.

nrakta S. and S.E. Europe to W. Asia. ksacta Woods, grassy clearings, rocky slopes and scrub to 2700 metres[50, 187].

propta Seed - surface sow early spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 20°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Another report says that the seed is best sown in the autumn[188].

nwatta Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. An easily grown plant, succeeding in ordinary garden soil, especially if it is rich in organic matter[1]. It also succeeds in dry soils and, once established, is drought tolerant[188, 190]. It prefers semi-shade but succeeds in full sun if the soil is moist[188, 200]. Planta are hardy to about -15°c[187]. This species is a short-lived perennial[187] and is best grown as a biennial[188]. Members of this genus are rarely if ever troubled by browsing deer and rabbits[233]. Special Features: Attractive foliage, Suitable for cut flowers.

# 5.2.977 Erysimum cheiranthoides

Wormseed Mustard

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Erysimum cheiranthoides is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Skin VermifugeA drink made from the crushed seed is used as a vermifuge[207]. It is intensely bitter but has been used on children and expels the worms both by vomit and by excretion[4, 207]. A decoction of the root has been applied to skin eruptions[257].

nrakta N. America - Newfoundland to New Jersey, Pennsylvania and Missouri, west to the Pacific coast. ksacta Found in many habitats from southern British Columbia to California at elevations of 750 - 3600 metres[155].

propta Seed - sow in situ in the spring[200]. Germination should take place within 3 weeks.

nwatta Requires a well-drained soil and a sunny position[200]. Dislikes acid soils[200]. Tolerates poor soils[200].

# 5.2.978 Phlox divaricata

Wild blue phlox

4 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.5 m hkuc

pcimhmimhtut cyutli hgattcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli hjonli

drutta Phlox divaricata is an evergreen Perennial growing to  $0.5 \,\mathrm{m}$  (1ft  $8\mathrm{in}$ ) by  $1 \,\mathrm{m}$  (3ft  $3\mathrm{in}$ ) at a medium rate. See above for USDA hardiness. It is hardy to UK zone  $5.\,\mathrm{It}$  is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista None Known

kcakta None Known

tcanta Soil conditioner Soil stabilizationA medium density groundcover for shady areas especially with acid soils. Good for woodland gardening. Attractive to butterflies, clearwing moths, and hummingbirds. As a long-lived perennial with fibrous roots it may be good for soil building and erosion control [318-1].

nrakta Eastern North America in Quebec and Ontario, south to Vermont and Florida and west to South Dakota and New Mexico. ksacta Indigenous to rich deciduous woodlands, open moist to slightly dry woods, seasonal floodplains, stream banks and open areas near woodland paths.

propta Propagate by division in fall or spring. Propagate by basal cuttings in spring or propagate by root cuttings in early fall or winter.

nwatta Herbaceous perennial ephemeral wildflower with showy fragrant flowers. USDA Hardiness Zones: 4 -9. Soil pH: 5.5 - 7.1. Growth Rate: Moderate. Life Span: Long-Lived Perennial Stand Persistence: Medium Form: Upright. Texture: Fine. Sun: bright shade, partial shade, shade. Soil Type: Loamy, Silty. Soil Moisture: Moderate. Minimum Root Depth: 14 inches (0.3m). Root Type: Fibrous Deep. Seasonal Interest: Spring. Flower Color: Blue, Pink, Purple, White. Flood: Sensitive. Salt: Intolerant. Soil Compaction: Moderate. Mowing: Intolerant. Fire Damage: Intolerant. Cold Injury: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor, Bloom Time: Spring - Early Summer. Plants tolerate clay loam, sand, acid or alkaline pH, heat, drought, part sun and dry shade. For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Evergreen. The root pattern is fibrous dividing into a large number of fine roots [1-2]. Royal Horticultural Society Award of Garden Merit

early summer. Plants are very slow from seed and can take up to 20 years to come into flower[200]. Basal cuttings of side-shoots in early to mid summer in a frame[200]. Take the cuttings as soon as the new growth has hardened sufficiently, each cutting should have 2 - 3 leaves[249]. It can also help to remove a shallow slice of bark from the bottom 15mm of the cutting to expose extra cambium, since this will encourage more callusing and better rooting[249]. When kept in a mist frame with a bottom heat of 27 - 30°c, they will root within 4 weeks and produce well-established plants by the autumn[249]. Layering in spring. Simply lay any convenient long shoot along the ground and cover it with a shallow layer of soil. The shoot will readily produce roots at intervals along the stem. When these are well formed, the shoot can be divided up into a number of plants. These should be potted up and kept in a lightly shaded position in a greenhouse until well established and can then be planted out as required.

nwatta Landscape Uses:Arbor, Espalier, Pollard. Prefers a good loamy soil in a sunny south or south-west facing position, sheltered from cold winds and from early morning sun on frosty mornings[11, 200]. Plants can become chlorotic on alkaline soils[200]. A soil that is too rich results in excessive foliage at the expense of flowering[200]. Although they are winter hardy to about -20°c[200], when growing in areas with cool summers the plants require the extra summer warmth of a sunny wall if they are to do well[184]. Plants can take a few years to settle down after planting out[219]. Too much shade or too rich a soil are normally the culprits, some form of root restriction can be beneficial[219]. A vigorous climbing plant, supporting itself by twining around shrubs and trees, though it also succeeds as a free-standing shrub, growing to about 2 metres in height. The shoots twine in a clock-wise direction[182]. This species is closely related to W. sinensis[50, 126]. Often grown as an ornamental plant, there are many named varieties[182, 200]. The flowers have a strong perfume which can be sweet or musty according to the variety being grown[249]. The plants flower mainly on short spurs so, if removing unwanted side-branches, it is best to cut them back to 2 - 3 leaves rather than removing them completely since this will encourage the formation of flowering spurs[249]. Any drastic pruning is best carried out in the spring, immediately after flowering[249]. Plants are very tolerant of even the most drastic pruning and will re-grow even if cut right back to the base[249]. Plants are self-fertile and usually produce good crops of seeds in cultivation, there are several cultivars such as 'Geisha' and 'Royal Purple' that are particularly good at this[249]. Plants in this genus are notably susceptible to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plants also form a symbiotic relationship with a mycorrhizal fungus which makes more water, phosphorus and other minerals available to the plants[249]. Special Features: Not North American native, Invasive, Naturalizing, All or parts of this plant are poisonous, Fragrant flowers, Blooms are very showy. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

#### 6.1.14 Indigofera tinctoria

Indigo, True Indigo, dye indigo

tfo2n 5 tlin 12 cyuc 2 kcak 4 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Indigofera tinctoria is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: ColouringThe deep blue dye obtained from the leaves is sometimes used to counteract the slightly yellow colour of icing sugar[301].

tcanta Dve Green manure Insecticide Soil conditioner TeethAgroforestry Uses: The plant is sometimes grown as a cover crop and green manure[418]. Indigofera tinctoria is useful as a green manure, it is used in India, for example, in coffee plantations and as a cover crop preceding rice, maize, cotton and sugarcane[299]. In traditional rainfed rice cropping systems in the Philippines, this plant is a popular green manure, increasing rice yield whilst also reducing by 50% the need to supply expensive nitrogen fertilizer[299]. The residue remaining after indigo extraction is also applied to the land as manure[299]. Another reason to grow Indigofera tinctoria as a green manure is because it is a good nitrogen catch crop, reducing the amount of fertilizer NO3 leaching to the groundwater[299]. Other Uses: A deep blue dye is obtained from the leaves[46, 299, 301]. The leaves and twigs do not actually contain indigo but colourless precursors that must be extracted and then processed in order to produce the indigo dye[299]. The harvested leafy branches are placed in a tank containing water to which some lime has been added, and are weighted down with planks[303]. After some hours of fermentation, during which enzymic hydrolysis leads to the formation of indoxyl, the liquid is drained off and then stirred continuously for several hours to stimulate oxidation of the indoxyl[303]. Afterwards the solution is left to rest and the insoluble indigo settles to the bottom as a bluish sludge[303]. The water is drained and after the indigo has dried, it is cut into cubes or made into balls[303]. To dye textiles, indigo is reduced to a soluble form by a fermentation process under alkaline conditions. In traditional preparations of the dye, various reducing agents such as molasses are used, together with coconut-milk, bananas and the leaves of Psidium quajava[303]. The alkalinity is maintained by adding lime. After the textile has been dipped into solution it turns blue when exposed to the air[303]. The twigs are used as toothbrushes[299].

dwatta Antiasthmatic Antihaemorrhoidal Epilepsy Febrifuge Kidney Mouthwash Skin Stings Stomachica leaf infusion (sometimes combined with honey or milk) is used to treat a range of disorders including epilepsy and nervous disorders; asthma and bronchitis; fever; complaints of the stomach, liver, kidney and spleen; and as a rabies prophylactic[299]. Applied externally, the leaves are made into an ointment for treating skin diseases, wounds, sores, ulcers and haemorrhoids[299]. A tircuture of the seed is used in India to kill lice[299]. A root preparation is applied to relieve toothache, syphilis, gonorrhoea and kidney stomes[299]. A watery root paste is applied topically in India to treat worm-infested wounds[299]. A root infusion is used there as an antidote against snakebites and to treat insect and scorpion stings[299].

nrakta Probably originally from Malaysia, the plant now has a pantropical distribution. ksacta Not known

propta Seed - pre-soak overnight in warm water and sow in a seedbed with partial shade. Germination takes about 4 days[299]. Semi-ripe cuttings of lateral shoots with a heel[200]. Root cuttings.

nwatta Agroforestry Services: Nitrogen Industrial Crop: Dye Management: Coppice Minor Global CropA plant of the tropics and subtropics, where it is found at elevations up to 1,600 metres. It grows best in areas where annual daytime temperatures are within the range 22 - 28°c, but can tolerate 7 - 32°c[418]. It prefers a mean annual rainfall in the range 1.300 - 1.700mm, but tolerates 640 -3.000mm[418]. Requires a position in full sun, succeeding in any deep, well-drained and moderately retentive and fertile soil[200]. Prefers a pH in the range 6 - 7, tolerating 4.3 -8.7[418]. Requires a position sheltered from hot winds[418] . Branches are harvested by cutting 10 - 20cm above ground level when the plants are 4 - 5 months old and have formed a closed stand, usually at the flowering stage[299]. The crop should be harvested promptly because heavy rains or flooding can destroy it in a few hours. In India harvested branches are tied into bundles of about 130 kg and transported to the dye factory. Up to 3 harvests are possible per year [299]. Dye vields can be 1.6 - 5.4 tonnes per hectare [418]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but. some can also be used by other plants growing nearby[755 ]. Flowering Time: Mid Spring. Bloom Color: Red-Orange or Pink. Spacing: 36-48 in. (90-120 cm).

nwatta An easily grown plant, succeeding in any moderately good soil in a sunny position[1, 200]. Succeeds in poor soils[46]. Requires an acid to neutral soil[200]. Cultivated for its edible seed in Italy[2], there are a number of varieties with sweet tasting seeds[183]. The flowers have a delicious vanilla-like perfume, the cultivar 'Romulus' has been especially mentioned[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

### 6.1.12 Glycyrrhiza uralensis

Gan Cad

tfo2n 5 tlin 9 cyuc 3 kcak 3 tcan 4 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Glycyrrhiza uralensis is a PERENNIAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs). It can fx Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: SweetenerThe fibrous root is used as a sweetener for foods[183]. It is boiled in water to extract the sugars etc and used as a liquorice substitute in sweets, medicines, drinks etc[74, 174, 177]. The root contains glycyrrhizin, which is 50 times sweeter than sugar[218].

tcanta Fire retardant InsulationLiquorice root, after the medicinal and flavouring compounds have been removed, is used in fire extinguishing agents, to insulate fibreboards and as a compost for growing mushrooms[218]. Nitrogen fixer. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiphlogistic Antispasmodic Antitussive Cholagogue Emollient ExpectorantGan Cao is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. It is considered to be second in importance only to Ginseng (Panax spp)[218]. Used in excess, however, it can cause cardiac dysfunction and severe hypertension[218]. The root is a sweet tonic herb that stimulates the corticosteroidal hormones, neutralizes toxins and balances blood sugar levels[238]. It is also antibacterial, anti-inflammatory, antiphlogistic, antispasmodic, antitussive, cholagogue, demulcent, emollient, expectorant and laxative[61, 176, 218, 238]. It is used internally in the treatment of Addison's disease, asthma, coughs and peptic ulcers[238]. Externally, it is used to treat acne, boils and sore throats[238]. It is included in almost all Chinese herbal formulae, where it is said to harmonize and direct the effects of the various ingredients[238]. It precipitates many compounds and is therefore considered to be unsuitable for use with some herbs such as Daphne genkwa, Euphorbia pekinensis and Corydalis solida[238]. It increases the toxicity of some compounds such as ephedrine, salicylates, adrenaline and cortisone[238]. It should not be prescribed for pregnant women or for people with high blood pressure, kidney disease or anyone taking digoxin-based medications[238]. Excessive doses cause water retention and high blood pressure[238]. It can cause impotence in some people[238]. The roots are harvested in early autumn, preferably from plants 3-4 years old, and is dried for later use[238]. The flowers are alterative and expectorant[218].

nrakta E. Asia - China, Japan, Siberia. ksacta Meadows, riparian woodlands and solonetzic slopes in Siberia, Mongolia, China and Japan[74].

propta Pre-soak the seed for 24 hours in warm water and then sow spring or autumn in a greenhouse[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in a greenhouse. Plant out in late spring or early summer when in active growth. Plants are rather slow to grow from

seed[238]. Division of the root in spring or autumn. Each division must have at least one growth bud. Autumn divisions can either be replanted immediately or stored in clamps until the spring and then be planted out[200]. It is best to pt up the smaller divisions and grow them on in a cold frame until they are established before planting them out in the spring or summer.

nwatta Requires a deep well cultivated fertile moistureretentive soil for good root production[200]. Prefers a sandy soil with abundant moisture[238]. Slightly alkaline conditions produce the best plants[238]. Plants are hardy to at least -15°c[238]. This species is widely cultivated in China as a medicinal plant. Unless seed is required, the plant is usually prevented from flowering so that it puts more energy into producing good quality roots[238]. A very deep-rooted plant, it can be difficult to eradicate once it is established[238]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 10 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 6.1.13 Wisteria floribunda

Japanese wisteria tfo2n 5 tlin 9 cyuc 2 kcak 2 tcan 0 dwat 8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Wisteria floribunda is a deciduous Climber growing to 8 m (26ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil

pcista The seed of all members of this genus is poisonous[200].

kcakta Edible Parts: Flowers Leaves SeedEdible Uses: TeaSeed - cooked[105, 177, 183]. When baked in a fire they have much the same flavour as chestnuts[249]. Some caution is advised, see the notes on toxicity at the top of the page. Young leaves - cooked[105, 177, 183]. The tender young leaves are sometimes eaten and are also used a a tea substitute[249]. Flowers - cooked[105, 177, 183]. Used as a food in parts of China[249].

tcanta FibreThe bark is used for making ropes and sandals[249]. The branches can be used as cables and also for making bridges, for which purpose it is said to be very durable[249].

nrakta E. Asia - Japan. ksacta Damp habitats by streams etc in thickets and woods in hills and mountains in all areas of Japan south of Hokkaido[58, 200, 249].

propta The seed does not exhibit any dormancy habits. It can be sown as soon as it is ripe in a cold frame and should germinate in the spring. Pre-soak stored seed for 24 hours in warm water and then sow in a greenhouse in early spring. The seed can also be sown in an outdoor seedbed in late spring[126]. Germination should take place in the first spring, though it can sometimes be delayed for another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or

### 5.2.979 Liatris squarrosa

Scaly blazing star, Alabama blazing star 4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.9 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Liatris squarrosa is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta RepellentThe plant is used as an insect repellent in the clothes cupboard[4].

dwatta Diuretic Poultice TonicThe root is diuretic and tonic[4, 61, 238]. A poultice made from the roots is applied to snake bites[238].

nrakta Eastern N. America - Ontario to Pennsylvania, Virginia, Florida, South Dakota and Texas. ksacta Dry open woods, clearings and fields, chiefly argillaceous[43]. Usually found on sandy soils[274].

propta Seed - best sown as soon as it is ripe in autumn in a greenhouse[200]. Sow stored seed as soon as possible in the year in a greenhouse. Prick out the seedlings into individual pots when they are large enough to handle and grow the plants on in the greenhouse for their first year. Plant then out into their permanent positions in early summer. Division in spring[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings taken in spring as growth commences. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Grows well in a moderately good light soil[200]. Plants are prone to rot overwinter in wet soils[200]. A good bee plant. Rodents are very fond of the tubers so the plants may require some protection[200].

# 5.2.980 Cirsium acaulon

Stemless Thistle

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cirsium acaulon is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta The seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

dwatta OdontalgicAt one time the root used to be chewed as a remedy for toothache[4].

nrakta Europe, including Britain, from Scandanavia to Spain and east to W. Asia. ksacta Closely grazed pastures, especially on chalk or limestone[17].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°c.

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position[200]. This plant is very injurious in grassland, killing all plants that grow below it[4].

# 5.2.981 Asplenium scolopendrium

Hart's Tongue Fern 4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc pcimhmim cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flat-priklwisslip hpa7tmwatli hjonli

drutta Asplenium scolopendrium is an evergreen Fern growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, and the seeds ripen from July to August. Suitable for: light (sandy) and medium (loamy) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

tcanta CosmeticA good ground cover plant for shady positions[28, 200], so long as it is planted no more than 30cm apart each way[208]. Plants form a slowly spreading clump[208]. A decoction of the fronds is used cosmetically as a hair wash to counteract greasy skin and also as a face pack for delicate skin[7].

dwatta Astringent Cholagogue Diaphoretic Diuretic Dysentery Expectorant VulneraryThe fronds are astringent, cholagogue, diaphoretic, diuretic, expectorant, vulnerary[4, 7, 9, 165]. Externally it is used as an ointment in the treatment of piles, burns and scalds[4]. An infusion is taken internally for the treatment of diarrhoea, dysentery, gravelly deposits of the bladder and for removing obstructions of the liver and spleen[4]. The fronds are harvested during the summer and can be dried for later use[7].

nrakta Central and southern Europe, including Britain, to N. Africa and eastwards to Japan. ksacta Moist banks and walls[4], rocks in damp shady places in woodlands[7, 9, 31], often on lime-rich soils[187].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. The spores usually germinate in the spring[1]. Spring sown spores germinate in 1 - 3 months at 15°c[134]. Pot on small clumps of plantlets as soon as they are large enough to handle and grow them on in light shade in a greenhouse. Keep the plants humid until they are well established. Once the plants are 15cm or more tall, plant them out into their permanent positions in the spring. Division in spring. Leaf bases - dig up the plant and wash off the soil until the old caudex covered with 'dead' leaf bases can be clearly seen. Strip off these bases individually by peeling them down the caudex. At the point of attachment they will be green. Young plants can be raised by planting these leaf bases, green tip up, in a pot of loam-based compost and enclosing the pot in a plastic bag. Within one month green swellings will appear around the original point of attachment to the caudex, each of these will develop quite quickly into a young fern. It takes 3 months in summer but longer in winter[200].

nwatta Easily grown in a shady position in a soil that is rich in leaf-mould[187]. Prefers a light sandy soil[1]. Succeeds on chalk[28]. Plants can be grown on drystone walls[219]. Grows well in heavy clay soils. Prefers a shady position with no more than 3 hours sunlight a day, greater exposure will cause yellowing and burning of the leaves[187]. One report says that it succeeds in dry shade[188]. Requires a pH of 6 or more in order to flourish. Plants are hardy to about -30°c[187], they grow very well in SW. England[31]. A very adaptable plant[28]. There are many named forms, selected for their ornamental value[187, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.982 Gentiana saponaria

Harvestbells

At lin 8 cyuc 0 kcak 0 tcan 3 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Gentiana saponaria is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy

to UK zone 5. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semishade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Antidote Appetizer Bitter Digestive Stomachic TonicThe root is said to be an antidote to snakebites[61]. This N. American species has medicinal properties practically identical with the European gentians[4]. The following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 2381. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta Eastern N. America - Ontario to Minnesota, Connecticut, Florida and Louisiana. ksacta Wet soils[235] in woodlands[200].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. The compost must be rich in organic matter and should not be allowed to become dry[239]. The seed can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species grows well in the woodland garden[200], it requires a lime-free soil[239]. Plants are intolerant of root disturbance[200]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1].

# 5.2.983 Aplectrum hyemale

Putty Root, Adam and eve 4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aplectrum hyemale is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from October to May, in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

tcanta AdhesiveA glue can be obtained from the tubers. The roots are bruised with a small addition of water, this gives a strong cement that is used for repairing broken pots, glass etc[207, 230].

dwatta Analgesic Pectoral PoulticeThe roots are macerated to a paste and applied to boils or used to treat head pains[207, 222, 257]. A tea made from the roots has been used in the treatment of bronchial troubles[222]. The roots were given to children by some tribes of native North American Indians in order to endow the children with the gift of eloquence and to make them fatf2571.

nrakta Eastern N. America - Quebec to Georgia, west to Minnesota and Arkansas. ksacta Deep shade in the leaf litter of the forest floor[230]. Woods and swamps[235]. Moist, deciduous, upland to swampy forests from sea level to 1200 metres[270].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Needs to be grown in the shade and humusrical shallow-rooting plants of well-drained low-fertility soils.
Their symbiotic relationship with a fungus in the soil allows
them to obtain sufficient nutrients and be able to compete
successfully with other plants. They are very sensitive to the
addition of fertilizers or fungicides since these can harm the
symbiotic fungus and thus kill the orchid[230]. Plants have
proved to be amenable to cultivation[230].

#### 5.2.984 Asarum europaeum

Asarabacca, European Wild Ginger 4 tlin 8 cyuc 0 koak 0 tcan 2 dwat 0.1 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Asarum europaeum is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is

USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Diseased clover, even if no symptoms of disease are visible, can contain toxic alkaloids[222].

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Condiment TeaLeaves and young flowering heads raw or cooked[2, 55, 105, 183]. The young leaves are harvested before the plant comes into flower, and are used in salads, soups etc[9]. On their own they can be used as a vegetable, cooked like spinach[9]. The leaves are best cooked[172]. They can be dried, powdered and sprinkled on foods such as boiled rice[183]. The leaves contain 81% water, 4% protein, 0.7% fat, 2.6% fibre and 2% ash[218]. The seed can be sprouted and used in salads. A crisp texture and more robust flavour than alfalfa (Medicago sativa)[183]. The seeds are reported as containing trypsin inhibitors[218]. These can interfere with certain enzymes that help in the digestion of proteins, but are normally destroyed if the seed is sprouted first. Flowers and seed pods - dried, ground into a powder and used as a flour[115]. The young flowers can also be eaten raw in salads[144, 172]. Root - cooked[172, 177]. A delicate sweet herb tea is made from the fresh or dried flowers[21, 55, 183]. The dried leaves impart a vanilla flavour to cakes etc[172].

tcanta Dye Green manure Miscellany Soil reclamationA yellow dye is obtained from the flowers[46, 61]. The plant makes a good green manure, it is useful for over-wintering, especially in a mixture with Lolium perenne[54]. Deep rooting, it produces a good bulk[87]. It is a host to 'clover rot' however, so should not be used too frequently[87]. It can be undersown with cereals though it may be too vigorous[87]. It is also grown with grass mixtures for land reclamation, it has good nitrogen fixing properties[200]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Alterative Antipsoriatic Antiscrophulatic Antispasmodic Aperient Cancer Detergent Digretic Eczema Expectorant Miscellany Sedative Skin TonicRed clover is safe and effective herb with a long history of medicinal usage. It is commonly used to treat skin conditions, normally in combination with other purifying herbs such as Arctium lappa and Rumex crispus[254]. It is a folk remedy for cancer of the breast, a concentrated decoction being applied to the site of the tumour in order to encourage it to grow outwards and clear the body[254]. Flavonoids in the flowers and leaves are pestrogenic and may be of benefit in the treatment of menopausal complaints[254]. The flowering heads are alterative, antiscrofulous, antispasmodic, aperient, detergent, diuretic, expectorant, sedative and tonic[4, 21, 165, 218, 238]. It has also shown anticancer activity[172, 218], poultices of the herb have been used as local applications to cancerous growths[4]. Internally, the plant is used in the treatment of skin complaints (especially eczema and psoriasis), cancers of the breast, ovaries and lymphatic system, chronic degenerative diseases, gout, whooping cough and dry coughs[238]. The plant is normally harvested for use as it comes into flower[222, 238] and some reports say that only the flowers are used[4]. The toxic indolizidine alkaloid 'slaframine' is often found in diseased clover (even if the clover shows no external symptoms of disease). This alkaloid is being studied for its antidiabetic and anti-AIDS activity[222].

nrakta Europe, including Britain, from Norway south and east to Spain and W. Asia. ksacta Meadows, pastures and other grassy places[9], especially on calcareous soils. Usually found on circumneutral soils[17].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. If the seed is in short supply it might be better to sow it in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. Division in spring[238].

nwatta Succeeds in a moist, well-drained circum-neutral

soil in full sun[200]. Prefers a medium-heavy loam[87]. A short-lived perennial[200]. A very hardy plant, tolerating temperatures down to at least -23°c[238]. A very important food plant for the caterpillars of many butterfly and moth species[30]. It is also a good bee plant[54], but not so valuable as the white clover, T. repens[4]. It grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. Very polymorphic, there are many subspecies and varieties. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercups growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

### 6.1.11 Lupinus luteus

Yellow Lupin, European yellow lupine tfo2n 5 tlin 9 cyuc 3 kcak 3 tcan 0 dwat 0.6 m hkuc htut cyutli tcup hwicli hyishrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Lupinus luteus is a ANNUAL growing to  $0.6\,$  m (2ft) by  $0.3\,$  m (1ft in). See above for USDA hardiness. It is hardy to UK zone  $6.\,$  It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed of many lupin species contain bittertasting toxic alkaloids, though there are often sweet varieties within that species that are completely wholesome[65, 76]. Taste is a very clear indicator. These toxic alkaloids can be leeched out of the seed by soaking it overnight and discarding the soak water. It may also be necessary to change the water once during cooking[K]. Fungal toxins also readily invade the crushed seed and can cause chronic illness[65].

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[2, 46, 105]. Used as a protein-rich vegetable or savoury dish in any of the ways that cooked beans are used. The seed can also be ground into a powder and be mixed with cereal flours for making bread etc[183]. If the seed is bitter this is due to the presence of toxic alkaloids and the seed should not be eaten without treatment[183]. These alkaloids can usually be removed by soaking the seed in 2 or 3 changes of water. Low alkaloid varieties were developed prior to 1930 by Von Sengbusch[183]. The roasted seed is a coffee substitute[183].

tcanta Green manureA good green manure for poor soils, it is quite fast growing and fixes atmospheric nitrogen[50, 61, 87]. It is commonly grown as a soil improver in southern Europe[245].

nrakta Europe - Italy and the Mediterranean. ksacta Light acid soils[50].

propta Pre-soak the seed for 24 hours in warm water and sow in mid spring in situ[1, 200]. You may need to protect the seed from mice. Germination should take place within 2 weeks. The seed can also be sown in situ as late as early summer as a green manure crop.

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cercis occidentalis is a deciduous Shrub growing to 4.5 m (14ft 9in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Seed SeedpodEdible Uses: Flowers - raw. Added to salads[183], they have a pleasant acid taste[K]. The flower buds are pickled like capers[183]. Seedpods - roasted[161, 177, 183]. The pods are up to 9cm long[229]. Seed - cooked[183].

tcanta Nitrogen Fixer

nrakta South-western N. America - California to Arizona. ksacta Dry slopes and in canyons in foothills below 1100 metres[71]

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Pre-soak stored seed for 24 hours in warm water then cold stratify for 3 months[113]. Sow spring in the greenhouse[78]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants resent root disturbance and are best planted out in their permanent positions as soon as possible[11]. Cuttings of half-ripe wood, July/August in a frame[200].

nwatta Landscape Uses:Specimen. Succeeds in most soils and pH types, but dislikes growing in wet soils, especially when these are of clay[200]. Prefers a deep damp sandy loam and a very sunny position[11, 182]. Succeeds in light shade[200]. Dislikes drought[200]. Repays generous treatment[11]. This species does not flower very freely in Britain. Plants do not thrive at Kew, they prefer a hotter climate[11]. Plants require cool greenhouse treatment in Britain[1]. The flowers are produced on the branches of the previous or earlier years, and also on the trunk of the plant[82]. Plants are susceptible to coral spot fungus, especially when growing in areas with cooler summers where the wood is not fully ripened[11]. Plants in this genus are notably resistant to honey fungus[200]. Resents root disturbance, plants should be planted into their permanent positions as soon as possible, preferably in May, and should be kept well watered until established[11]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: North American native, Blooms are very showy.

# 6.1.9 Myrica heterophylla

Bayberry

tho2n 5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta Myrica heterophylla is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista Although no reports of toxicity have been seen for this species, there is a report for some members of this genus that some of the constituents of the wax might be carcinogenic[2221.

kcakta Edible Parts: FruitEdible Uses: Condiment TeaThe following notes are for the closely related M. cerifera. It is assumed that they also apply to this species[K]. Fruit

raw or cooked[105, 177, 183]. The fruit is about 2 - 4mm in diameter with a single large seed[200]. There is very little edible flesh and this is of poor quality[K]. Leaves and berries are used as a food flavouring[62, 105, 177]. An attractive and agreeable substitute for bay leaves, used in flavouring soups, stews etc[183]. The dried leaves are brewed into a robust tea[183].

tcanta Dye Hedge Hedge Wax WoodThe following notes are for the closely related M. cerifera. It is assumed that they also apply to this species[K]. A wax covering on the fruit is extracted by scalding the fruit with boiling water and immersing them for a few minutes, the wax floats to the surface and is then skimmed off. The fruit is then boiled in water to extract the wax from the pulp and once more the wax is skimmed off. It is then strained through a muslin cloth and can be used to make aromatic candles, sealing wax etc[1, 4, 6, 11, 62, 95, 171, 2451. Candles made from this wax are guite brittle but are less greasy in warm weather[213]. They are slightly aromatic, with a pleasant balsamic odour[245], and do not smoke when put out, making them much more pleasant to use that wax or tallow candles[213]. The wax is also used in making soaps[213]. About 1 kilo of wax can be obtained from 4 kilos of berries[4]. A blue dye is obtained from the fruit[6]. The plant can be grown as an informal hedge[200], succeeding in windy sites[K]. Wood - light, soft, brittle, fine-grained[82, 227]. The wood weighs 35lb per cubic foot[227]. It is of no commercial value[229].

dwatta Astringent Dysentery Emetic Stimulant TonicThe following notes are for the closely related M. cerifera. It is assumed that they also apply to this species [K]. The root bark is astringent, emetic (in large doses), sternutatory, stimulant and tonic[4, 21, 46, 165, 213]. It is harvested in the autumn, thoroughly dried then powdered and kept in a dark place in an airtight container[4]. It is used internally in the treatment of diarrhoea, jaundice, fevers, colds, influenza, catarrh, excessive menstruation, vaginal discharge etc[4, 238]. Externally, it is applied to indolent ulcers, sore throats, sores, itching skin conditions, dandruff etc[4, 238]. The wax is astringent and slightly narcotic[4]. It is regarded as a sure cure for dysentery and is also used to treat internal ulcers[4]. A tea made from the leaves is used in the treatment of fevers and externally as a wash for itchy skin[222].

nrakta Southeastern N. America - New Jersey to Florida, west to Louisiana. ksacta Bogs, stream, pond and lake margins, moist regions of mixed deciduous forests, pine flatlands near pitcher-plant bogs, swamps from sea level to 250 metres[270]

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[78]. Stored seed germinates more freely if given a 3 month cold stratification and then sown in a cold frame[78]. Germination is usually good[78]. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a cold frame for the first winter. Plant out in late spring or early summer[K]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Pot up and overwinter in a cold frame then plant out in late spring or early summer. Fair to good percentage[78]. Layering in spring[2001.

nwatta Prefers a moist soil[200]. Grows well in an open position in a well-drained soil in sun or light shade[200]. Thrives in any ordinary garden soil according to one report[11] whilst another says that it thrives in an acid soil[182]. Prefers a lime-free loamy or peaty soil[1]. Succeeds in dry and maritime climates[200]. Closely related to M. pensylvanica and M. cerifera[200]. Dioecious, male and female plants must be grown if seed is required. Plants in this genus are notably resistant to honey fungus[200]. Many species in this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.10 Trifolium pratense

ad Classa

tfo2n 5 tlin 9 cyuc 3 kcak 4 tcan 3 dwat 0.6 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trifolium pratense is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for

in leaf all year, in flower from May to August. The species is hermaphrodite (has both male and female organs) and is polinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The plant is poisonous in large doses[13, 19], the toxin is neutralized by drying[7].

tcanta DyeA vibrant apple-green dye is obtained from plant[7, 244]. A useful ground cover for a shady position so long as it is not dry[197], spreading by its roots[208].

dwatta Cathartic Diaphoretic Emetic Errhine Sternutatory Stimulant TonicAsarabacca has a long history of herbal use dating back at least to the time of the ancient Greeks, though it is little used in modern herbalism[268]. The root, leaves and stems are cathartic, diaphoretic, emetic, errhine, sternutatory, stimulant and tonic[4, 7, 9, 13, 21, 46, 240]. The plant has a strong peppery taste and smell[244]. It is used in the treatment of affections of the brain, eyes, throat and mouth[4, 19]. When taken as a snuff, it produces a copious flow of mucous[268]. The root is harvested in the spring and dried for later use[7]. Use with caution[21], see the notes above on toxicity. An essential oil in the root contains 50% asarone and is 65% more toxic than peppermint oil[240]. This essential oil is the emetic and expectorant principle of the plant and is of value in the treatment of digestive tract lesions, silicosis, dry pharyngeal and laryngeal catarrh etc[240].

nrakta Central and southern Europe, east to W. Asia. Naturalized in Britain[17]. ksacta Open woodland and waterside thickets[13, 19], especially in beech woodlands[7].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Landscape Uses:Border, Ground cover, Massing, Rock garden, Woodland garden. Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Other reports say that this plant prefers a calcareous soil[13, 19, 268]. Plants are hardy to at least -15°c[200]. The flowers are malodorous and are pollinated by flies[200]. The root has a pungent, aromatic smell like mild pepper and ginger mixed, but more strongly aromatic. Plants often self-sow when growing in a suitable position[200]. This plant was at one time commonly cultivated as a medicinal herb[17]. Special Features: Attractive foliage, Not North American native, Naturalizing, Inconspicuous flowers or blooms.

#### 5.2.985 Verbena urticifolia

White Vervain

4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Verbena urticifolia is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Miscellany Restorative Women's complaints A decoction of the root is given to babies to break out the hives[207]. The sweetened root decoction is drunk as an aid for flu[207]. An infusion of the root has been used in the treatment of profuse menstruation[257]. The root has been eaten to revive a patient and restore them to health[257].

nrakta Eastern N. America - Quebec and Ontario to North Dakota, south to Florida and Texas. ksacta Woodlands, pastures, along streams, roadsides and waste areas[228].

propta Seed - sow early spring in a greenhouse or cold frame[1]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in early summer. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any moderately fertile well-drained but moisture retentive soil in a sunny position[1, 200]. Hardy to about -15°c[200].

#### 5.2.986 Anemone obtusiloba

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Anemone obtusiloba is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of this plant contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

dwatta Antirheumatic Emetic Ophthalmic Rubefacient. The roots, mixed with milk, are administered internally in the treatment of contusions[240]. They are used externally as a blistering agent[240]. The juice of the root is opthalmic[272]. The seeds taken internally induce vomiting[211, 240], whilst an oil extracted from them is used in the treatment of rheumatism[211].

nrakta E. Asia - Himalayas from Kashmir to Sikkim. ksacta Moist open slopes, 2000 - 3400 metres in Kashmir[145].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down, or in early spring.

nwatta Succeeds in ordinary garden soil but prefers a rich sandy loam[1]. Requires a well-drained humus-rich soil in full sun[200]. Requires a wern sheltered position[1]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. This species is very closely related to A. rupestris[211].

# 5.2.987 Phlox stolonifera

Creeping phlox

687

4 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc

pcimhmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hionli

drutta Phlox stolonifera is an evergreen Perennial growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate droudht.

pcista None Known kcakta None Known tcanta A good medium to high density groundcover that can be grown in semi-shade. Good for woodland gardening.

nrakta Native to woodlands in the vicinity of the Appalachian Mountains from Pennsylvania south to northern Georgia in the United States. Naturalized populations occur as far north as Québec, Canada. ksacta Indigenous to rich deciduous woodlands, stream banks, open woods and shaded rocky slopes mostly in the Appalachian Mountains.

propta Seed, division or by cuttings.

nwatta A long blooming mat forming perennial wildflower with showy flowers. Prefers bright shade with moist rich well drained soil. Plants tolerate acid or alkaline pH, drought, part sun and dry shade. Species self-seeds in optimum growing conditions. Spreads by stolons to form large colonies in the wild. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

#### 5.2.988 Bergenia purpurascens

4tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bergenia purpurascens is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta A useful ground cover plant, though rather slow to spread[197]. Plants form clumps[208].

dwatta Antiseptic Astringent Styptic TonicThe root is astringent, styptic, tonic[61, 91, 218]. A safe and effective treatment for chronic bronchitis[218]. It is also used in the treatment of giddiness and general physical feebleness[61, 91]. Extracts of the plant are antiseptic[218]. The plant is a source of the drug bergenin[266].

nrakta E. Asia - Himalayas to China. ksacta On rocks and open slopes, 3600 - 4700 metres. in the Himalayas[51]. Forests, scrub, alpine meadows and alpine rock crevices at elevations of 2700 - 4800 metres in western China[266].

propta Seed - surface sow in a greenhouse. Make sure that the compost does not dry out. Two weeks cold stratification can speed up germination which usually takes 1-6 months at  $15^{\circ} c [134]$ . Fresh seed, sown as soon as it is ripe in late spring is liable to germinate better than stored seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in late spring after flowering [188] or in autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in full sun or light shade in most soils[134, 200] but prefers a deep fertile soil that does not dry out fully[134]. Grows well in heavy clay soils. Plants are at their best in a medium-heavy soil[208]. Requires a position sheltered from cold drying winds and from the early morning sun. The leaf colour is best when plants are grown in a poor soil in a sunny position[188]. Plants are hardy to about -20°c[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants are position sheltered from the early morning sun[K]. Plants seem to be immune to the predations of rabbits[233]. The different species of this genus will hybridise freely when grown near each other[233].

# 5.2.989 Pulsatilla pratensis

Pasque Flower

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Pulsatilla pratensis is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant is slightly toxic, the toxins are dissipated by heat or by drying the plant[65].

tcanta Plants can be grown to form a ground cover, they are best spaced about 30cm apart each way[208].

dwatta Homeopathy Ophthalmic SkinConsidered by herbalists to be of highly valuable modern curative use as a herbal simple[4], the whole plant is alterative, antispasmodic, diaphoretic and nervine[4]. The plant is harvested soon after flowering and should be carefully preserved by drying[4]. It should not be stored for longer than 12 months before being used[4]. Use with caution, see notes above on toxicity. The whole plant is used externally to treat ulcers and inflammations of the eyes[232]. A homeopathic remedy is made from the whole fresh plant, gathered when in flower[232]. It has a wide range of applications and is especially useful in the treatment of babies and children[232].

nrakta C. and E. Europe. ksacta Open fields[232].

propta Seed - best sown as soon as it is ripe in early summer in a cold frame. The seed usually germinates in about 2 - 3 weeks. Sow stored seed in late winter in a cold frame. Germination takes about 1 - 6 months at 15°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in the spring. Root cuttings, 4cm long taken in early winter, potted up in a mixture of peat and sand[175]. They can also be taken in July/August, planted vertically in pots in a greenhouse or frame. Some care is needed since the plant resents root disturbance[200].

nwatta Requires a well-drained humus rich gritty soil in a sunny position[200]. Tolerates alkaline soils[200]. Prefers lime[187]. Established plants are fairly drought tolerant[190]. Plants are hardy to about -20°c[187]. Large plants transplant badly[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 5.2.990 Iris versicolor

Blue Flag, Harlequin blueflag 4 tlin 8 cyuc 0 koak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Iris versicolor is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238]. Fresh root can cause nausea and vomiting. The volatile oil furfural is irritant to mucous membranes and causes larchrymation (tears) and inflammation of the eyes. Irritation of the throat and headache also reported. The sap can cause dermatitis. Should not be used internally except in small doses. Should not be used by people with allergies or sensitivities [301].

tcanta Litmus Repellent WeavingA fine blue infusion is obtained from the flowers and this can be used as a litmus substitute to test for acids and alkalis[4]. The leaves have

tcanta Fibre Fodder Paper Soil reclamation Soil stabilizationA tough, strong fibre from the stems is used to make ropes, cables, coarse cordage and textiles[61, 109, 151, 169, 189]. The fibre is 2 - 3mm long and can be used to make paper. Straight first year stems, 2 - 2.7 metres long, are harvested in mid summer, the leaves are removed and the stems steamed until the fibres can be stripped. The fibres are then cooked for 2 hours with lye, tough vines might require 4 hours cooking, and the fibre put in a ball mill for 3 hours. The resulting paper is greenish/cream in colour[189]. Can be used as a ground cover plant in a sunny position[188]. Plants have an extensive root system which can be 1.8 metres deep, they are used for erosion control and for rebuilding depleted soils[171, 174]. A member of the Leguminosae, so it adds nitrogen to the soil through the actions of root bacteria.

dwatta Antidiarrhoeal Antidote Antiemetic Antihistamine Antineoplastics Antipruritic Antipsoriatic Antipyretic Antispasmodic Antivinous Cardiac Demulcent Depurative Diaphoretic Dysentery Febrifuge Galactogogue Hypoglycaemic Hypotensive StypticThe kudzu vine, known as Ge Gen in China, is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. Recent research has shown that compounds called 'daidzin' and 'daidzein', which are contained in the roots and the flowers, are a safe and effective method for treating alcohol abuse[238]. They work by suppressing the appetite for alcohol, whereas existing treatments interfere with the way the alcohol is metabolised and can cause a build-up of toxins[238]. The plant is often used in combination with Chrysanthemum x morifolium in treating alcohol abuse[254]. The flowers and the roots are antidote, antiemetic, antipyretic, antispasmodic, demulcent, diaphoretic, digestive, febrifuge, hypoglycaemic and hypotensive[174, 176, 218, 222, 238]. A concoction of the flowers and tubers is used to treat alcoholism, fever, colds, diarrhoea, dysentery, acute intestinal obstruction etc[174, 176, 218, 222]. It is useful in the treatment of angina pectoris and migraine[218]. The root is frequently used as a remedy for measles, often in combination with Cimicifuga foetida[254]. The root contains puerarin. This increases the blood flow to the coronary artery and protects against acute myocardial ischaemia caused by the injection of pituitrin[176]. The root can be harvested from the autumn to the spring and is used fresh or dried[238]. The flowers are harvested just before they are fully open and are dried for later use[238]. The stems are galactogogue and are also applied as a poultice to incipient boils, swellings, sore mouths etc[218, 222]. The seed is used in the treatment of hangover and dysentery[218, 222]. The leaves are styptic[218].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and thin woods all over Japan[58].

propta Pre-soak the seed for 12 hours in warm water and sow in a warm greenhouse in early spring. Germination should take place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out after the last expected frosts[200]. Cover the young plants with a frame or cloche until they are growing away well. Division of young shoots from the crown. The young shoots are removed in the spring with some of the underground part of the stem, preferably with some roots already formed. They are potted up and will usually develop new roots from the nodes. They are planted out in the summer if growth is sufficient, otherwise they are grown on in nots for a vear and planted out late the following spring.

nwatta Agroforestry Services: Nitrogen Fodder: Bank Fodder: Pasture Industrial Crop: Fiber Management: Hay Minor Global Crop Staple Crop: ProteinGrows best on well-drained loam soil of good fertility[269]. Succeeds in most well-drained soils in a sunny position[200], though it does not make good growth on very light poor sand or on poorly drained heavy clay[269]. Plants cannot stand waterlogging on any soil[269]. A deep-rooted pant, once established it is very drought resistant[171, 269]. The plant is reported to tolerate an annual precipitation in the range of 97 to 214cm, an annual mean temperature in the range of 12.2 to 26.7°C, and a pH of 5.0 to 7.1[269]. Plants are hardy to about -15°c, they can resprout from the base if they are cut down by frosts[200]. A twining plant, the top growth is not generally hardy in Britain and plants do not always flower here[1]. Plants can be grown as annuals in Britain, the seed is started off in a greenhouse and is planted out after the last frosts[1]. They can grow up to 6 metres in

their first year and make good temporary screens[1]. The plant succeeds outdoors in Berlin, but it has to be propagated vegetatively there [74]. This plant is cultivated for its edible root in Japan and China[183]. The flowers have a sweet vanilla scent[245]. When grown in warmer climates than Britain the root can be invasive and plants have become weeds[182, 219]. Introduced into the southern N. American states in 1876 as a soil stabilizer, the plant has spread very widely (it can grow up to 30cm in a day), has swamped out native vegetation, including large trees. It is considered to be one of the most obnoxious weeds in that region[274]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.7 Gleditsia japonica

tfo2n 5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Gleditsia japonica is a deciduous Tree growing to 20 m (65ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed cooked. The seed is roasted, dehusked, soaked until soft then boiled and eaten with sugar[179]. The seed contains 22.4% protein and 2.8% fat[218]. Young leaves - cooked[105]. A famine food used when all else fails[177].

tcanta SoapA soap is obtained from the pulp contained in the seedpods [11, 46, 61, 174]. It is obtained from the seed according to another report[105]. Wood - strong, durable, coarse-grained[82].

dwatta Antitussive Astringent Expectorant Haemostatic Skin VDAntitussive, astringent, expectorant, haemostatic, skin[174]. Treats syphilitic skin diseases[174].

nrakta E. Asia - Japan, ksacta Damp sandy soils[200]

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo[78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within 2 - 4 weeks at 20°c. As soon as they are large enough to handle, prick the seedlings out into individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Easily grown in a loamy soil, requiring a sunny position[11]. Succeeds in most soils[200]. Tolerates drought once established[1] and atmospheric pollution[200]. A rather tender plant, especially when young, it is seen at its best in southern Britain[11]. Older trees, however, are completely hardy in Britain[11]. Trees at Kew produced lots of pods and fertile seeds in the hot summer of 1989, they also fruited well in the cool summer of 1993 and also in 1994, 95 and 96[K]. Trees are cultivated for their seedpods in Japan[61]. Trees have a light canopy, they come into leaf late in the spring and drop their leaves in early autumn[200] making them an excellent canopy tree for a woodland garden. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 6.1.8 Cercis occidentalis

Western Redbud, California Redbud tfo2n 5 tlin 9 cyuc 3 kcak 3 tcan 0 dwat 4.5 m hkuc beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Care for diabetics on antidiabetic allopathic as may lower blood sugar. Can affect drug absorption as high fibre content. Constituents can alter the effects of monoamine oxide inhibitors [301].

kcakta Edible Parts: Leaves Seed SeedpodEdible Uses: Coffee Condiment TeaSeed - cooked or sprouted and eaten raw[2, 4, 21, 34]. It has guite a strong spicy flavour, not unlike lovage or celery[4, 183]. When ground into a powder, the seed is a principal ingredient of curries and mango chutney[244], it is also used in pickles and spice mixes, as a flavouring in bread etc[4, 183, 238]. The seed is usually lightly roasted before use in order to reduce the bitterness[238]. The seed is about 3mm long, about 10 - 20 seeds being produced in each pod[4]. A good source of many essential elements such as iron, phosphorus and sulphur[244], the seed contains about 6% moisture, 23% protein, 10% carbohydrate, 8% fat, 10% fibre and 4.3% ash[61]. The ground seeds are used to give a maple syrup flavour to foods[183]. The seed can be soaked for 12 hours in warm water and then allowed to sprout for 3 - 5 days[244]. These sprouted seeds have a spicy flavour and can be added to salads or cooked[238, Kl. An essential oil obtained from the seed is used as a food flavouring in imitation maple syrup, vanilla compositions, liquorice, pickles etc[183]. It also has medicinal virtues[57]. The ground up seeds can also be used as a substitute for maple syrup[4]. Leaves - raw or cooked[2, 4, 7, 34]. Very aromatic, in small quantities they can be added to salads, otherwise they are used as a potherb, a flavouring for root vegetables, an ingredient of curries etc[183, 238]. Seedpods - cooked[105]. The roasted seed is a coffee substitute[2, 177, 183]. A soothing tea is made from the leaves and the seed[21, 183].

tcanta Cosmetic Dye Essential Green manure Hair ParasiticideAn essential oil is obtained from the seed - used as a food flavouring and medicinally. The dried plant has a strong aroma of hay[4]. The crushed seed, mixed with oil and massaged into the scalp, is recommended for glossy hair[244]. An infusion of the seed, used as a skin lotion, is said to be good for the complexion[244]. A good green manure crop, it is fast growing and vigorous[200], producing a lot of bulk and fixing a large quantity of atmospheric nitrogen[87]. A vellow dye is obtained from the seed[61].

dwatta Anticholesterolemic Antiinflammatory Antiphlogistic Antitumor Appetizer Cardiotonic Carminative Demulcent Deobstruent Diuretic Emollient Expectorant Febrifuge Galactogogue Hypoglycaemic Hypotensive Laxative Parasiticide RestorativeFenugreek is much used in herbal medicine, especially in North Africa, the Middle East and India. It has a wide range of medicinal applications[254]. The seeds are very nourishing and are given to convalescents and to encourage weight gain, especially in anorexia nervosa[254]. The seeds should not be prescribed medicinally for pregnant women since they can induce uterine contractions [238, 254]. Research has shown that the seeds can inhibit cancer of the liver lower blood cholesterol levels and also have an antidiabetic effect[254]. The seed and leaves are anticholesterolemic, anti-inflammatory, antitumor, carminative, demulcent, deobstruent, emollient, expectorant, febrifuge. galactogogue, hypoglycaemic, laxative, parasiticide, restorative and uterine tonic[4, 7, 21, 147, 165, 176, 238]. The seed yields a strong mucilage and is therefore useful in the treatment of inflammation and ulcers of the stomach and intestines[4, 254]. Taken internally, a decoction of the ground seeds serves to drain off the sweat ducts[7]. The seed is very nourishing and body-building and is one of the most efficacious tonics in cases of physical debility caused by anaemia or by infectious diseases, especially where a nervous factor is involved[7, 244]. It is also used in the treatment of late-onset diabetes, poor digestion (especially in convalescence), insufficient lactation, painful menstruation, labour pains etc[238, 244]. The seeds freshen bad breath and restore a dulled sense of taste[254]. Externally, the seeds can be ground into a powder and used as a poultice for abscesses, boils, ulcers, burns etc, or they can be used as a douche for excessive vaginal discharge [4, 244, 254]. The leaves are

harvested in the growing season and can be used fresh or dried[238]. The seeds are harvested when fully ripe and dried for later use [238]. Compounds extracted from the plant have shown cardiotonic, hypoglycaemic, diuretic, antiphlogistic and hypotensive activity[218]. One of its constituent alkaloids, called 'trigonelline', has shown potential for use in cancer therapy. The seed contains the saponin diosgenin, an important substance in the synthesis of oral contraceptives and sex hormones[244], whilst saponins in the plant have been extracted for use in various other pharmaceutical products[238]. The German Commission E Monographs, a therapeutic quide to herbal medicine, approve Trigonella foenum-graecum for loss of appetite, inflammation of the skin (see [302] for critics of commission E).

nrakta Europe - S. France, ksacta Field verges, uncultivated ground, dry grasslands and hillsides[200].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ.

nwatta Succeeds in ordinary garden soil[1], preferring a well-drained loamy soil in full sun[200]. Requires a warm, sheltered position in Britain[244]. Plants are hardy to about -15°c[238]. Fenugreek is widely cultivated for its edible seed in warm temperate and tropical regions, there are some named varieties[183]. Seed production is more problematic in Britain due to the cooler and moister summers. The seed is ripened intermittently over a period of some weeks making harvesting more complicated[87]. Plants take about 16 weeks to mature in warmer climes, probably about 4 weeks longer in Britain[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

# 6.1.6 Pueraria montana lobata

tfo2n 5 tlin 9 cvuc 4 kcak 4 tcan 5 dwat m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Pueraria montana lobata is a PERENNIAL CLIMBER growing to 10 m (32ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral

It prefers moist soil and can tolerate drought.

possibly due to Kudzu [301].

mg riboflavin, 0.8 mg niacin[269].

pcista Although no specific mention has been found for this species, the leaves of the closely related P. hirsuta (which might be no more than a synonym for this species) have barbed hairs and these can cause severe irritation[151]. Possible interaction with antiplatelet and antidiabetic medication. Rare case of a patient developing bleeding after surgery

and basic (mildly alkaline) soils. It cannot grow in the shade.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Root - cooked[105, 171]. Rich in starch[109]. The root can be up to 1.8 metres long[174] and has been known to weigh 35 kilos or more[269]. The root contains about 10% starch, this can be extracted and used as a crispy coating in deep fried foods, or for thickening soups etc[174, 183]. It can also be made into noodles, or like agar or gelatine is used as a gelling agent for salads[183]. This plant is a staple food in Japan, the peeled root contains about 2.1% protein, 0.1% fat, 27.1% carbohydrate, 1.4% ash[179]. The starch of the roots contains (per 100 g) 340 calories, 16.5 percent moisture, 0.2

g protein, 0.1 g fat, 83.1 g total carbohydrate, 0.1 g ash, 35 mg Ca, 18 mg P, 2.0 mg Fe, and 2 mg Na[269]. A nutritional analysis for the whole root is available. Flowers - cooked or made into pickles[183]. Stems and young leaves - raw or cooked[105]. A very nutritious food, the fresh young shoots taste like a cross between a bean and a pea[183]. The cooked leaves contain (per 100 g) 36 calories, 89.0 percent moisture, 0.4 g protein, 0.1 g fat, 9.7 g total carbohydrate. 7.7 g fiber, 0.8 fat, 34 mg Ca, 20 mg P, 4.9 mg Fe, 0.03 mg thiamin, 0.91

been used to weave baskets and mats[257]. Some native North American Indian tribes used the root as a protection against rattlesnakes. It was believed that, so long as the root was handled occasionally to ensure the scent permeated the person and their clothes, rattlesnakes would not bite them. Some tribes even used to chew the root and then hold rattlesnakes with their teeth and were not bitten so long as the scent persisted[257]

dwatta Alterative Antiinflammatory Cathartic Cholagogue Diuretic Emetic Sialagogue StimulantBlue flag was one of the most popular medicinal plants amongst various native North American Indian tribes[213]. In modern herbalism it is mainly employed to detoxify the body - it increases urination and bile production and has a mild laxative effect[254]. Some caution should be exercised in its use, however, since there are reports that it is poisonous[222]. The fresh root is guite acrid and when taken internally causes nausea, vomiting, colic and purging[4, 238]. The dried root is much less acrid[4]. This remedy should not be prescribed for pregnant women[238]. The root is alterative, anti-inflammatory, cathartic, cholagogue, diaphoretic, diuretic, emetic and sialagogue[21, 46, 165, 238]. Taken internally as a tea, the root has been used as a strong laxative or emetic that also acts strongly on the liver and promotes the excretion of excess body fluids[4, 213]. It is also stimulant for the circulatory and lymphatic system[165]. Its detoxifying effect make it useful in the treatment of psoriasis, acne, herpes, arthritis, swollen glands, pelvic inflammatory disease etc[238, 254]. Externally, it is applied to skin diseases, wounds and rheumatic joints[238]. The roots are harvested in late summer and early autumn and are usually dried for later use[4, 238]. The roots were boiled in water and then mashed to make a poultice which was used to relieve the pain and swelling associated with sores and bruises[213].

nrakta Eastern N. America - Newfoundland to Manitoba. south to Florida and Arkansas. ksacta Swamps, wet meadows, scrub and by lakes and rivers[187]. Wetlands[21].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in early autumn after flowering, but can also be done in mid-spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Prefers growing in marshy conditions[1]. Very easily grown in any damp soil[42]. Prefers a heavy rich moist soil[4] and partial shade[188]. Prefers a sunny position[233]. Plants are hardy to about -25°c[187]. This species has been cultivated by the N. American Indians as a medicinal plant[207, 213]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

#### 5.2.991 Limonium carolinianum

Sea Lavender, Lavender thrift

4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli fyifxre7t hjonli

drutta Limonium carolinianum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

dwatta Astringent DysenteryThe roots contain tannin and are powerfully astringent[4, 207]. A decoction of the root has long been used as a popular domestic remedy for diarrhoea, dysentery etc and are also used to treat sore mouths, cankers etc[4, 207]. The dried and powdered root is applied to old ulcers or piles[4].

nrakta Eastern N. America - Labrador to Florida and Texas. ksacta Coastal salt flats[200].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very difficult[200].

nwatta Requires a well drained soil and a sunny position[200]. Plants are well-suited to coastal gardens and dry soils[200]. Hardy to about -20°c[200].

#### 5.2.992 Ranunculus flammula

Lesser Spearwort, Greater creeping spearwort 4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcuphia7nhs6s hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ranunculus flammula is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista All parts of the plant are poisonous when fresh, the toxins are destroyed by heat or by drying[4, 10, 19, 21, 65]. The plant also has a strongly acrid juice that can cause blistering to the skin[65, 183].

dwatta The whole plant is strongly rubefacient[4]. A tincture of the plant is used to cure ulcers[4].

nrakta Most of Europe, including Britain, to temperate Asia. ksacta Common in wet places throughout Britain[4].

propta Seed - sow spring in situ. This plant does not really need any encouragement. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta A plant of boggy soils and shallow water, it prefers a loamy soil and a sunny position. A greedy plant, inhibiting the growth of nearby plants, especially legumes [54].

#### 5.2.993 Gentiana straminea

4 tlin 8 cvuc 0 kcak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana straminea is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clav) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Analgesic Antiinflammatory Antipyretic Antirheumatic HypotensiveThe roots of gentian species contain some of the most bitter compounds known and make an excellent tonic for the whole digestive system, working especially on the stomach, liver and gall bladder[238]. The root is analgesic, anti-inflammatory, antipyretic, antirheumatic, diuretic, febrifuge, hypoglycaemic and hypotensive[176, 238]. The root is used internally in the treatment of arthritis, allergic inflammations, low-grade fever in chronic diseases, jaundice and hepatitis[176, 238]. The root is harvested in the autumn and dried for later use.

nrakta E. Asia - W. China. ksacta Grassy slopes and alpine meadows to 3.500 metres[239].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200. 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks

with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[1111, Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This is an easily grown species [239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. Plants are intolerant of root disturbance[200].

#### 5.2.994 Antennaria dioica

Catsfoot, Stoloniferous pussytoes 4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 0.1 m hkuc htut cyutli hgatkyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli fyifnyanhjen hjonli

drutta Antennaria dioica is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Allergic reaction may occur in subjects sensitive to rag weed, chrysanthemums, marigolds and daisies. May increase blood pressure. Safety during pregnancy is not known [301].

tcanta A good ground cover plant for sunny positions. Rather slow to spread, however, and it requires weeding for at least the first year[197]. Plants form a carpet and root as they spread[208].

dwatta Antitussive Astringent Cholagogue Diuretic EmollientCatsfoot has been little used in herbal medicine though it was once used in mixtures for the treatment of bronchitis and bilious conditions[268]. The whole plant is antitussive, astringent, cholagogue, discutient, diuretic and emollient[4, 7, 9, 21]. The plant is very rich in mucilage which makes it very valuable in the treatment of chest complaints[7]. It is also used in the treatment of liver and gall bladder complaints, hepatitis and diarrhoea[238]. Externally it is used as a gargle for treating tonsillitis and as a douche for vaginitis[238]. The herb is gathered in May before it comes into flower and can be dried for later use[7].

nrakta Northern and central Europe, including Britain, to Siberia and W. Asia. ksacta Mountain grassland, heaths, dry pastures and woodland edges, usually on calcareous soils[9, 13, 17].

propta Seed - sow spring in cold frame and only just cover the seed. Do not allow the soil to dry out. The seed germinates in 1 -2 months at 15°c. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring of the following year[K]. Division in spring or autumn. Fairly easy, the divisions can be planted out direct into their permanent positions if required.

nwatta Prefers a light well-drained soil in full sun, succeeding in poor soils[1, 133, 200]. Established plants are drought tolerant[190]. This species is very susceptible to slug damage, the young growth in spring is particularly at risk[K]. Tolerates light treading[200]. The flowers are sometimes cut and used as 'everlasting flowers' since they dry well and keep their colour[7]. Plants are usually dioecious, male and female plants must be grown if seed is required. Some male plants have a few hermaphrodite flowers, though these are usually sterile. Apomictic flowers are also produced[17], these produce seed without sexual fertilization, each seedling being a clone of the parent plant. The plant is heat tolerant in zones 9 through 4. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

### 5.2.995 Scutellaria galericulata

Common Skullcap, Marsh skullcap 4 tlin 8 cvuc 0 kcak 0 tcan 3 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scutellaria galericulata is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Antiinflammatory Antispasmodic Astringent Epilepsy Febrifuge Nervine TonicThe herb is antiinflammatory, antispasmodic, slightly astringent, febrifuge, nervine and strongly tonic[4, 9, 165]. In the home an infusion is sometimes used in the treatment of throat infections[9]. The plant is harvested in the summer as it comes into flower and can be dried for later use[9]. This plant is rarely if ever used in herbal medicine[9], though it is said to have the same applications as S. lateriflora[238]. These applications are:- Skullcap was traditionally used in the treatment of a wide range of nervous conditions including epilepsy, insomnia, anxiety, delirium tremens, withdrawal from barbiturates and tranquillisers, and neuralgia[222, 238]. An infusion of the plant has been used to promote suppressed menstruation[213], it should not be given to pregnant women since it can induce a miscarriage[238]. This plant should be used with some caution since in excess it causes giddiness, stupor, confusion and twitching[238].

nrakta Europe, including Britain, south and east from Scandanavia to Spain north and west Asia ksacta Moist acid or calcareous soils on the edges of streams, in water meadows and fens, ascending to 360 metres in Britain[4, 17].

propta Seed - sow in situ outdoors in late spring. If there is only a small quantity of seed it is better to sow it in a pot in a cold frame in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the spring. Division in spring just before new growth begins. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Basal cuttings in early summer in a frame. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

can be eaten with the fruit though the seed case is rather 6.1.4 Lathyrus tuberosus

tcanta Companion Hedge Hedge RootstockPlants can be grown as a hedge in exposed positions, tolerating maritime exposure. Reasonably fast growing and providing a good screen in the summer, though much more open in the winter. It is a good companion hedge to grow, the plants enriching the soil and improving the growth of neighbouring plants[K]. A hedge in a very exposed position at Rosewarne in N. Cornwall was 3.5 metres tall in 1989[K]. Often used as a rootstock for evergreen species that are hard to grow from cuttings. It frequently sprouts from the base and can out-compete the scion[182].

dwatta Antitussive Astringent CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The leaves are used in the treatment of coughs[218]. The fruit is prescribed in the treatment of watery diarrhoea[218]. The root is astringent, a decoction is used to treat itch and foul sores[218].

nrakta E. Asia - China and Japan. ksacta Thickets and thin woods in hills and on lowland, at elevations of 600 - 1800 metres[58]

propta Seed - best sown as soon as it is ripe in a cold frame [78]. It should germinate in late winter or early spring, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates guite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Layering in September/October. Takes 12 months[78]

nwatta An easily grown plant[184], it succeeds in most soils that are well-drained[11, 200]. Prefers a soil that is only moderately fertile, succeeding in poor soils and in dry soils[11, 200]. Prefers a light sandy loam and a sunny position but succeeds in light shade[11, 200]. Very drought and wind resistant[1, 11, 200]. Tolerates atmospheric pollution[160]. Plants are hardy to about -20°c[184], but the roots are hardy to -30°c (although top growth will be killed at this temperature). A very variable species[266], it is often cultivated for its edible fruit in Japan, there are some named varieties[3, 11, 183]. Plants can crop in 4 years from cuttings[160]. They bear heavily in Britain[11]. The synonym E. longipes is sometimes accepted as a distinct species, differing mainly in having very long peduncles about 2.5cm in length[214]. The fruit is well hidden in the shrub and is quite difficult to harvest without damaging the plant[K]. The ssp. E. multiflora ovata. (Maxim.)Servettaz. produces brown fruits on long stalks[200], would this be any easier to harvest?[K]. This species is notably resistant to honey fungus[88, 2001. Birds love the fruits[160]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. The small flowers are deliciously scented with a lilac-like smell, their aroma pervading the garden on calm days[K]. For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

Earthnut Pea. Tuberous sweetpea tfo2n 5 tlin 9 cyuc 5 kcak 3 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lathyrus tuberosus is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been found for this plant, the seed of some species in this genus contain a toxic amino acid that can cause a severe disease of the nervous system known as 'lathyrism' if they are eaten in large amounts (although small quantities are said to be nutritious)[65, 76]. Great caution is advised.

kcakta Edible Parts: RootEdible Uses: Root - cooked or raw[2, 27, 46, 61, 105]. Sweet and starchy, it is delicious when baked with a flavour that is somewhat like a sweet potato[183, K]. Taste trials consistently place this root very highly, it is certainly one of our favourites[K]. Unfortunately, vields are rather low and so the plant is only worthwhile growing as a taste treat, not as a staple crop[K].

tcanta Nitrogen fixer. Attractive flowers. Attracts

nrakta Europe to W. Asia. Naturalized in Britain in a very few sites in E. England. ksacta Cornfields and hedgerows, avoiding acid soils[17].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division of the tubers when the plant is dormant in spring or

nwatta An easily grown plant, succeeding in any moderately good garden soil[200]. It prefers a limestone soil in a warm position[13], and likes some shade[1]. A climbing plant, scrambling through other plants and supporting itself by tendrils[219]. It tends to be slightly invasive[187] with new stems emerging at some distance from the parent plant[219]. The earthnut pea has occasionally been cultivated for its edible root[2, 183]. Slugs are inordinately fond of this plant and will totally destroy it given a chance[K]. A good bee plant. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A suckering vine sending up suckers some distance main plant [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 6.1.5 Trigonella foenum

Fenugreek, Sicklefruit fenugreek tfo2n 5 tlin 9 cyuc 4 kcak 0 tcan 5 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trigonella foenum-graecum is a ANNUAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The seed contains 1% saponins[240]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some years from cuttings[160]. They bear heavily in Britain[11]. The fruit is well hidden in the shrub and is guite difficult to harvest without damaging the plant[K]. This sub-species produces brown fruits on long stalks[200], would this be any easier to harvest?[K] This species is notably resistant to honey fungus[88, 200]. Birds love the fruits[160]. There is some confusion over the correct name for this species. In the online version of the Flora of Japan it is referred to as Elaeagnus montana ovata[275]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. The small flowers are deliciously scented, their aroma pervading the garden on calm

# 6.1.2 Elaeagnus x ebbingei

Elaeagnus, Ebbing's Silverberry tfo2n 5 tlin 9 cyuc 5 kcak 4 tcan 2 dwat 5 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tii flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus x ebbingei is an evergreen Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from October to January, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[177]. A reasonable size, it is about 20mm long and 13mm wide although it does have a large seed[K]. The fully ripe fruit has a very rich flavour and makes pleasant tasting with a slight acidity[K]. The fruit should be deep red in colour and very soft when it is fully ripe, otherwise it will be astringent[K]. The flavour improves further if the fruit is stored for a day or two after being picked. The fruit ripens intermitently over a period of about 6 weeks from early to mid April until May[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K]. The taste is vaguely like peanuts[K].

tcanta Companion Hedge HedgePlants can be grown as a hedge in very exposed positions, tolerating maritime exposure. The plants provide a very good protection from the wind, they are very resistant to damage by salt winds and are also tolerant of regular trimming[75]. They have a strong vigorous growth and are faster growing than E. macrophylla[75, 200]. Because they fix atmospheric nitrogen, they make good companion plants and improve the growth of neighbouring species[K]. They can be planted in the line of an old shelterbelt of trees that is becoming bare at the base and will in time fill up the empty spaces and climb into the bottom parts of the trees[K].

dwatta CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers [214].

nrakta A garden hybrid, E. macrophylla x E. pungens or E. x. reflexa. ksacta Not known in the wild.

propta Seed - this is a hybrid and it will not breed true from seed. If this is not a problem, then the seed is best sown as soon as it is ripe in a cold frame[78]. It should germinate freely within 4 weeks, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough

to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Rather slow, but you usually get a good percentage rooting[78]. June is the best time to take cuttings[202]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Layering in September/October. Takes 12 months[78].

nwatta A very easily grown plant, it succeeds in most soils that are well-drained[11, 200]. Prefers a soil that is only moderately fertile, succeeding in poor soils and in dry soils[11, 200]. A drought resistant plant once established, it can be grown on top of Cornish hedges (drystone walls with earth between two vertical layers of stones). It is very tolerant of shade and grows well under trees[200]. Plants are very tolerant of maritime exposure, growing well right by the coast[K]. Plants are hardy to about -20°c, but they can be deciduous in very cold winters[200]. Fruiting as it does in early April to May, this plant has excellent potential as a commercial fruit crop in Britain. The fruit is of a reasonable size and when fully ripe is very acceptable for dessert[K]. It should be fairly easy to selectively breed for improved fruit size and flavour[K]. Not all plants bear many fruits, though many specimens have been seen that produce very heavy crops on a regular basis[K]. Since this is a hybrid species, yields may be improved by growing a selection of cultivars or one of the parent plants nearby for cross pollination. E. pungens is perhaps the best candidate for this and its cultivar E. pungens 'Variegata' has been seen on a number of occasions with good crops of fruit next to E. x ebbingei plants that are also laden with fruit[K]. The cultivar E. x ebbingei 'Gilt Edge' is also probably a good pollinator[K]. Other cultivars worth looking at are 'Salcombe Seedling', which is said to flower more abundantly than the type[200] and 'Limelight', which has been seen with a good crop of fruits even on small bushes[K]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. Plants produce very aromatic flowers in late autumn and early winter[182]. This species is notably resistant to honey fungus[88, 200]. Sometimes whole branches die out for no apparent reason. This happens most frequently when it is grafted onto E. multiflora[182]. These branches should be removed from the plant. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 6.1.3 Elaeagnus multiflora

Goumi, Cherry silverberry

tfo2n 5 tlin 9 cyuc 5 kcak 3 tcan 2 dwat m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus multiflora is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[1, 3, 11, 15, 46, 177]. Pleasantly acid when ripe, they make a very good dessert fruit[K] though they are usually made into pies, preserves etc[183]. Quite fiddly and difficult to pick without breaking the young shoots[200]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The fruit contains a single large seed[K]. Seed - raw or cooked. It

nwatta Succeeds in a sunny position in any ordinary garden soil that does not dry out during the growing season[200].

#### 5.2.996 Centaurea scabiosa

Greater Knapweed

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.9 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Centaurea scabiosa is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

dwatta Diaphoretic Diuretic Tonic VulneraryThe roots and seeds are diaphoretic, diuretic, tonic and vulnerary[4]. The plant once had a very high reputation as an ingredient of the Medieval 'salve', an ointment applied to heal wounds and treat skin infections[4, 254].

nrakta Much of Europe, including Britain, north to 68° N., east to the Caucasus and W. Asia. ksacta Pastures, field edges and roadsides, usually on chalk[4, 17].

propta Seed - sow early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. This should be done at least once every three years in order to maintain the vigour of the plant. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. Does well in the summer meadow[24]. An important nectar plant for bees and butterflies[24]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 5.2.997 Limonium vulgare

Sea Lavender, Mediterranean sea lavender, Common Privet 4 tlin 7 cyuc 0 koak 0 tcan 1 dwat 0.3 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli fyifxre7t hjonli

drutta Limonium vulgare is a PĒRĒNNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees, wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

tcanta Repellent TanninThe plant repels moths[66]. The root is a source of tannin[46].

dwatta Decongestant DepurativeThe roots are decongestant and depurative[66]. They are used in the treatment of consumption with haemorrhage[257].

nrakta Western and southern Europe, including Britain, N. Africa, N. America. ksacta Muddy salt marshes, avoiding shadel 171

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

Division in spring. Very difficult[200]. Root cuttings in late autumn or winter[200].

nwatta Landscape Uses:Border, Hedge, Screen, Superior hedge. Succeeds in light dry soils[1]. Tolerates maritime exposure[200]. A good bee plant[108]. Special Features: Not North American native, Invasive, Naturalizing, Attractive flowers or blooms

# 5.2.998 Fritillaria roylei

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis

drutta Fritillaria roylei is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antiasthmatic Antirheumatic Febrifuge Galactogogue Haemostatic Ophthalmic OxytoxicThe bulb is antiasthmatic, antirheumatic, febrifuge, galactogogue, haemostatic, ophthalmic and oxytocic[46, 61, 178]. It is boiled with orange peel and used in the treatment of TB and asthma[240].

nrakta E. Asia - Himalayas. ksacta Alpine slopes and in shrubberies, 2700 - 4000 metres, from Pakistan to Uttar Pradesh[51].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[11]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[11]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta This species is easily grown in a cold greenhouse but is difficult to grow outdoors in Britain[42]. In the wild it is under snow for 6 months of the year and is baked by the sun for the rest of the year[42]. Very closely related to and merging into F. cirrhosa in the eastern part of its range[90]. Famous in Chinese medicine, where it is called Pé-mou, it is sold as a medicinal herb in local markets there[42, 61]. Flowers are produced in 3 - 5 years from seed.

#### 5.2.999 Woodwardia areolata

Netted chain fern

4 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc

hmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Woodwardia areolata is a deciduous Fern growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista None Known

kcakta None Known

tcanta Groundcover. A medium to high density groundcover that will work in a wet and shady spot. Garden Uses: Shade gardens, native plant gardens, woodland gardens or naturalized areas. Also effective along streams and ponds [368-1]. Provides shelter for frogs, toads, newts.

nrakta Eastern and southern North America from Nova Scotia, Canada, south to Florida and Texas, USA. It is is most abundant on the coastal plain of the eastern United States, scattered in the Ouachita and Boston mountains, Ozark and Cumberland plateaus, and the Piedmont, but not in the high Appalachians, the heavy gumbo soils of the Mississippi Valley, or the limestone regions of the Interior Low Plateaus

(Flora of North America Editorial Committee 1993+). ksacta and peat[1]. Found in acidic bogs, seeps, wet woods, meadows and fields, swamps, wetland margins; but rarely on rock of siliceous cliffs and ledges on northern edge of range.

propta Propagate by spores or rhizome division.

nwatta A deciduous, perennial, colony-forming, waxy green, deciduous fern. Prefers organically rich, medium to wet, well-drained soils in part shade to full shade. Does well in average garden soils and will take considerable sun as long as soils are kept consistently moist[368-1]. Soil pH: Acidic (pH<6.8). Typically occurs in woodland swamps and bogs. Bloom Time: Non-flowering. Bloom Description: Nonflowering. Can be mistaken for Onoclea sensibilis. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.1000 Arnica fulgens

Hillside Arnica, Foothill arnica

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Arnica fulgens is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is toxic and should only be used for external applications to unbroken skin[172].

dwatta Antiecchymotic Antiphlogistic Irritant Nervine Sternutatory Tonic VulneraryThe whole plant, but especially the flowers and the root, is antiecchymotic, antiphlogistic, irritant, nervine, sternutatory, tonic and vulnerary[61, 172]. This plant is used in North America in much the same way as A. montana is used in Europe[254]. These uses are as follows:- Arnica has a long history of herbal use, especially as an external treatment for bruises and sprains[232, 238] - it is an incredient of a number of proprietary preparations[238. Internally, it has been used in the treatment of heart complaints and as a booster for the immune system[238]. Arnica increases local blood supply and accelerates healing, it is anti-inflammatory and increases the rate of absorption of internal bleeding[254]. Generally the plant is nowadays only recommended for internal use as a homeopathic medicine, principally for treating shock, injury and pain[254]. If used as a decoction or tincture it stimulates the circulation and is valuable in the treatment of angina and a weak or failing heart, but it can be toxic even at quite low doses and so is rarely used this way[254]. The flowers are the part most commonly used[4, 232], they are harvested when fully open and dried - the receptacles are sometimes removed since these are liable to be attacked by insects[4]. The root is also used, it is harvested after the leaves have died down in the autumn and dried for later use[4]. The whole plant is antiecchymotic, antiphlogistic, nervine, sternutatory, vulnerary[4]. 7, 9, 46, 165]. Although a very valuable remedy, it should be used with caution. It has been known to cause contact dermatitis when used externally and collapse when taken internally[238]. Only take it internally under the supervision of a qualified practitioner. The freshly crushed flowers cause sneezing if inhaled[232]. The leaves have also been smoked as a tobacco[232], though it is unclear whether this was for medicinal reasons The whole plant, harvested when in flower, is used in homeopathic remedies[232]. It is especially useful in the treatment of traumatic injuries, sores and bruises[232]

nrakta Central and North-western N. America - British Columbia to Saskatchewan, south to California. ksacta Open places, especially in foothills, and at moderate elevations in mountains[60].

propta Seed - sow early spring in a cold frame[200]. Only just cover the seed and make sure that the compost does not dry out. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Prefers a moist, well-drained humus rich soil, preferably lime-free[200]. Prefers a mixture of sand, loam

#### 5.2.1001 Paeonia caucasica

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Paeonia caucasica is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Beads Dye OilA red dye is obtained from the flowers[74]. It has been used to dye cloth and paper[250]. A fatty oil is obtained from the seed[74, 250]. No uses of the oil are given[K]. The seeds are used as beads in necklaces etc[74,

dwatta AntitussiveA tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose

nrakta W. Europe to W. Asia. ksacta Forests, forest margins, short grass meadows and shrub thickets in the forest

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year. but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. This species is not recognized by many botanists, who view it as no more than a synonym of P. mascula[250]. A long-lived plant, specimens can survive in the garden for at least 50 years[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1].

# 5.2.1002 Delphinium nuttallianum

Larkspur, Twolobe larkspur

4 tlin 8 cvuc 0 kcak 2 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Delphinium nuttallianum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable

#### 5.2.1050 Waldsteinia ternata

Barren Strawberry

4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.2 m hkuc

hmimhtut cyutli haattcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Waldsteinia ternata is an evergreen Perennial growing to 0.2 m (0ft 6in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It cannot tolerate atmospheric pollution.

pcista None Known

kcakta None Known

tcanta Ground Cover. Food Forest, Accent: Good Texture/Form, Containers, Edging. Rabbit Resistant.

dwatta None Known

nrakta Native Range: Europe, Japan, China ksacta Moist or dry upland conifer forests, mixed hardwood and pine woodlands, thickets, clearings and fields.

propta Propagate by division in early spring.

nwatta Herbaceous rhizomatous perennial. A dense mat of shiny dark green leaves similar to a strawberry plant. Saucer-shaped, bright vellow flowers. A very good low maintenance ground cover. Evergreen in mild winter regions. Tolerates light foot traffic. Easily divided in spring or early fall. Combines well with spring-blooming bulbs. Drought tolerant once established. Light: Partial Shade or Full Shade. Soil Type: Normal, Sandy or Clay. Soil pH: Neutral to Acid. Soil Moisture: Average or Moist. Dislikes heat and humidity. Growth Rate: Fast. Bloom Time: Early spring to summer.

# 5.2.1051 Hyacinthoides nonscripta

Bluebell

4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hyacinthoides nonscripta is a BULB growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The bulb (and the whole plant?) is poisonous[4]. tcanta Adhesive StarchA glue is obtained from the sap in the bulb and stem[4, 6, 66]. Simply cut open a bulb and apply the sap to whatever needs to be joined[K]. It makes an excellent paper glue, the join is stronger than the surrounding paper[6]. It would not work on non-absorbent materials such as plastics and glass[K]. A starch from the bulb has been used in laundering[4], it is very harsh on the skin[6].

dwatta Diuretic StypticThe bulb has diuretic and styptic properties[4]. It is used as a remedy for leucorrhoea[4].

nrakta Western Europe from the Netherlands and Britain o Belgium and France. ksacta Deciduous woodland[28], usually on slightly acid soils[17].

propta Seed - sow early spring or as soon as ripe in a cold frame. It usually requires stratification. If you have plenty of seed it can be sown in situ, but it is usually more economical to sow it in a frame. If sown thinly, the seedlings can be left in their pots for the first year, though give them regular liquid feeds to make sure that they get sufficient nutrient. Prick out the seedlings about 3 to a pot and grow on for 1 -2 more years before planting out into their permanent positions when they are dormant[K]. Division of the bulbs in summer after the leaves die down. Larger bulbs can be replanted direct into their permanent positions, but it is best to pot up smaller bulbs and grow them on for a year in a cold frame before planting them out when dormant in late summer.

nwatta Easily grown in a soil rich in leafmold[90], preferring semi-shade[28, 31] but tolerating full sun. Succeeds in most soils but prefers a heavy one[200]. Succeeds in the dry shade of trees[188, 233]. Bulbs like to be quite deep in the soil[200]. The flowers diffuse a balsam-like scent in the sunshine[245].

# 5 tlin

# **6.1** bwon

# 6.1.1 Elaeagnus multiflora ovata

tfo2n 5 tlin 9 cvuc 5 kcak 3 tcan 2 dwat m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus multiflora ovata is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit raw or cooked[1, 3, 11, 15, 46, 177]. Pleasantly acid when ripe, they are usually made into pies, preserves etc[183]. Quite fiddly and difficult to pick without breaking the young shoots[200], this sub-species carries the fruit on longer stalks than the species and might therefore be easier to pick[K]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The fruit is about 10mm long and contains a single large seed[275, K] Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

tcanta Hedge Hedge RootstockPlants can be grown as a hedge in exposed positions, tolerating maritime exposure. A hedge in a very exposed position at Rosewarne in N. Cornwall was 3.5 metres tall in 1989[K]. Often used as a rootstock for evergreen species that are hard to grow from cuttings. It frequently sprouts from the base and can out-compete the

dwatta CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids. which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - China and Japan. ksacta Thickets and thin woods in hills and on lowland, at elevations of 600 - 1800 metres[58].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate in late winter or early spring, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Layering in September/October. Takes 12 months[78].

nwatta An easily grown plant[184], it succeeds in most soils that are well-drained[11, 200]. Prefers a soil that is only moderately fertile, succeeding in poor soils and in dry soils[11, 200]. Prefers a light sandy loam and a sunny position but succeeds in light shade[11, 200]. Very drought and wind resistant[1, 11, 200]. Tolerates atmospheric pollution[160]. Plants are hardy to about -20°c[184], but the roots are hardy to -30°c (although top growth will be killed at this temperature). Cultivated for its edible fruit in Japan, there are some named varieties[3, 11, 183]. Plants can crop in 4 tablished plants are drought tolerant[190]. This species is failure[238]. The root is harvested in the autumn and is dried best grown in a bulb frame, the light being left off (except in severe weather) whilst growth is in progress but then put on in the summer when growth dies down to ensure that the ground is baked[1]. Do not disturb the plants and only hand weed them[1].

#### 5.2.1047 Primula involucrata

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc hmim cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Primula involucrata is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

dwatta DysenteryThe entire plant is used in Tibetan medicine, it is said to have a sweet and bitter taste and a cooling potency[200]. Antidysenteric, anti-inflammatory and febrifuge, it is used in the treatment of contagious diseases and dysentery[241].

nrakta E. Asia - Himalayas from Pakistan to S. W. China. ksacta Grows in abundance in moist meadows flushed with melt water from snow and glaciers, 4,000 - 5,000 me-

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn. This is best done every other year[200].

nwatta Prefers a moist position in partial shade, such as along the edge of a stream or in a woodland garden[200]. In such a position the plant is usually long-lived[200]. If conditions are too dry the plant may become dormant by late summer[200]. Grows well in heavy clay soils. The flowers have a delicious sweet honey perfume[245].

#### 5.2.1048 Heuchera americana

Rock Geranium, American alumroot, Alumroot, Coral Bells, Rock Geranium

4 tlin 9 cvuc 0 kcak 2 tcan 3 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Heuchera americana is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta MordantThe root can be used as an alum substitute, this is a mordant that is used in fixing dyes[168]. The root is rich in tannin and it has been suggested that this is the mordant[168]. A good ground cover plant for the woodland garden[200]. Plants should be spaced about 35cm apart each way[208].

dwatta Astringent Cancer Dysentery VulneraryThe root is very astringent and has been used in the treatment of cancer and also as an external remedy in sores, wounds, vaginal discharges and ulcers[207, 238]. It can be dried, ground into a powder and sprinkled onto wounds etc[213]. It is taken internally in the treatment of diarrhoea, dysentery and gastric ulcers[238]. It should be used with some caution since excess irritates the stomach and can cause kidney and liver

for use in decoctions or as a powder[238].

nrakta Eastern N. America - Southern Ontario to Connecticut and Michigan, south to Oklahoma and Georgia. ksacta Loamy woods and shady calcareous slopes and

propta Seed - sow early spring in a warm greenhouse and only just cover the seed. Germination is usually fairly rapid. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in late spring or early summer. The seed can also be sown in the middle of spring in an outdoor seedbed and planted out in early summer. Alternatively, you can sow the seed in an outdoor seedbed in the middle of summer for planting out in the following spring. Division in March or October[1, 111]. It is best to divide the plants in August or early September, making sure that the woody roots are planted quite deeply with only the crown of foliage above the ground[233].

nwatta Landscape Uses:Border, Foundation, Specimen. Succeeds in any good sweet garden soil that does not dry out in spring[1]. Prefers full sun but tolerates partial shade[1, 111]. Prefers a well-drained fairly rich and not too heavy soil[111]. A polymorphic species[4], it is apt to hybridize with other members of this genus[111]. Special Features: Attractive foliage, North American native, Suitable for cut flowers. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.1049 Ieffersonia dubia

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc pcimhmim cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Jeffersonia dubia is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

dwatta Cancer Febrifuge StomachicThe root is febrifuge and stomachic[218]. It also contains the anti-tumour compound berberine[218]

nrakta E. Asia - N. China to Siberia. ksacta Forests[200].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Sow stored seed as soon as possible in late winter or the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring[200].

nwatta Prefers a light sandy, peaty or humus-rich woodland soil and a rather shady situation[1, 130, 280]. Suitable for a choice position in a cool leafy soil[187]. This species is hardy to at least -20°c[187]. Plants have an extensive root system and resent disturbance[188]. They should be potgrown and planted into their permanent positions as soon as possible They should be pot-grown and planted into their permanent positions as soon as possible

for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[172]. The plant is most toxic when it is young[200].

tcanta Dye Ink ParasiticideA blue dye is obtained from the flowers[207, 257]. An ink can be made from the dve[207]. A parasiticide is obtained from the leaves[172]. It is quite toxic and so is for external use only.

nrakta Western N. America - British Columbia to California. ksacta Sagebrush desert to (more commonly)mountain valleys and slopes[60]. Most frequent in the ponderosa pine belt and is usually found in well-drained gravelly soils[60].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°c[200]. Temperatures above 15°c inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Prefers a rich well-drained soil[111, 200]. Dislikes water-logged soils[200]. Requires an open sunny position[188]. A very variable species, there are several subspecies[61]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Slugs and snails are very attracted to this plant[200].

# 5.2.1003 Linaria canadensis

Blue Toadflax

4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Linaria canadensis is a ANNUAL/BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

dwatta Antihaemorrhoidal Diuretic LaxativeThe leaves are antihaemorrhoidal, diuretic and laxative[61, 254]. They are applied externally in the treatment of haemorrhoids[254].

nrakta N. America - Nova Scotia to Florida, west to Minnesota, Oregon, Texas and California ksacta Dry sterile or sandy soils, often a weed in sandy loams[43].

propta Seed - sow spring in situ[200]. An autumn sowing can also be made in areas with mild winters[200]. This sowing will produce larger plants.

nwatta A very drought resistant plant once established, it thrives in a poor gravelly soil[200]. Nitrogen-rich soils produce excessive leaf growth at the expense of flowering[200]. Prefers a sunny position[200].

#### **5.2.1004** Erica vagans

Cornish Heath, Cornish heath 4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.8 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli frusflatprik hpa7tmwatli fyifxre7t hjonli

drutta Erica vagans is an evergreen Shrub growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. flies, Lepidoptera (Moths and Butterflies). The plant is selffertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

tcanta Brush Dve Fuel ThatchingA dve is obtained from the flowers. No further details. The twigs are used for making brushes, thatching, bedding etc and also as a fuel. A good ground cover plant, though it might need weeding for the first year[197]. It can be clipped in spring to give denser growth[197, 208]. Space the plants about 60cm apart each way[208].

nrakta Western Europe in Britain, France and N. Spain. ksacta Heaths in S. Cornwall, rare in Britain but locally common and abundant in Cornwall[17].

propta Seed - surface sow in an acid sandy compost in a cold frame in spring. Keep moist. Prick out the plants as soon as they are large enough to handle and plant them in their permanent positions when they are 5 - 8cm tall[11]. Cuttings of half-ripe wood, 3cm long taken from twiggy lateral growths near the base of the plant, July/August in a frame. Remove the leaves from the bottom part of the stem without causing any damage to the bark. The cuttings root in a few weeks if they are given some bottom heat. Plant out in spring[11]. Layering in spring or autumn. Plants can be 'dropped' and then dug up and divided about 6 - 12 months later. Dropping involves digging up the plant and then replanting it about 15 - 20cm deeper in the soil to encourage roots to form along the stems[78].

nwatta A calcifuge plant, it requires a light lime-free loam[11]. Grows well on sunny slopes, thriving in any soil that is not heavy or alkaline[11]. Plants can succeed in a slightly alkaline soil if it is rich in humus according to some reports[182, 188]. Grows best in a poor soil[11]. Resents dry soils. Prefers an open situation. A very ornamental plant[1], there are many named varieties[182]. A food plant for the caterpillars of many species of butterflies and moths as well as providing a food source for the moths and butterflies[30]. Plants in this genus are notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 5.2.1005 Pulsatilla vulgaris

Pasque Flower, European pasqueflower 4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Pulsatilla vulgaris is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant is slightly toxic, the toxins are dissipated by heat or by drying the plant[65]. Repeated handling of the plant can cause skin irritation in some people[238].

tcanta DyeA green dye is obtained from the flowers[238]. Plants can be grown to form a ground cover, they are best spaced about 30cm apart each way[208].

dwatta Alterative Antispasmodic Diaphoretic Diuretic Emmenagogue Expectorant Homeopathy Nervine Ophthalmic SedativePasque flower is considered by herbalists to be of highly valuable modern curative use as a herbal simple[4]. The plant contains the glycoside ranunculin, this is converted to an emonine when the plant is dried and is the medicinally active principle in the plant[268]. The whole plant is alterative, antispasmodic, diaphoretic, diuretic, emmenagogue, expectorant, nervine and sedative[4, 46, 165]. It is taken internally in the treatment of premenstrual syndrome, inflammations of the reproductive organs, tension headaches, neuralgia, insomnia, hyperactivity, bacterial skin infections, septicaemia, spasmodic coughs in asthma, whooping cough and bronchitis[238]. Externally, it is used to treat eye conditions such as diseases of the retina, senile cataract and glaucoma[244]. This remedy should be used with caution[165], excessive doses cause diarrhoea and

vomiting[238]. It should not be prescribed to patients with colds[238]. See also the notes above on toxicity[165]. The plant is harvested soon after flowering, it is more poisonous when fresh and so should be carefully preserved by drying[4, 268]. It should not be stored for longer than 12 months before being used[4]. In homeopathy, the plant is considered to be specific in the treatment of measles[244]. It is also used for treating nettle rash, toothache, earache and bilious indigestion[244]

nrakta Northern and central Europe, including Britain, to W. Asia. ksacta Dry, sunny grassy calcareous slopes[17, 244, 2681,

propta Seed - best sown as soon as it is ripe in early summer in a cold frame. The seed usually germinates in about 2 - 3 weeks. Sow stored seed in late winter in a cold frame. Germination takes about 1 - 6 months at 15°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in the spring. Root cuttings, 4cm long taken in early winter, potted up in a mixture of peat and sand[175]. They can also be taken in July/August, planted vertically in pots in a greenhouse or frame. Some care is needed since the plant resents root disturbance[200].

nwatta Requires a well-drained humus rich gritty soil in a sunny position[200]. Lime tolerant[1]. Prefers lime[187]. Grows best in a well-drained chalky soil in a dry warm situation[268]. Established plants are fairly drought tolerant[190]. A very hardy plant, tolerating temperatures down to about -20°c[187]. A very ornamental plant[1], there are many named varieties [187]. The plant has become rare in its natural environment, due partly to over-collecting and partly to habitat loss[238]. Large plants transplant badly[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 5.2.1006 Anemone nemorosa

Wood Anemone, European thimbleweed 4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hrasilutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Anemone nemorosa is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista All parts of this plant contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270]. Can be a dangerous and powerful depressant of the central nervous system and heart [301]. Avoid during pregnancy.

dwatta Antirheumatic Homeopathy Rubefacient Tonic-The leaves are antirheumatic, rubefacient and tonic[7, 19, 46]. The plant is sometimes used externally as a counterirritant in the treatment of rheumatism[7]. The herb is gathered in spring before the plant comes into flower[7]. Various parts of this herb used to be recommended for a variety of complaints such as headaches and gout, though the plant is virtually not used nowadays[4]. A homeopathic remedy has been made from the leaves[7].

nrakta Throughout the northern temperate zone of C. Europe, including Britain, and W. Asia. ksacta Woodland and shady hillsides in all but the most base deficient or waterlogged soils[7, 17, 90].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow

them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies

nwatta Prefers a moist soil[1, 90, 200] but tolerates dry conditions during its summer dormancy[200]. Plants tolerate dry conditions and drought so long as there is plenty of humus in the soil[190]. Prefers a well-drained humus-rich soil[200]. Dislikes very acid soils[13]. Prefers a shady position, growing well on woodland edges[24, 90], but plants can also be naturalized in thin turf[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes [54]. The plant has a running rootstock and can spread rapidly when well-sited[4]. A very ornamental plant[1], there are several named varieties[190].

# 5.2.1007 Pyrola rotundifolia

Round-Leaved Wintergreen

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis

hpa7tmwatli fyifxre7t hjonli

drutta Pyrola rotundifolia is an evergreen Perennial growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil

tcanta Plants can be used as a ground cover when spaced about 30cm apart each way[208]. They are somewhat slow to settle down though, and only form a good cover when they are growing luxuriantly[208].

dwatta Antirheumatic Antiseptic Antispasmodic Astringent Cardiotonic Contraceptive Diuretic Epilepsy Ophthalmic Skin Tonic UrinaryThe leaves are antirheumatic, antiseptic, antispasmodic, astringent, cardiotonic, contraceptive, diuretic, poultice, sedative and tonic[4, 9, 46, 172, 176, 218, 222]. A decoction is used in the treatment of skin diseases, as a gargle and a wash for the eyes[4]. It is used internally in the treatment of epilepsy and other nervous afflictions[4]. The leaves are harvested in mid to late summer and can be used fresh or dried[9]. The plant contains arbutin. a proven diuretic and antibacterial agent that is used as a urinary antiseptic, this hydrolyzes in the body into the toxic hydroguinone[222].

nrakta Europe, including Britain, from Iceland south and east to Spain, N. and W. Asia. N. E. N. America. ksacta Bogs, fens and woods, especially beech woods, often on limestone. and in dune slacks[187]. Avoids acid soils[17].

propta Seed - the only information we have on this species is that it is difficult from seed and germinates infrequently[200]. We would suggest sowing the seed as soon as it is ripe if this is possible. Sow it into soil collected from around an established plant, only just covering the seed, and put the pot in a shady part of a cold frame. Pot up any young seedlings as soon as they are large enough to handle, once again using soil from around an established plant. Plant out into their permanent positions when the plants are large enough. You should not need to use soil from around an established plant to do this since the soil in the pot will contain the necessary micorrhiza. Division with great care in the spring[1, 111]. Pot up the divisions using some soil from around an established plant, grow on in a lightly shaded part of a greenhouse or frame and do not plant out until the plants are growing away vigorously[200].

nwatta Prefers a moist sandy woodland soil[111, 200] in a cool position with partial shade[1, 11, 200]. Requires a peaty or leafy but not very acid soil that remains moist in the summer[31, 187]. Plants are hardy to at least -20°c[187]. This is a very ornamental[1] but difficult plant to grow. It requires a mycorrhizal relationship in the soil and therefore needs to be grown initially in soil collected from around an established plant[200]. It is also very difficult from seed as well as being intolerant of root disturbance which makes division difficult[1]. The flowers have a delicious almond-like fragrance[245].

Flood: Moderate, Salt: Moderate, Soil Compaction: Intolerant. Mowing: Tolerant. Does not compete well with larger plants in full sun. Competes well in moderate to deep shade. Can form dense mats. Makes one of the earliest spring appearances of the Carices. Life Span:Long-Lived Perennial Stand Persistence:Long. Form: Clump. [368-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. An evergreen. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

# 5.2.1044 Phlox subulata

Moss phlox

4 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.1 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli hionli

drutta Phlox subulata is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known kcakta None Known

tcanta Soil conditioner Soil stabilizationA great high density groundcover. As a long-lived perennial with fibrous roots it may be good for soil building and erosion control

nrakta Native to eastern and central USA, and widely cultivated. ksacta Indigenous to rocky and sandy barrens, savannas, rocky ledges, slopes, clearings and disturbed sites. propta Seed, division or by cuttings.

nwatta Herbaceous mat forming perennial wildflower. A very colourful, vigorous groundcover for full sun or partial shade. Poor soil tolerant. USDA Hardiness Zones: 4 - 9. very hardy, tolerating temperatures down to -20 °C (-4 °F). Soil pH: 5.0 - 8.0. Soil Type: Sandy, Loamy. Soil Moisture: Moderate, Dry. Growth Rate: Moderate. Life Span: Long-Lived Perennial. Stand Persistence: Long. Form: Prostrate. Texture: Fine. Minimum Root Depth: 14 inches. Drought: Tolerant. Flood: Intolerant. Salt: Intolerant. Soil Compaction: Moderate. Fire Damage: Tolerant. Cold Injury: Infrequent. Wind Storm Damage: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Root Type: Fibrous Deep. Seasonal Interest: Spring. Used in borders, edgings, foundations and walls. Semi evergreen. Fruit Type: Capsule. Flower Color: Blue, Pink, Purple, Red, White. Bloom Time: Spring - Late Spring. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Evergreen, The root pattern is fibrous dividing into a large number of fine

# 5.2.1045 Pyrola asarifolia

Bog Wintergreen, Liverleaf wintergreen, Pink wintergreen 4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli fyifxre7t hjonli

drutta Pyrola asarifolia is an evergreen Perennial growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Plants can be used as a ground cover when spaced about 30cm apart each way[208]. They are somewhat slow to settle down though, and only form a good cover when they are growing luxuriantly[208].

dwatta Antirheumatic Haemostatic Hepatic Ophthalmic-This plant was considered to be an effective remedy in the treatment of rheumatism[207]. A decoction of the leaves, or the leaves and roots, has been used as an eyewash for sore eves[257]. A decoction of the plant has been used to treat the coughing up of blood[257]. A decoction of the root has been used to treat liver complaints[257].

nrakta N. America - Alaska to Newfoundland, south to New York, California and New Mexico. ksacta Wet soils of bogs, stream courses and around springs, mostly in shady areas and especially in coniferous woodlands, from the plains to around 2,700 metres in the mountains[212].

propta Seed - the only information we have on this species is that it is difficult from seed and germinates infrequently[200]. We would suggest sowing the seed as soon as it is ripe if this is possible. Sow it into soil collected from around an established plant, only just covering the seed, and put the pot in a shady part of a cold frame. Pot up any young seedlings as soon as they are large enough to handle, once again using soil from around an established plant. Plant out into their permanent positions when the plants are large enough. You should not need to use soil from around an established plant to do this since the soil in the pot will contain the necessary micorrhiza. Division with great care in the spring[1, 111]. Pot up the divisions using some soil from around an established plant, grow on in a lightly shaded part of a greenhouse or frame and do not plant out until the plants are growing away vigorously[200].

nwatta Prefers a moist sandy woodland soil[111, 200] in a cool position with partial shade[1, 11, 200]. Requires a peaty or leafy acid soil that remains moist in the summer[200]. This is a very difficult plant to grow. It requires a mycorrhizal relationship in the soil and therefore needs to be grown initially in soil collected from around an established plant[200]. It is also very difficult from seed as well as being intolerant of root disturbance which makes division difficult[1]. This species is extremely rare and endangered in the

# 5.2.1046 Fritillaria sewerzowii

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Fritillaria sewerzowii is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from March to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

dwatta AnaestheticAnaesthetic[123]. The plant contains an alkaloid that is a good local anaesthetic.

nrakta C. Asia - Tien Shan and Pamir Alai. ksacta Cliff ledges, amongst scrub and on steep earthy slopes, 1000 -3000 metres[90].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta Prefers a well-drained loam that is kept dry in the summer[1, 90]. The soil must be kept quite firm[1]. Es-

when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils[1]. Grows well in heavy clay soils. Succeeds in sun or shade[31]. Grows well on woodland edges[24]. The flowers have the sweet woodland perfume of the primrose[245]. This is not very discernible when only a few plants are grown, but is quite noticeable in a group of plants[245].

#### 5.2.1041 Anthemis arvensis

Corn Chamomil

4 tlin 8 cyuc 0 kcak 2 tcan 2 dwat 0.4 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Anthemis arvensis is a ANNUAL growing to  $0.4~\mathrm{m}$  (1ft 4in) by  $0.3~\mathrm{m}$  (1ft). See above for USDA hardiness. It is hardy to UK zone  $5~\mathrm{and}$  is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs and is pollinated by Flies, beetles. The plant is self-fertile. Suitable pf: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Can be used as an ornamental plant.

dwatta FebrifugeThis species is considered to be one of the best febrifuge species indigenous to France[4]. The flowers and leaves are used[4].

nrakta Most of Europe, including Britain, south and east to N. Africa and W. Asia. ksacta A locally common calcicolous plant of arable land and waste places throughout Britain[17].

propta Seed - best sown outdoors as soon as it is ripe. Most of the seed germinates in the autumn.

nwatta Prefers a sunny position and a well-drained soil that is neutral to slightly acid[1, 200]. Succeeds in heavy clay soils.

#### 5.2.1042 Gentiana dahurica

4tlin 8 cyuc 0 kcak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana dahurica is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Analgesic Antiinflammatory Antipyretic Antirheumatic Diuretic HypotensiveThe roots of gentian species contain some of the most bitter compounds known and make an excellent tonic for the whole digestive system, working especially on the stomach, liver and gall bladder[238]. The root is analgesic, anti-inflammatory, antipyretic, antirheumatic, diuretic, febrifuge, hypoglycaemic and hypotensive[176, 218, 238]. The root is used internally in the treatment of arthritis, allergic inflammations, low-grade fever in chronic diseases, jaundice and hepatitis[176, 218, 238]. The root is harvested in the autumn and dried for later use.

nrakta W. Asia to E. Asia - China. ksacta Grassy slopes[74]. Roadsides, stream banks, sandy places around lakes, sunny slopes, dry steppes and the edges of cultivated land at elevations of 800 - 4500 metres[266].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically[200, 239]. It is advantageous to keep the seed at about 10°c for a

few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species prefers an alkaline soil, but can succeed in neutral to slightly acid conditions[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. Many of the plants and seeds offered under this name are wrongly identified, usually being G. gracilipes, G. cruciata or G. decumbens[239]. Plants are intolerant of root disturbance[200].

### 5.2.1043 Carex pensylvanica

Pennsylvania sedge

4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Carex pensylvanica is an evergreen Perennial growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. The flowers are pollinated by Wind, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta None Known

tcanta Soil stabilizationCapable of colonizing disturbed sites [277]. Groundcover for dry shade. Underplanting for shade perennials. Lawn substitute for dry soils in shady areas (forms a turf that never needs mowing or mow 2-3 times per year to 2" tall). [368-1]. Provides cover for migratory fowl, sandhill cranes, and ducks (who also use the leaves for nesting material). It is also used by sharptail grouse and prairie chickens for nesting, cover, and dancing grounds [277]. Erosion Control. Ornamental: The leaves are soft and fine textured with an arching habit. It can be used as a lawn substitute [368-1]. Tolerant of mowing. Moderate salt tolerance.

nrakta Native to North America, especially eastern Canada and the eastern United States. ksacta A shade-loving perennial sedge that is native to thickets and dry woodland areas. dry to mesic upland forests and shaded bluff ledges. It typically grows in loose colonies with a creeping habit. Roots are reddish brown. It is often found in areas with oak trees, hence the additional common name of oak sedge [368-1].

propta Plants spread by rhizomes. Plants may self-seed in optimum growing conditions. This species often does not grow well from seed,[368-1].

nwatta Easily grown in average, dry to medium, welldrained soils in part shade to full shade. Prefers loose loams in dry soils in sun-dappled part shade. Most sedges prefer moist to wet soils, but not this one. Plants spread by rhizomes. Plants may self-seed in optimum growing conditions[368-1]. Soil pH: 4.0 - 8.0. Drought: Tolerant.

# 5.2.1008 Delphinium cashmerianum seedlings out into individual pots and grow them on in the

4tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Delphinium cashmerianum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UX zone 5. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[65, 172]. The plant is most toxic when it is young[200].

tcanta Miscellany Öil ParasiticideThe following uses are for the closely related D. brunonianum. They probably also apply for this species: A parasiticide is obtained from the leaves[51, 61]. It is quite toxic and so is for external use only. In the Himalayas it is only used to destroy ticks on animals[51, 240]. The seed contains 30% of an oil that has industrial uses[91]. The seed is very small, however, and it would require a large area of plants to obtain reasonable yields.

dwatta Miscellany ParasiticideOne report says that the roots are used medicinally, but gives no further details[240]. nrakta E. Asia - Western Himalayas in Kashmir and Tibet. ksacta Alpine areas from 3000 to 4800 metres[240].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about  $3^{\circ}\text{c}[200]$ . Temperatures above  $15^{\circ}\text{c}$  inhibit germination[175]. The seed usually germinates in 2- 9 weeks at  $15^{\circ}\text{c}[175]$ . When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Prefers a rich well-drained soil that stays moist in the summer[111, 187]. Dislikes water-logged soils[200], it is liable to die out in heavy soils over winter[111]. Requires an open sunny position[188]. Plants are generally hardy to about -20°c[187]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Grows well in the rock garden[188]. This species is closely related to C. brunonianum[200].

#### 5.2.1009 Uvularia grandiflora

Fairybells, Merry Bells, Bellwort, Largeflower bellwort 4 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.3 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Uvularia grandiflora is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

dwatta Analgesic Poultice SalveThe root is analgesic[257]. It is used as a poultice or salve in the treatment of toothaches, boils, swellings, wounds and ulcers[222, 257]. As I was typing this report (29/01/95), Geoffrey Smith on Radio 4's 'Gardeners Question Time' spoke about it and said that it was the best poultice for boils that he knew of[K]. An infusion of the root has been used to treat backaches and, mixed with oil, has been used as a salve on sore muscles[257]. A tea made from the roots is used as a wash in the treatment of rheumatic pains[222].

nrakta Southeastern N. America - South Quebec to Georgia, west to Arkansas to North Dakota. ksacta Rich moist woods on calcareous to neutral soils from sea level to 1100 metres[222, 270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[200]. Sow stored seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division after the plants die down in late summer. It is best carried out in early spring before the plants flower[188]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Landscape Uses:Container, Foundation, Specimen, Woodland garden. An easily grown plant, it requires a cool moist shady position and a light sandy soil[1, 42, 111]. Likes plenty of humus in the soil[111]. Grows well in a woodland garden and in the rock garden[200]. Plants grow much taller in rich soils and then succeed in the herbaceous border[222]. A very hardy plant, tolerating temperatures down to about -20°c[187]. A very ornamental species, there are some named varieties[233]. Special Features:North American native, Naturalizing, Attracts butterflies.

# 5.2.1010 Anemone virginiana

Tall Thimbleweed

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc

pcimhmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Anemone virginiana is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista Although no specific mention has been seen for this species, many members of this genus contain protanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

dwatta Astringent Emetic Expectorant PoulticeThe root and seeds are astringent, emetic and expectorant[222]. A decoction of the roots was used in the treatment of TB, whooping cough and diarrhoea[222, 257]. The root is pulverised and used as a wet poultice in the treatment of boils[213, 222, 257].

nrakta Central and Eastern N. America - Nova Scotia to South Carolina, Kansas, Alberta and Arkansas. ksacta Dry open woods[222]. Dry, rocky, open woods, thickets and river banks from sea level to 2000 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 20°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first year in a lightly shaded place in a greenhouse. When large enough, plant them out into their permanent positions in the spring. Division in late summer after the plant dies down.

nwatta Succeeds in ordinary garden soil but prefers a moist well-drained woodland soil[1, 200]. Prefers a moist peaty soil in some shade[187]. Tolerates drought during its summer dormancy[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 5.2.1011 Pyrola chlorantha

Green-Flowered Wintergreen 4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli fyifxre7t hjonli

drutta Pyrola chlorantha is an evergreen Perennial growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from June to July. The species is hermaphrodite

(has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta AstringentThe plant is astringent. It has been used in the treatment of menorrhagia, diarrhoea and haemorrhages[155]. It has also been used to treat bloody diarrhoea in children[257].

nrakta Western N. America - Labrador to British Columbia, south to Illinois, Nebraska and Arizona. ksacta Moist coniferous woods, 2000 - 3000 metres in Texas[60, 155].

propta Seed - the only information we have on this species is that it is difficult from seed and germinates infrequently[200]. We would suggest sowing the seed as soon as it is ripe if this is possible. Sow it into soil collected from around an established plant, only just covering the seed, and put the pot in a shady part of a cold frame. Pot up any young seedlings as soon as they are large enough to handle, once again using soil from around an established plant. Plant out into their permanent positions when the plants are large enough. You should not need to use soil from around an established plant to do this since the soil in the pot will contain the necessary micorrhiza. Division with great care in the spring[1, 111]. Pot up the divisions using some soil from around an established plant, grow on in a lightly shaded part of a greenhouse or frame and do not plant out until the plants are growing away vigorously[200].

nwatta Prefers a moist sandy woodland soil[111, 200] in a cool position with partial shade[1, 11, 200]. Requires a peaty or leafy acid soil that remains moist in the summer[200]. This is a very difficult plant to grow. It requires a mycorrhizal relationship in the soil and therefore needs to be grown initially in soil collected from around an established plant[200]. It is also very difficult from seed as well as being intolerant of root disturbance which makes division difficult[1]. This species is extremely rare and endangered in the wild[200].

#### 5.2.1012 Chamaelirium luteum

Blazing Star - Unicorn Root - Devil's Bit, Fairywand 4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli nyanhjen hjonli

drutta Chamaelirium luteum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This plant is a cardiac toxin in large quantities[4]. Large doses may cause nausea and vomiting. Chamaelirium luteum is an emmenagogue (promotes menstruation) so best avoided during pregnancy [301].

dwatta Adaptogen Diuretic Emetic Tonic Uterine tonic VermifugeBlazing star is a traditional remedy of the North American Indians where it was used mainly as a woman's herb[254]. It is widely used in Western herbal medicine where it is seen as a balancing herb for the female reproductive system and has proved to be a beneficial remedy for menstrual problems and ovarian cysts - it can also be of help in the menopause[254]. The root is adaptogen, diuretic, emetic, uterine tonic and vermifuge[4, 46, 61, 105, 238]. Small doses of the dried and powdered root are used[222]. It is employed in the treatment of amenorrhoea, dysmenorrhoea and leucorrhoea[207] and also for a variety of ailments associated with the male and female reproductive organs[222]. It should be used with caution since an excess causes vomiting[238]. The root is harvested in the autumn and dried for later use[238].

nrakta Eastern N. America - New York to Florida, west to Arkansas, Illinois and Michigan. ksacta Low moist ground[4] in meadows. thickets and rich woods[43].

propta Seed - sow as soon as it is ripe just below the surface of a peat/sand mix in pots in a cold frame[164]. Keep

cool and moist. Germination usually takes place within 1-6 months at  $10^{\circ}$ c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in pots plunged in a nursery bed for 1-2 years, giving protection from severe weather. Plant out in spring when the plants are large enough[164]. Division.

nwatta Requires a moist fertile humus-rich acidic soil in sun or light dappled shade[1, 200]. Prefers a cool peaty soil[233]. Plants are dioecious, male and female plants must be grown if seed is required[270].

### 5.2.1013 Actaea spicata

Herb Christopher, Baneberry 4 tlin 8 cyuc 0 koak 0 tcan 1 dwat 0.5 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Actaea spicata is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is polinated by Beetles, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista All parts of plant are poisonous but rarely fatal[4, 10, 13, 19, 65, 76].

tcanta Dye RepellentThe smell of the plant is reputed to drive away vermin[4]. A black dye is obtained from the berries when alum is used as a mordant[4, 13, 74, 100]. The seeds contain tannin[240].

dwatta Antidote Antispasmodic Cytostatic NervineThe root is antispasmodic, cytostatic, emetic, nervine and purgative[4, 17, 65, 240]. In Canada the root is used in the treatment of snakebite[211]. It is also considered useful in the treatment of nervous disorders and rheumatic fever[211]. In India it is used in the treatment of rheumatism, goitre and asthma[240]. This remedy should be used with some caution, see the notes above on toxicity.

nrakta Most of Europe, including Britain, through temperate and arctic Asia to China. ksacta Ash woods on limestone and in damp stony woods to 1500 metres[13, 17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame or outdoors in a moist shaded seedbed[200]. The seed has a limited viability[200], it can also be sown in spring in a cold frame but germination rates may be poor. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in late spring or early summer of the following year. Division in March or October.

nwatta Succeeds in most conditions[233], but prefers a humus-rich moist soil in light shade doing well amongst shrubs and in light woods[1, 200]. A greedy plant, inhibiting the growth of nearby plants, especially lequimes[54].

# 5.2.1014 Apocynum venetum

4tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Apocynum venetum is a PERENNIAL growing to  $0.3 \, \mathrm{m}$  (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[1, 62].

tcanta FibreThe bark yields a fibre that is used for making twine, bags, linen etc[46, 61]. It can be harvested after the leaves fall in autumn but is probably at its best as the seed pods are forming[169]. The dogbane-milkweed family Asclepias, Apocynum, Calotropis, and Trachomitum spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed fiber or 'floss' in the fruit pods. Many have also been

propta Seed - sow spring in a greenhouse[K]. The seed is best sown in the autumn[188]. Germination is quick and easy[K]. Prick out the seedlings into individual pots once they are large enough to handle and plant them out in the summer[K]. Division in spring[188]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Prefers a light, fertile, well-drained dry soil in a shady position[1, 200]. A very ornamental plant[1], it is occasionally cultivated for its medicinal uses[46].

### 5.2.1038 Narcissus poeticus

Poet's Narcissus

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Narcissus poeticus is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant, and especially the bulb, are poisonous[4]. The aroma of the flowers can cause some people to get a headache when they are in a closed room[4].

tcanta EssentialAn essential oil is obtained from the flowers. 500kg of the flowers yields 1kg concrete, 300gr absolute of the essential oil[46, 61].

dwatta Emetic Homeopathy IrritantThe bulb is powerfully emetic and irritant[4]. A homeopathic remedy is made from the bulb[4].

nrakta Europe - France to Greece. ksacta Damp meadows[90] in mountains[50].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils and situations[1]. Grows well in heavy clay soils. Easily grown in a moist soil, doing well in grass[90] but it is slow to establish[188]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°c[214]. A very ornamental plant[1], but it is sometimes shy to flower[90]. The flowers are powerfully scented[245].

#### 5.2.1039 Waldsteinia fragarioides

Appalachian barren strawberry 4 tlin 7 cyuc 0 kcak 3 tcan 2 dwat 0.2 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikhsom hpa7tmwatli hjonli

drutta Waldsteinia fragarioides is an evergreen Perennial growing to 0.2 m (0ft 6in) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils and can grow in saline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known

kcakta None Known

tcanta Groundcover. A good medium to high density groundcover that will work in a dry or shady spot. Edging or Groundcover for the Perennial Border or Rock Garden. Woodland gardens. Andrenid bees (Andrena spp.) have been observed to visit the flowers for nectar and/or pollen; it is likely that other small bees and other small insects visit the flowers as well. It has been reported that White-tailed Deer avoid browsing on the foliage [1-6].

dwatta Native American ethnobotany: The Iroquois take a compound decoction of the plants as a blood remedy, and apply a poultice of the smashed plants to snakebites (Herrick, JW, 1977, Iroquois Medical Botany, State University of New York, Albany, PhD Thesis,).

nrakta Native to eastern North America, from Minnesota, Ontario, Quebec, and Maine south to Indiana and Pennsylvania and as far south as North Carolina in the mountains. ksacta Moist or dry upland conifer forests, mixed hardwood and pine woodlands, thickets, clearings and fields.

propta Clump Division , Seeds.

nwatta An evergreen strawberry-like mat forming perennial wildflower. The fruit is neither fleshy nor edible at maturity. Prefers partial sunlight to light shade, more or less mesic (requiring a moderate amount of moisture) conditions, and soil containing rocky material, clay, loam, or humus. Will tolerate almost any well drained soil. The soil pH should be moderately acidic to neutral (5.5-7.0). This plant dislikes hot summer weather. Bloom Color: Yellow. Bloom Time: Apr to Jun. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 5.2.1040 Narcissus pseudonarcissus

Wild Daffodil Daffodil

4 tlin 8 cvuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Narcissus pseudonarcissus is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista All parts of the plant are poisonous[4, 10, 76], the toxins being found mainly in the bulb[65], but even the flowers are mildly toxic[4]. An extract of the bulb, when applied to open wounds, has caused staggering, numbness of the whole nervous system and paralysis of the heart[4].

tcanta DyeA yellow to gold dye is obtained from the flowers[168]

dwatta Astringent Dysentery Emetic EpilepsyThe bulbs, leaves and flowers are astringent and powerfully emetic[4]. The bulb, especially, is narcotic and depresses the nervous system[4]. It has been used in the treatment of hysterical affections and even epilepsy with some effect[4]. The bulb is harvested in the winter and dried for later use[4]. The flowers are harvested in dry weather when they are fully open and should be dried quickly[4]. They are less powerful than the bulbs but are also considered to be antispasmodic and are useful in relieving the congestive bronchial catarrh of children and also useful in cases of epidemic dysentery[4].

nrakta Western Europe, including Britain. ksacta Moist woodlands and grassland[17].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out

bers of this genus are rarely if ever troubled by browsing deer[233].

# 5.2.1035 Zizia aptera

Meadow zizia, Golden alexanders

4 tlin 8 cyuc 0 kcak 2 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Zizia aptera is an evergreen Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known. There is a report that the root of related Zizia aurea might be toxic[222].

kcakta None Known

tcanta Nectary: provides nectar or pollen for beneficial insects [1-2]. The flowers attract butterflies and seed heads attract birds. Various kinds of insects visit the flowers primarily for nectar, especially small bees (Halictid, Andrenid, Nomadine) and flies (Chloropid, Tachinid, Muscid, Syrphid, etc.), as well as occasional beetles and plant bugs. The bees collect pollen as well, while some flies and beetles may feed on pollen. The caterpillars of Papilio polyxenes asterias (Black Swallowtail butterfly) feed on the foliage of this and other members of the Carrot family [1-6]. Suitable for the wild garden and other informal plantings as well as collections of native wild flowers[200]. Cut Flower. Water Purifier: Used in raingarden plantings [318-1].

dwatta The presence of secondary compounds such as apterin may contribute to the potential medicinal value of Zizia species. Zizia aurea roots have been used by Native Americans as a tea to cure fevers, and the plant has been referred to as a vulnerary (wound-healing) agent [318-1].

nrakta Native Range: North America. ksacta Moist to dry black soil prairies, hill prairies, rocky upland woodlands, limestone glades, bluffs, abandoned fields, and roadsides. Usually, this species occurs in drier locations than Zizia aurea (Golden Alexanders) [1-6].

propta Seed - we have no information for this species but it is probably best sown in spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta An upright short-lived tap-rooted perennial wildflower in the Carrot (Apiaceae) family. Prefers sun or part sun with moist or dry soil. Plants tolerate clay loam, rocky or gravelly soil, alkaline pH and controlled burns. Drought Tolerant. Bloom Time: May to July. Bloom Description: Showy, Yellow. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

# 5.2.1036 Coreopsis rosea

Pink tickseed

4 tlin 9 cvuc 0 kcak 3 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hrasjlut hpa7tli flat-

prik hpa7tmwatli hjonli drutta Coreopsis rosea is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH; mildly acid and neutral soils. It can grow in semi-shade (light woodland)

or no shade. It prefers dry moist or wet soil. pcista None Known

kcakta None Known

tcanta A good ground cover with medium to high density growing at a fast rate. Plants will spread in the garden by rhizomes and self-seeding to form a dense ground cover,

sometimes to the point of being considered aggressive [368-1]. Ornamental: Long summer bloom and airy foliage provide good accent in borders or rock gardens. Good small area ground cover. Also effective as an edger for borders, foundations and walks/paths. Naturalized areas, native plant gardens or cottage gardens [368-1]. Wildlife Food: Attracts birds that eat the seeds. Insectory: Provides for food for pollinators [1-2]. A good cut flower.

nrakta Native to the coastal plain in the northeastern U. S. from Massachusetts and Rhode Island to southeastern New York, New Jersey, Delaware and Maryland. Disjunct populations occur in Nova Scotia, South Carolina and Georgia. ksacta Pine barrens, moist open woods, shores of lakes, rivers or ponds and damp sandy depressions. This species generally occurs in pioneer habitats with changing water levels, low fertility, lack of surface leaf litter and few competing

propta Sow seeds at 55° to 61°F in mid- or late winter, or divide plants in early spring. Basal cuttings can be rooted in spring.

nwatta An herbaceous perennial for temperate areas. USDA Hardiness Zones: 4 - 9. Soil pH: 6.6 - 7.8. Growth Rate: Moderate. Life Span: Long-Lived Perennial. Stand Persistence: Long. Form: Creeping. Texture: Fine. Sun: Full Sun, Partial Shade. Soil Type: Sandy, Loamy, Silty. Soil Moisture: Wet, Moderate. Root Type: Rhizome. Seasonal Interest: Summer-Fall. Spreads via rhizome and seeds, can be aggressive. Seeds resemble ticks, hence the name tickseed. Fruit is a cypsela. Flower Color: Pink, Yellow. Drought: Sensitive. Flood: Sensitive. Salt: Moderate [318-1]. Bloom Time: Early Summer - Early Fall. Fruit Time: Summer - Fall. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 5.2.1037 Scopolia carniolica

Scopolia, European scopolia

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc pcimhmim cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Scopolia carniolica is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist

pcista This plant is probably fairly poisonous. The rhizomes contain potentially poisonous alkaloids that are similar to Atropa belladonna[200]. Adverse effects include visual disturbances, heat build up due to lack of sweating. Micturition disorders may occur with overdose. Contraindicated in close angle glaucoma, prostatic adenoma with residual urine. tachycardia, and gastrointestinal obstructions and any state where increased anticholinergic activity is harmful [301].

dwatta Antispasmodic Dysentery Hypnotic Mydriatic NarcoticThe dried root is hypnotic, mydriatic and narcotic[4, 46. 611. It causes a sleep that resembles normal sleep[4]. The medicinal activity of this plant resembles belladonna (Atropa belladonna) but it is more narcotic[46]. It is used internally in the treatment of chronic diarrhoea, dysentery, stomach ache and manic-depressive states[238]. A very toxic plant, it should only be used under the supervision of a qualified practitioner[238]. The root is harvested in the autumn and normally processed for extraction of the alkaloids which are used in the pharmaceutical industry[238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Scopolia carniolica for liver and gallbladder complaints (see [302] for critics of commission E).

nrakta Europe - Austria, Hungary and Russia. ksacta Moist rocky beech woods around 1000 metres[187, 200]. Damp stony places in hilly areas[4].

identified as potential hydrocarbon crops due to high latex 5.2.1016 Polemonium reptans content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Cardiotonic Diuretic HypotensiveThe leaves or the whole herb is cardiotonic, diuretic and hypotensive[176, 218]. It is used in the treatment of hypertensive headache, dizziness, insomnia, irritability, oliguria and nephritic oedema[176]. It increases the renal blood flow and can be used for renal and cardiac oedema and ascites of liver cirrhosis[176]

nrakta S. Europe. N. Africa - Syria. ksacta Swamps, wet places and maritime sands[1, 50].

propta Seed - best sown as soon as it is ripe in late summer and overwintered outdoors. The seed requires a period of cold stratification if it is to germinate well[238]. Prick out the seedlings when large enough to handle and grow them on in a cold frame for their first winter, planting out in late spring of the following year [K]. Division in spring just before active growth begins[200]. Plants can also be divided in the autumn[238].

nwatta Industrial Crop: Fiber Management Hay Regional CropSucceeds in sun or shade in most welldrained but moisture-retentive soils[1, 200]. Plants can be invasive[200]. The flowers are attractive to bees.

#### 5.2.1015 Gentiana decumbens

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana decumbens is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta StomachicA tincture of the plant is used as a stomachic[240].

nrakta E. Asia - Himalayas to Siberia. ksacta Alpine slopes, 3300 - 4500 metres[240]. Along streams, grassland slopes, clearings in forests, dry steppes at elevations of 1,200 - 2,700 metres in northern China[266].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. Plants are intolerant of root disturbance[200].

Abcess Root, Greek valerian

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Polemonium reptans is a PERENNIAL growing to 0.3 m (1ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta HairA decoction of the whole plant is used as a hair rinse[213]

dwatta Alterative Astringent Diaphoretic Expectorant PectoralThe dried roots have a slightly bitter and acrid taste[4]. They are alterative, astringent, diaphoretic, expectorant and pectoral[4, 61, 222, 238]. They can be used in an infusion with water or as a tincture with alcohol[4]. They are used internally in the treatment of coughs, colds, bronchitis, laryngitis, tuberculosis, feverish and inflammatory diseases, including skin conditions and poisonous bites[238]. The root is rarely used in modern herbalism[238]. It is harvested in the autumn and dried for later use[238].

nrakta Eastern N. America - New York to Minnesota, south to Kansas and Georgia. ksacta Rich woods, damp ground and along shady river banks[4, 43].

propta Seed - sow spring in a cold frame[14]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring or early autumn[111]. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a moist well-drained fertile soil in sun or semi-shade[200]. Plants are best grown in a soil approaching that of a moraine and they must not be allowed to dry out in the summer[1]. Plants are hardy to about -20°c[187]. A number of named varieties have been selected for their ornamental value[187]. Plants have a creeping root and can multiply very quickly[4]. They can also self-sow to the point of nuisance[200]. The plants have a smell that attracts cats. The cats roll in the plants with evident pleasure and can cause considerable damage to young plants and ones that have recently been moved[238, K].

# 5.2.1017 Collinsonia canadensis

Stone Root - Horse Balm, Richweed 4 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 0.8 m hkuc hmim cyutli tcuphja7n hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Collinsonia canadensis is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista Minute doses of the fresh leaves can cause vomiting[222], though the root is well-tolerated by the body[238]. Possible blood pressure elevation [301].

dwatta Alterative Antispasmodic Diaphoretic Diuretic Sedative Tonic Urinary Vasodilator VulneraryThe whole plant, but especially the fresh root, is alterative, antispasmodic, diaphoretic, diuretic, sedative, tonic, vasodilator and vulnerary[4, 21, 46, 102, 165]. A tea made from the roots is strongly diuretic, it is valuable in the treatment of all complaints of the urinary system and the rectum and is used in the treatment of piles, indigestion, diarrhoea, kidney complaints etc[4, 222]. It has proved of benefit in the treatment of irritable bowel syndrome, mucous colitis and varicose veins[254]. The root is seldom used on its own

but is contained in remedies with other herbs, especially Aphanes arvensis, Eupatorium purpureum and Hydrangea arborescens[238]. The roots contain more than 13,000 parts per million of rosmarinic acid, the same anti-oxidant that is found in rosemary[222]. The fresh leaves are strongly emetic[222]. Some caution is advised, see notes above on toxicity[222]. A poultice of the leaves or roots is applied to burns, bruises, sores, sprains etc[4, 222, 254].

nrakta Eastern N. America - Ontario and Vermont to Florida, west to Wisconsin. ksacta Rich damp woods[43,

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can also be sown in the spring, though it might be slower to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a greenhouse or cold frame. Plant them out in spring or early summer of their second year. Division in spring[1].

nwatta Prefers a sandy peat in a moist situation but it is easily grown in ordinary garden soils[1] so long as they are not dry[200]. Prefers dappled shade[200]. The whole plant has a strong disagreeable odour and a pungent spicy taste[4]. Another report says that the foliage is strongly aromatic, with a lemon scent[238].

# 5.2.1018 Salvia lyrata

Cancer Weed, Lyreleaf Sage

4 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia lyrata is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or

dwatta Diaphoretic Laxative Salve WartsThe plant is diaphoretic and mildly laxative[222]. It can be used in the treatment of diarrhoea, coughs and colds[257]. The fresh leaves are applied to remove warts[207]. The plant is also a folk remedy for cancer[222]. The leaves and seeds are made into an ointment to cure wounds and sores[207]. The root can be used to make a salve for sores[222, 257].

nrakta Eastern N. America - Pennsylvania to Florida. west to Texas and Illinois, ksacta Sandy soils and lawns[222].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200]

nwatta Landscape Uses: Seashore. Requires a very welldrained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Plants can be killed by excessive winter wet[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, North American native, Attracts butterflies, Suitable for cut

# 5.2.1019 Gentiana triflora

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Gentiana triflora is a PERENNIAL growing to  $0.5\,$ m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antibacterial Eczema Stomachic UrinaryGentian roots contain some of the most bitter compounds known and make an excellent tonic for the digestive system, working especially on the stomach, liver and gall bladder[238]. The root is antibacterial and stomachic[176]. It is used in the treatment of jaundice, leucorrhoea, eczema, conjunctivitis, sore throat, acute infection of the urinary system, hypertension with dizziness and tinnitus[176]. The root is harvested in the autumn and dried for later use.

nrakta E. Asia - China, Japan, Siberia. ksacta Grassy places, especially along roadsides, from sea level to the mountains[187].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size. place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species requires a lime-free, peaty, moist but well-drained soil in sun or partial shade[187, 239]. Plants are hardy to about -20°c[187].

#### 5.2.1020 Adiantum pedatum

Northern Maidenhair, American Maidenhair Fern 4 tlin 9 cvuc 0 kcak 2 tcan 2 dwat 0.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Adiantum pedatum is a FERN growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 3. The seeds ripen from August to October. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

tcanta Basketry Hair LiningThe stipe of the plant is used as an ornament in basketry[172, 157]. The leaves can be used as a lining for carrying or storing fruits in baskets and on racks[257]. The plant is used as a hair conditioner[172]. The stems have been used as a hair wash to make the hair shiny[222]. Plants can be used for ground cover when planted about 30cm apart either way, they form a slowly spreading clump[208].

cup of a decoction of the root during menstruation[213]. A htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis decoction of the whole plant has been drunk to ease the pain of childbirth[257]. The root has been chewed as a cardiac medicine and as a treatment for stomach aches[257]. An infusion of the roots has been used to treat despondency[257]. The infusion has also been used as a wash for sore eyes[257]. The plant has been chewed to sweeten the saliva[257].

nrakta South-western N. America - Colorado, Utah and New Mexico. ksacta Sandy to gravelly or infrequently rocky flats and slopes, mixed grassland, saltbush, blackbrush, creosote bush, mesquite, and sagebrush communities and montane woodlands, 1300 - 2900 metres[270].

propta Seed - best sown as soon as it is ripe in the autumn in a sandy compost in a greenhouse. Sow stored seed in early spring in a warm greenhouse[1]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Division in early spring[1]. This has to be done with care because the plant resents root disturbance[200]. Try to obtain divisions from around the edges of the plants without digging up the whole clump. Tease the divisions out with as much root on them as possible and pot them up. Grow them on in light shade in the greenhouse until they are rooting well and plant them out in the summer. Cuttings of greenwood with a heel in the summer[200].

nwatta Requires a loose lean gritty well-drained soil in a very sunny position[200]. Succeeds in dry soils. Tolerates exposed positions[200]. Requires some protection from winter wet[1]. Established plants deeply resent root distur-

# 5.2.1032 Chondrilla ambigua

Chondrilla, Sha di fen bao ju

4 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.5 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Chondrilla ambigua is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or

pcista None Known

kcakta None Known

tcanta Possibly a hydrocarbon latex crop. The species was experimentally cultivated in the USSR during the years 1929-1937 as a source of rubber. Carbon Farming Solutions - Industrial Crop: hydrocarbon (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1].

dwatta None Known

nrakta Northern Middle Asia. ksacta Sand dunes, gravel and loess areas; 300-800 m. Xinjiang - Kazakhstan, Russia (Southern European), Turkmenistan, Uzbekistan.

propta Seed

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: HayClimate: cold to warm temperate. Humidity: semi-arid to humid. A woody, broomlike perennial herb usually growing to 0.5m but can reach 1m high. It has a taproot which can be very deep and highly branched. Usually found in Sand dunes, gravel and loess (a type of silt which forms fertile topsoil - The soil has few clay particles to hold it together) areas; Grows at 300-800m in the wild. Needs a well drained dry to moist soil. This genus is closely related to the dandelions of genus Taraxacum. Plants of both genera undergo apomixis, producing fertile seeds via asexual reproduction. Carbon Farming Solutions - Cultivation: experimental. Management: hay (Describes the non-destructive management systems that are used in cultivation) [1-1].

# 5.2.1033 Pulsatilla patens

Pasque Flower, Eastern pasqueflower, Cutleaf anemone 4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc

hpa7tmwatli fyifxre7t hjonli

drutta Pulsatilla patens is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

pcista Although no mention has been seen for this species, at least one member of the genus is slightly toxic, the toxins being dissipated by heat or by drying the plant[65].

dwatta Appetizer Digestive Diuretic Emmenagogue Expectorant Irritant Oxytoxic StimulantAppetizer, digestive, diuretic, emmenagogue, expectorant, stimulant[61, 207, 213]. Use of the plant lessens sexual excitement. It does not diminish sexual power but rather strengthens it by lessening morbid excitement[207]. A drug derived from the chopped whole plant induces vomiting and irritation of the kidneys[213]. In high doses it acts as a depressant on the central nervous system and the heart[213]. A decoction of the plant has been used to speed delivery of a child[257]. A poultice of the fresh crushed leaves has been applied in the treatment of rheumatism and neuralgia[257]. A volatile oil contained in the plant is used as an irritant[212].

nrakta N. Europe to Siberia. ksacta Sparse pine forests and dry sunny slopes[74]. Grassy slopes, mountain slopes under forests at around 1100 metres in northern China[266].

propta Seed - best sown as soon as it is ripe in early summer in a cold frame. The seed usually germinates in about 2 - 3 weeks. Sow stored seed in late winter in a cold frame. Germination takes about 1 - 6 months at 15°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in the spring. Root cuttings, 4cm long taken in early winter, potted up in a mixture of peat and sand[175]. They can also be taken in July/August, planted vertically in pots in a greenhouse or frame

nwatta Requires a well-drained humus-rich gritty soil and a sunny position[200]. Lime tolerant[1, 200]. A very ornamental plant[1]. Large plants transplant badly[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

# 5.2.1034 Helichrysum arenarium

**Everlasting Flower** 

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Helichrysum arenarium is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Cholagogue Diuretic Homeopathy Skin StomachicThe fresh or dried flowers, or the entire flowering herb, are cholagogue, diuretic, skin and stomachic[9, 46, 61]. An infusion is used in the treatment of gall bladder disorders and as a diuretic in treating rheumatism, cystitis etc[9]. A homeopathic remedy is made from the flowering plant[9]. It is used in the treatment of gall bladder disorders and lumbago[9].

nrakta Europe. ksacta Dry sandy places, heaths, dunes, pine forests etc[9, 50].

propta Seed - sow February/March in a greenhouse. The seed usually germinates in 2 - 3 weeks at 20°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected

nwatta Requires a well-drained, sunny sheltered position[1, 200]. Often cultivated for its flowers which are extensively used as a decoration and in wreaths etc[1]. Mem-

planted too deeply[42]. A very ornamental plant[1] it is longlived when once established, though it is very difficult to establish a plant[233]. The flowers have a soft, rose-like perfume[245]. Plants are growing very well at the Savill Gardens in Windsor[233]. This plant is becoming very rare in the wild due to overcollecting for medicinal usage[238]. Reports that the plant is cultivated for its medicinal uses are largely spurious and, unless you can be certain that the root has come from a cultivated source, it is best not to use this plant medicinally but to use suitable substitutes such as Scutellaria laterifolia and Lavendula angustifolia[238]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

### 5.2.1029 Eupatorium hyssopifolium

Hyssopleaf thoroughwort

4 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Eupatorium hyssopifolium is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta The plant is used as a strewing herb and to discourage insects[61].

dwatta StingsThe entire plant is applied externally as a remedy for the bites of reptiles and insects[207].

nrakta Central and Eastern N. America - Massachusetts to Florida and Texas. ksacta Dry fields[235].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Succeeds in ordinary well-drained but moisture retentive garden soil in sun or part shade[200]. Plants seem to be immune to the predations of rabbits[233].

# 5.2.1030 Cypripedium calceolus pubescens

Nerve Root

4tlin8cyuc0kcak0tcan3dwat $0.6\,\mathrm{m}$ hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cypripedium calceolus pubescens is a PEREN-NIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Contact with the fresh plant can cause dermatitis in sensitive people[1, 21]. Large doses can cause hallucinations[268]. Large doses may result in dizziness, restlessness, headaches, mental excitement and visual hallucinations. Avoid with allergies. Avoid during pregnancy [301].

dwatta Antidiarrhoeal Antispasmodic Diaphoretic Hypnotic Nervine Sedative TonicNerve root has a high reputation for its sedative and relaxing effect on the nervous system[238, 254]. The root is a pungent bitter-sweet herb with an unpleasant odour. It was much used by the North American Indians who used it as a sedative and antispasmodic to ease menstrual and labour pains and to counter insomnia and nervous tension[238, 254]. The root is antispasmodic, diaphoretic, hypnotic, nervine, sedative, tonic[21, 46, 165, 192, 222, 238]. It is taken internally in the treatment of

anxiety, nervous tension, insomnia, depression and tension headaches[238]. The active ingredients are not water soluble and so the root is best taken in the form of a tincture[222]. The plant is said to be the equivalent of Valerian (Valeriana officinalis) in its effect as a nervine and sedative, though it is less powerful[1, 4]. Another report says that its restorative effect appears to be more positive than that of valerian[254]. The roots are harvested in the autumn and are dried for later use[238]. In the interests of conservation, it is best not to use this herb unless you can be certain it was obtained from a cultivated source - see the notes above under cultivation details[K].

nrakta N. America to E. Asia - Japan. ksacta Rich woods and meadows[21, 43]. Mesic deciduous and coniferous forest, openings, thickets, prairies, meadows and fens at elevations of 0 - 2900 metres[270].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division with care in early spring, the plants resent disturbance[200]. Remove part of the original rootball with the soil intact[200]. Division is best carried out towards the end of the growing season, since food reserves are fairly evenly distributed through the rhizome[230]. Small divisions of a lead and two buds, or divisions from the back (older) part of the rhizome without any developed buds, establish quickly using this method[230]. Replant immediately in situ[230].

nwatta Succeeds in shade or full sun so long as there is adequate moisture[42]. Grows well in a woodland garden[230]. Plants are best grown on a north or north-west aspect in order to slow down early growth[1]. Requires a humus rich soil with plenty of moisture in the growing season[42], it also succeeds in chalky soils[200]. Must not be planted too deeply[42]. A very ornamental plant[1] it is longlived when once established, though it is very difficult to establish a plant[233]. The flowers have a soft, rose-like aroma[245]. Plants are growing very well at the Savill Gardens in Windsor[233]. This plant is becoming very rare in the wild due to overcollecting for medicinal usage[238]. Reports that the plant is cultivated for its medicinal uses are largely spurious and, unless you can be certain that the root has come from a cultivated source, it is best not to use this plant medicinally but to use suitable substitutes such as Scutellaria laterifolia and Lavendula angustifolia[238]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

# 5.2.1031 Eriogonum jamesii

Antelope Sage, James' buckwheat 4 tlin 8 cyuc 0 koak 0 tcan 2 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eriogonum jamesii is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

dwatta Analgesic Cardiac Contraceptive Ophthalmic StomachicSome native North American Indian tribes used this plant as a contraceptive. The women would drink one dwatta Antirheumatic Astringent Demulcent Emmenagogue Expectorant Febrifuge Haemostatic Pectoral TonicThe whole plant is considered to be antirheumatic, astringent, demulcent, emmenagogue, expectorant, febrifuge, haemostatic, pectoral and tonic[172, 222, 240]. A tea or syrup is used in the treatment of nasal congestion, asthma, sore throats etc[222]. A decoction of the root was massaged into rheumatic joints[257]. The N. American Indians chewed the fronds and then applied them to wounds to stop bleeding[213]. A strong infusion of the whole plant was has been used as an emetic in the treatment of ague and fevers[257]. This plant was highly valued as a medicinal plant in the 19th century and merits scientific investigation[222].

nrakta N. America - Alaska to Quebec and Nova Scotia, south to California and Georgia. E. Asia ksacta Rich, deciduous woodlands, often on humus-covered talus slopes and moist lime soils. from sea level to 700 metres[270].

propta Spores - best sown as soon as ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep them humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division in spring or autumn

nwatta Landscape Uses:Container, Foundation, Ground cover, Massing, Rock garden, Woodland garden. Easily grown in a cool moist shady position[1, 187]. Requires an abundance of moisture in the air and soil[1]. Prefers an alkaline soil[200]. Requires an acid soil according to another report. A very ornamental plant[1], it does not always succeed outdoors in Britain[1]. It probably prefers to be covered in snow overwinter - could a mulch help[1]? This species is often divided into three separate species by botanists - the type species is found in eastern N. America, A. aleuticum is found in western N. America and a third species is found in eastern Asia[270]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants have a slowly-increasing rootstock[233]. Special Features: Attractive foliage, North American native, Naturalizing, Wetlands plant, There are no flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 5.2.1021 Dryopteris cristata

Crested Wood Fern

4 tlin 8 cyuc 0 kcak 0 tcan 4 dwat 0.5 m hkuc hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hionli

drutta Dryopteris cristata is an evergreen Fern growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caucion is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked

fronds can have a long term harmful effect. Some caution is therefore advised.

dwatta Diaphoretic Expectorant Febrifuge VermifugeThe male fern is one of the most popular and effective treatments for tape worms. The root stalks are anodyne, antibacterial, anti-inflammatory, antiviral, astringent, expectorant, febrifuge, sudorific, vermifuge and vulnerary[218, 222, 238]. The root contains 'filicin', a substance that paralvses tapeworms and other internal parasites and has been used as a worm expellent[238]. It is one of the most effective treatments known for tapeworms - its use should be immediately followed by a non-oily purgative such as magnesium sulphate in order to expel the worms from the body[238]. An oily purge, such as caster oil, increases the absorption of the fern root and can be dangerous[238]. The root is also taken internally in the treatment of internal haemorrhage, uterine bleeding, mumps and feverish illnesses[238]. The root is harvested in the autumn and can be dried for later use, it should not be stored for longer than 12 months[238]. This remedy should be used with caution and only under the supervision of a qualified practitioner[238]. The root is toxic and the dosage is critical[238]. See also the notes above on toxicity. Externally, the root is used in the treatment of abscesses, boils, carbuncles and sores[238].

nrakta Eastern N. America - Newfoundland to Saskatchewan and south to N. Carolina and Montana. ksacta Damp woods[222]. Swamps, swampy woods or open shrubby wetlandsfrom sea level to 1200 metres[270].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at 20°c. Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position. Succeeds in full sun but grows best in a shady position with only 2 - 3 hours sun per day[200]. Tolerates a pH range from 4.5 to 7[200]. Dislikes heavy clay. Prefers a good supply of water at its roots but succeeds in dry shade and tolerates drought when it is established. A very hardy plant, tolerating temperatures down to about -30°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Hybridizes in the wild with several other species[187].

#### 5.2.1022 Erigeron pulchellus

Robin's plantain, blue spring daisy, hairy fleabane 4 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Erigeron pulchellus is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Bees, Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known kcakta None Known

tcanta Ground Cover. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2]. Locations: Cottage gardens, butterfly gardens, native plant/wildflower gardens, meadows or naturalized areas. May be used in borders and rock gardens [368-1].

nrakta Widespread across much of the United States and Canada from Québec and Ontario south as far as eastern Texas and the Florida Panhandle. ksacta Open rocky woodlands, wooded sand dunes, slopes of wooded bluffs, savannas and sandy savannas, banks of streams, and clearings in wooded areas. Robin's Plantain is found in less disturbed areas than other species in this genus.

propta Propagate by seed, division or cuttings. Seeds: sow outside in late fall or the following spring without any cold treatment. Poor germination. Seeds require light for

germination. Division - very good. Will naturalize in optimum growing conditions by self-seeding and stoloniferous spread.

nwatta A perennial herbaceous wildflower. Dry to medium, well-drained soils in full sun. Tolerates light shade, heat and humidity. Good drainage is very important. Best in poor to modest soils which have not been fertilized. Plants usually perform poorly in rich soils. [368-1]. Will naturalize in optimum growing conditions by self-seeding and stoloniferous spread. Flowers: Showy, Flower Color: White, Flower Time: Late spring or early summer. No serious insect or disease problems. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground

# 5.2.1023 Asperula cynanchica

Squinancy Wort

4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Asperula cynanchica is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta DyeA red dye is obtained from the root[4].

dwatta The plant was at one time esteemed as a remedy for quinsy, but it is no longer used in herbal medicine[4].

nrakta Central and southeastern Europe, including Britain, to the Caucasus. ksacta Dry calcareous pastures and calcareous dunes[17]

propta Seed - sow spring to early summer in a light position in a cold frame[134]. 2 weeks pre-chilling improves the germination rate[134]. The seed usually germinates in 1 month at 10°c[134]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or early summer[200]. Basal cuttings of soft young shoots in early summer[200].

nwatta Succeeds in almost any soil, including dry ones[1]. Prefers a well-drained moisture retentive soil in sun or semi-shade[200].

# 5.2.1024 Anemone cylindrica

Candle Anemone

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anemone cylindrica is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

dwatta Antiseptic Miscellany Ophthalmic PoulticeThe root of this plant was one of the most highly esteemed medicines of the Omaha and Ponca Indians[213]. A wash of the pounded boiled root was applied externally to wounds[213]. The root contains anemonin, which is said to be a potent antiseptic[213]. A poultice made from the leaves is used to treat burns[207, 257]. A tea of the roots was used in the treatment of headaches and dizziness[213, 257]. A of cold stratification if it is to germinate well[238]. Prick out

decoction of the stem and fruit is used as a wash for sore

nrakta Western N. America - British Columbia to New Mexico, east to South Dakota and New Jersey.. ksacta Prairies, dry, open woods, pastures and roadsides at elevations from 300 - 3000 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies

nwatta Succeeds in ordinary garden soil but prefers a well-drained woodland soil and some shade[200]. Plants succeed in maritime gardens[233]. Hardy to at least -20°c[187]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. A good woodland plant[1, 187].

#### **5.2.1025** Apocynum androsaemifolium

Spreading Dogbane

4 tlin 8 cvuc 0 kcak 1 tcan 2 dwat 0.6 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli

frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Apocynum androsaemifolium is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid. neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers dry or moist

pcista All parts of the plant are poisonous[1, 62].

tcanta Fibre LatexThe bark yields a good quality fibre that is used for making twine, bags, linen etc[4, 99, 155, 2571. It is inferior to A. cannabinum[991. The fibre is finer and stronger than cotton[207]. It can be harvested after the leaves fall in the autumn but is probably at its best as the seed pods are forming[169]. The plant yields a latex, which is a possible source of rubber[46, 61]. It is obtained by making incisions on the stem and resembles indiarubber when

dwatta Cardiotonic Cathartic Contraceptive Diaphoretic Diuretic Emetic Expectorant Urinary VDSpreading dogbane is an unpleasantly bitter stimulant irritant herb that acts on the heart, respiratory and urinary systems, and also on the uterus[238]. It was widely employed by the native North American Indians who used it to treat a wide variety of complaints including headaches, convulsions, earache, heart palpitations, colds, insanity and dizziness[257]. It should be used with great caution, and only under the supervision of a qualified practitioner if taking this plant internally[21, 238]. The root contains cymarin, a cardioactive glycoside that is toxic to ruminants[222]. The root is cardiotonic, cathartic, diaphoretic, diuretic, emetic and expectorant[1, 4, 21, 61, 2221. It has a powerful action in slowing the pulse and also has a very strong action on the vaso-motor system, it is rather an irritant to the mucous membranes though, so some people cannot tolerate it[4]. The juice of the fresh root has been used in the treatment of syphilis[207]. The sap of the plant has been applied externally to get rid of warts[257]. The roots were boiled in water and the water drunk once a week in order to prevent conception[213]. The green fruits were boiled and the decoction used in the treatment of heart and kidney problems and for the treatment of dropsy[213]. This preparation can irritate the intestines and cause unpleasant

nrakta Northern N. America. ksacta Open woodland, woodland edges etc. usually on drier soils[43, 62].

propta Seed - best sown as soon as it is ripe in late summer and overwintered outdoors. The seed requires a period the seedlings when large enough to handle and grow them on in a cold frame for their first winter, planting out in late spring of the following year [K]. Division in spring just before active growth begins[200]. Plants can also be divided in the autumn[238].

nwatta Prefers an acid peaty soil[1] but it succeeds in sun or shade in most well-drained soils and climates[169. 200]. A very ornamental plant[1], but it can be invasive[200]. The flowers the flowers secrete a sweet liquid that is very attractive to flies[4]. The flies are then imprisoned by their proboscis which becomes trapped between the short filaments of the stamens[207].

# 5.2.1026 Tephrosia virginiana

Catgut, Virginia tephrosia

4 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli hqatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tephrosia virginiana is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Contact with the plant can cause dermatitis in sensitive people[222]. The seeds are toxic[222].

tcanta Hair InsecticideThe root is a source of the insecticide 'rotenone' [207, 213]. This is especially effective against flying insects but appears to be relatively harmless to animals[213]. A decoction of the roots has been used as a hair shampoo by women in order to prevent hair loss[257].

dwatta Anthelmintic Cancer Diaphoretic Diuretic Pectoral Tonic Women's complaintsThe root is anthelmintic, diaphoretic, diuretic, pectoral and tonic[207, 222, 257]. A tea made from the roots is said to make children muscular and strong[222, 257]. A cold tea is used to improve male potency and also to treat TB, bladder problems, coughs, irregular menstruation and other women's complaints[222, 257]. Experimentally, the root has shown both anticancer and cancercausing activity[222]. The leaves have been placed in the shoes in order to treat fevers and rheumatism[257].

nrakta Eastern N. America - New Hampshire to Florida. west to Texas and Manitoba. ksacta Dry sandy woods and openings[43].

propta Pre-soak the seed for 12 hours in warm water and then sow in a greenhouse in spring. Prick out the seedlings into individual pots when they are large enough to handle and grow on in the greenhouse for their first winter, planting out in the following spring or early summer.

nwatta Industrial Crop: Pesticide Management Hay Wild CropA deep rooted plant, requiring a dry to moist light or medium very well-drained soil in a sunny position[200]. Plants are hardy to about -25° when given a suitable position[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 5.2.1027 Veronica arvensis

Corn Speedwell

4 tlin 8 cvuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Veronica arvensis is a ANNUAL growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from March to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Alterative Antiscorbutic DiureticThe herb is alterative, antiscorbutic and diuretic[240]. It is used in the treatment of scurvy, impurities of the blood etc[240]. It is also used as a remedy for scrofulous affections, especially of the skin, and is bruised and applied externally for healing burns, ulcers, whitlows and the mitigation of painful

nrakta Europe, including Britain, from Sweden south and east to N. Africa, central and western Asia. ksacta Cultivated ground, grassland and on heaths, in more or less open habitats and usually on dry soils[17].

propta Seed - sow spring or autumn in situ.

nwatta Easily grown in a moderately fertile moisture retentive or dry well drained soil[200]. Prefers cool summers[200].

#### 5.2.1028 Cypripedium calceolus parviflorum

4 tlin 8 cvuc 0 kcak 0 tcan 3 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cypripedium calceolus parviflorum is a PEREN-NIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Contact with the fresh plant can cause dermatitis in sensitive people[1, 21].

dwatta Antidiarrhoeal Antispasmodic Diaphoretic Hypnotic Nervine Sedative TonicNerve root has a high reputation for its effect on the nervous system[238]. The root is a pungent bitter-sweet herb with an unpleasant odour, it is antispasmodic, diaphoretic, hypnotic, nervine, sedative, tonic[21, 46, 165, 192, 222, 238]. It is taken internally in the treatment of anxiety, nervous tension, insomnia, depression and tension headaches[238]. The active ingredients are not water soluble and so the root is best taken in the form of a tincture[222]. The plant is said to be the equivalent of Valerian (Valeriana officinalis) in its effect as a nervine and sedative, though it is less powerful[1, 4]. The roots are harvested in the autumn and are dried for later use[238]. In the interests of conservation, it is best not to use this herb unless vou can be certain it was obtained from a cultivated source see the notes above under cultivation details[K].

nrakta South-eastern N. America. ksacta Swamps and bogs. Mesic to dry deciduous and deciduous-hemlock forests, usually on slopes; mostly at elevations of 0 - 1200 metres[270].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division with care in early spring, the plants resent disturbance[200]. Remove part of the original rootball with the soil intact[200]. Division is best carried out towards the end of the growing season, since food reserves are fairly evenly distributed through the rhizome[230]. Small divisions of a lead and two buds, or divisions from the back (older) part of the rhizome without any developed buds, establish guickly using this method[230]. Replant immediately in situ[230].

nwatta Succeeds in shade or full sun so long as there is adequate moisture[42]. Grows well in a woodland garden[230]. Plants are best grown on a north or north-west aspect in order to slow down early growth[1]. Requires a humus rich soil with plenty of moisture in the growing season[42], it also succeeds in chalky soils[200]. Must not be

laxative, ophthalmic and tonic (bitter)[46, 61, 158, 194, 240]. An infusion is used in the treatment of malaria, eye complaints, skin diseases, menorrhagia, diarrhoea and jaundice[240, 243]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas in Nepal. ksacta Shrubberies to 3500 metres[51]. Open hillsides at elevations of 1800 - 3000 metres[272].

propta Seed - best sown as soon as it is ripe in a cold frame, it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78]. Stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for at least their first winter. Once they are at least 20cm tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are subject to damping off, so be careful not to overwater them and keep them well ventilated[113]. Cuttings of half-ripe wood, July/August in a frame. Very difficult, if not impossible. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Very difficult, if not impossible.

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants are very hardy, they survived the severe winters of 1986-1987 without problems in most areas of Britain[K]. Plants can be pruned back quite severely and resprout well from the base[200]. The fruits are sometimes sold in local markets in India[194]. Hybridizes freely with other members of this genus[1]. Most plants cultivated under this name are B. chitria., B. coriaria., B. glaucocarpa. and, more commonly, B. floribunda[67, 200].

### 6.2.48 Hibiscus syriacus

Rose Of Sharon, Althaea, Shrub Althea, Hardy Hibiscus 5 tlin 9 cyuc 4 kcak 2 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hibiscus syriacus is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil RootEdible Uses: Oil TeaYoung leaves - raw or cooked[2, 177, 179, 183]. A very mild flavour, though slightly on the tough side, they make an acceptable addition to the salad bowl[K]. A tea is made from the leaves[2, 177, 240] or the flowers[183]. Flowers - raw or cooked[74, 105, 183]. A mild flavour and mucilaginous texture, they are delightful in salads, both for looking at and for eating[K]. Root - it is edible but very fireworks[144]. Mucilaginous. without very much flavour[144].

tcanta Dye Fibre Hair Hedge Hedge OilA low quality fibre is obtained from the stems. It is used for making cordage and paper[74]. The seed contains about 25% oil[74]. No further details are given, but it is likely to be edible. A hair shampoo is made from the leaves[74]. A blue dye is obtained from the flowers[168]. This species is planted as a hedge in S. Europe[50].

dwatta Anthelmintic Antiphlogistic Antipruritic Demulcent Diuretic Dysentery Emollient Expectorant Febrifugo Ophthalmic Skin Stomachic StypticThe leaves are diuretic, expectorant and stomachic[218, 240]. A decoction of the flowers is diuretic, ophthalmic and stomachic[147, 178, 218]. It is also used in the treatment of itch and other skin diseases[240], dizziness and bloody stools accompanied by

much gas[147]. The bark contains several medically active constituents, including mucilage, carotenoids, sesquiterpenes and anthocyanidins[279]. A decoction of the root bark is antiphlogistic, demulcent, emollient, febrifuge, haemostatic and vermifuge[218, 240]. It is used in the treatment of diarrhoea, dysentery, abdominal pain, leucorrhoea, dysmenorrhoea[240, 279] and dermaphytosis[147].

nrakta E. Asia - China to India. Locally naturalized in S. Europe. ksacta Found wild on mountain slopes, though the original habitat is obscure[74].

propta Seed - sow early spring in a greenhouse. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in late spring or early summer. Some reports say that the seed can be sown in situ outside and that it gives a good rate of germination[78, 80, 113]. Cuttings of half-ripe wood, July/August in a frame. Good percentage[113]. Cuttings of mature wood, early autumn in a frame. Good percentage[113]. Layering in mid summer to early autumn[1].

nwatta Landscape Uses:Border, Container, Foundation, Standard, Seashore, Specimen. Prefers a well-drained humus rich fertile soil in a sheltered position in full sun[200]. Succeeds in any soil of good or moderate quality[11]. Dislikes shade or badly drained soils[11]. Plants grow best with their roots in cool moist soil and their tops in a hot sunny position. This species is hardy to about -20°c[200] but plants only really succeed in the warmer counties of Britain because of their late flowering habit[184]. When planted in colder areas of the country, they will need protection for the first few winters[200]. The flowers only open in sunny weather[219]. Plants rarely require pruning[219], though they respond well to pruning and trimming and this is best carried out in the spring or just after flowering[219]. Plants are late coming into leaf, usually around the end of May or early June[182]. A very ornamental plant[1], there are many named varieties[182]. Special Features: Attracts birds, Not North American native, Naturalizing, Attracts butterflies, Blooms are very showy. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant. in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown

# 6.2.49 Hydrangea serrata amagiana

5 tlin 9 cyuc 4 kcak 2 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hionli

drutta Hydrangea serrata amagiana is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: SweetenerThe young leaves, even without fermentation[174], are very sweet and are used to make a sweet tea called 'tea of heaven', it is used in Buddhist ceremonies[174]]. The leaves contain phellodulcin (its chemical formula is C16 H14 O), a very sweet substance that can be used as a sugar substitute[174]. The older leaves can be dried, powdered and used as a flavouring on foods[174]. The young leaves and shoots are also eaten cooked[174].

about 1.5 metres apart each way[208]. They are very vigorous and so are best not used with small plants[K]. They also die down completely in the winter, giving weeds a chance to become established[K].

nrakta S. Europe. Occasionally naturalized in Britain. ksacta Hedges, vineyards, fields and uncultivated places[50].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should be taken[200].

nwatta Landscape Uses:Arbor, Container. An easily grown plant, succeeding in any moderately good garden soil[200], whether acid or alkaline[202]. Prefers a position in full sun but tolerates part day shade[200]. Succeeds in dry soils and is drought tolerant when established[190]. Grows well on dry slopes[208]. Plants can be grown in guite coarse grass, which can be cut annually in the autumn[233]. Plants are hardy to at least -10°c[202]. A very ornamental plant[1], there are many named varieties[187]. It is fast-growing and, when in a suitable position, can become invasive[202]. Plants climb by means of tendrils[188]. Resents root disturbance and can take a year or two to settle down after being moved[219]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:All or parts of this plant are poisonous, Suitable for cut flowers. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Herbaceous. A suckering vine sending up suckers some distance main plant [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 6.1.22 Sophora davidii

Sophora

tfo2n 5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 2.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Sophora davidii is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a slow rate. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The plant contains cytosine, which resembles nicotine and is similarly toxic[238].

kcakta Edible Parts: FlowersEdible Uses: Flowers[177, 183]. No further details are given.

nrakta E. Asia - China in W. Hubei, W. Sichuan and Yunnan. ksacta Dry rocky places and arid valleys, often covering large areas[109].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Pre-soak stored seed for 12 hours in hot (not boiling) water and sow in late winter in a greenhouse[78]. Prick out the seedlings as soon as they are large enough to handle into individual pots in the greenhouse, and grow them on for 2 years under protected conditions. Plant them out into their permanent positions in early summer of their third year. Cuttings of young shoots with a heel, July/August in a frame[11]. Air-layering[200].

nwatta Landscape Uses:Specimen. Succeeds in a sunny position in most dry or moist well-drained soils[184]. Reguires a good loamy soil[11]. Grows well on chalk[184]. It grows best in the warmer areas of the country where the wood will be more readily ripened and better able to withstand winter cold[219]. Hardy to about -20°c but requires the extra warmth of a wall if it is to flower well[184]. However, a free-standing shrub at Kew is growing very well[184]. A very ornamental plant[1]. Plants should be container-grown and planted out whilst young, older plants do not transplant well[219]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

### 6.1.23 Cytisus scoparius

Broom, Scotch broom, Common Broom tfo2n 5 tlin 8 cyuc 1 kcak 4 tcan 3 dwat 2.4 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Cytisus scoparius is a deciduous Shrub growing to 2.4 m (7ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Poisonous[10, 19, 65]. The plant is of extremely low or zero toxicity[76].

kcakta Edible Parts: FlowersEdible Uses: Coffee CondimentThe flower buds are pickled and used as a substitute for capers[4, 46, 183, 244]. They can also be added to salads[183]. Some caution is advised, see the notes above on toxicity. The tender green tops of the plant have been used like hops to give a bitter flavour to beer and to render it more intoxicating[4, 183]. The roasted seed is a coffee substitute[2, 4, 115, 183].

tcanta Basketry Broom Dye Essential Fibre Paper Repellent Soil stabilization Tannin WoodAn excellent fibre is obtained from the bark, it is used in the manufacture of paper, cloth and nets[4, 100, 115]. It is not as strong as the fibre from the Spanish broom (Spartium junceum)[4]. The fibre is obtained from the root according to other reports[13, 46]. The bark fibre is used to make paper, it is 2 - 9mm long[189]. The branches are harvested in late summer or autumn, the leaves removed and the stems steamed until the fibres can be stripped. The fibres are cooked for 3 hours in lye then put in a ball mill for 3 hours. The paper is pale tan in colour[189]. The bark is a good source of tannin[4]. A vellow and a brown dye are obtained from the bark[46]. A yellow dye is obtained from the flowering stem[169]. A green dye is obtained from the leaves and young tops[4]. The branches are used to make baskets, brushes, brooms and besoms[4, 6, 13, 46, 55, 115]. They are also sometimes used for thatching roofs and as substitutes for reeds in making fences or screens[4]. An essential oil from the flowers is used in perfumery[57]. Growing well on dry banks and on steep slopes, it is an effective sand binder and soil stabiliser[4, 11, 46]. Broom is one of the first plant to colonize sand dunes by the coast[4]. The plant attracts insects away from nearby plants[14]. The var. prostratus (= C. scoparius maritimus?[208]) makes a good fast growing ground cover plant to 30cm tall, though it needs weeding in its first year [197]. The cultivar 'Andreanus Prostratus' can also be used[208]. Wood - very hard, beautifully veined[4]. The plant seldom reaches sufficient size for its wood to be of much value, but larger specimens are valued by cabinet makers and for veneer[4].

dwatta Antiarrhythmic Antirheumatic Cardiotonic Cathartic Diuretic Emetic VasoconstrictorBroom is a bitter narcotic herb that depresses the respiration and regulates heart action[238]. It acts upon the electrical conductivity of the heart, slowing and regulating the transmission of the impulses[254]. The young herbaceous tips of flowering shoots are cardiotonic, cathartic, diuretic, emetic and vasoconstrictor[4, 13, 21, 46, 165]. The seeds can also be used[4]. The plant is used internally in the treatment of heart complaints. and is especially used in conjunction with Convallaria majalis[238]. The plant is also strongly diuretic, stimulating urine production and thus countering fluid retention[254]. Since broom causes the muscles of the uterus to contract, it has been used to prevent blood loss after childbirth[254]. Use this herb with caution since large doses are likely to upset the stomach[4, 21]. The composition of active ingredients in the plant is very changeable, this makes it rather unreliable medicinally and it is therefore rarely used[9]. This herb should not be prescribed to pregnant women or patients with high blood pressure[238]. Any treatment with this plant should only be carried out under expert supervision[9]. See also the notes above on toxicity. The young herbaceous tips of flowering shoots are harvested in spring, generally in May[4]. They can be used fresh or dried[4, 238]. They should not be stored for more than 12 months since the medicinally active ingredients break down[238].

nrakta Europe, including Britain, from Scandanavia south to Spain, east to Poland and Hungary. ksacta Sandy pastures and heaths, occasionally in open woodland, and often near the coast[4, 17]. Strongly calcifuge[17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[80]. Pre-soak stored seed for 24 hours in warm water then cold stratify for 1 month and sow in a cold frame[80]. The seed usually germinates in 4 weeks at  $20^{\circ}\text{c}[98, 113]$ . Seedlings should be potted up as soon as possible since plants quickly become intolerant of root disturbance[186]. Plant them out into their permanent positions in late summer if they have made sufficient growth, otherwise in late spring of the following year[K]. The seed has a long viability[186]. Seed can also be sown in situ as soon as it is ripe in the late summer and autumn[4]. Cuttings on falf-ripe wood, 4- 7 cm with a heel, August in a frame[11]. Produces roots in the spring[11]. Pot up as soon as possible[11]. Cuttings of mature wood, October/November in a frame. Layering.

nwatta Agroforestry Services: Nitrogen Management: Coppice Minor Global CropLandscape Uses:Border, Container, Foundation, Massing, Specimen. Succeeds in most soils, preferring a fairly good but not rich soil[11]. Prefers a poor well-drained soil[14]. Succeeds in slightly acid, neutral and limy soils but dislikes shallow soils over chalk[200]. Plants are strongly calcifuge according to other reports and intolerant of a pH much above 6.5[17, 186]. Prefers a sunny position but tolerates some shade[11, 14, 17]. Plants succeed in exposed conditions, and are very tolerant of maritime exposure[4, K]. Plants have a deep root system, they are very drought tolerant once established and grow well on dry banks[4, 11]. Tolerates a smoky atmosphere, growing well in polluted areas[186]. Plants are hardy to about -20°c[184]. A number of named forms have been developed for their ornamental value[182]. New leaves are formed in April but these soon drop off the plant, photosynthesis being carried out by means of the green stems[186]. Very tolerant of cutting, it regenerates quickly from the base[186]. Plants are usually killed by fire but the seeds quickly germinate after the fire and rapidly become established[186]. A good bee plant and food plant for many caterpillars [24, 30, 46], it provides the food for the larvae of the green hairstreak butterfly [186]. Ants are attracted to the seeds, feeding on the juicy attachment that holds them to the pods and thus distributing the seed[186]. Dislikes root disturbance, especially when more than 20cm tall[11]. It is best to plant out into their permanent positions as early as possible. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native, Naturalizing, Fragrant flowers, Attractive flowers or blooms.

# 6.1.24 Lespedeza cyrtobotrya

Leafy lespedez

tfo2n 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lespedeza cyrtobotrya is a deciduous Shrub growing to 2 m (6ft 7im). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and plant tops - cooked[105, 177].

tcanta BasketryThe branchlets may be used for making baskets[266].

nrakta E. Asia - China, Japan, Korea. ksacta Meadows and grassy places in hills and low mountains, C. and S. Japan[58]. Mountain slopes, thickets and forests below 1500 metres[266]

propta Pre-soak the seed for 24 hours in warm water and then sow it in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in individual pots in a frame. It can be difficult to get the cuttings through their first winter, it is best to plunge the pots in a bed of ashes in a sheltered border outdoors[78].

nwatta Easily grown in a light loam in full sun[1]. The top growth is not very cold tolerant, although the rootstock is considerably hardier. Plants are usually cut back to the ground in all but very mild winters, though they generally resprout well from the base in the following spring and flower in late summer[182]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.25 Lupinus polyphyllus

Big-Leaf Lupin, Lupine

tfo2n 5 tlin 9 cyuc 1 kcak 4 tcan 1 dwat 1.5 m hkuc htut cyutli hgattcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Lupinus polyphyllus is a PERENNIAL growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from July to August, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable PH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The seed of many lupin species contain bittertasting toxic alkaloids, though there are often sweet varieties within that species that are completely wholesome[65, 76]. Taste is a very clear indicator. These toxic alkaloids can be leeched out of the seed by soaking it overnight and discarding the soak water. It may also be necessary to change the water once during cooking. Fungal toxins also readily invade the crushed seed and can cause chronic illness[65].

kcakta Root - raw or cooked[257].

tcanta Landscape Uses: Border, Container, Ground cover, Massing, Specimen, Woodland garden. Special Features: Attracts birds, Attractive foliage, North American native, Naturalizing. Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. Nitrogen fixer.

dwatta A decoction of the plant has been used as a tonic[257].

tcanta DyeA yellow dye is made from the root and leaves when alum is used as a mordant[4, 178]. With iron sulphate, the colour is brown[4].

dwatta Alterative Antipsoriatic Antiscrophulatic Carminative Depurative Diaphoretic Diuretic Skin Tonic Urinary VDThe root is alterative, antiscrophulatic, carminative, depurative, diaphoretic, diuretic and tonic[1, 4, 11, 147, 174, 178, 218]. It is considered useful when taken internally in the treatment of old syphilitic cases and is also used for certain skin diseases, including psoriasis, rheumatoid arthritis, gout, enteritis, urinary tract infections, skin ulcers etc[4, 238]. Large doses can cause nausea and vomiting, which is valuable in weakened and depraved conditions due to a poisoned state of the blood[4]. The root is harvested in the autumn and dried for later use.

nrakta E. Asia - China, Japan. ksacta Shrub thickets[147] in hills and mountains[58]. Forests, thickets, hillsides, grassy slopes, shaded places along valleys or streams from near sea level to 2000 metres[266].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most well-drained soils in sun or semi-shade[200]. Hardy to about -15°c[200]. A climbing plant, supporting itself by means of tendrils and thorns as it scrambles through small trees and shrubs. A young plant is growing and thriving close to a west-facing wall at Kew Botanical gardens[K]. This species is not the true 'China root' of medicine, see the record for S. pseudo-china[178]. Dioecious. Male and female plants must be grown if seed is required.

# 6.2.46 Prunus angustifolia watsonii

Sand Plur

5 tlin 9 cyuc 4 kcak 2 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus angustifolia watsonii is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[1, 11]. An acid taste, the fruit is often used for making preserves, pies etc[183]. A reasonable size, it is about 14mm x 9mm and contains a single large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bittersee the notes above on toxicity. tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - heavy, rather soft, not strong[82]. It weighs 43lb per cubic foot[235] and is of little commercial value[229].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Central N. America. ksacta Thickets in low sandy places near streams[11].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Unlike the type species, this sub-species thrives in Britain[11]. The flowers, which appear just before the leaves unfold, have a refreshing fruity scent[245]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 6.2.47 Berberis aristata

Chitra, Indian Barberry or Tree Turmeric 5 tlin 9 cyuc 4 koak 3 tcan 3 dwat 3.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis aristata is an evergreen Shrub growing to 3.5 m (11ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit raw or cooked[145]. A well-flavoured fruit, it has a sweet taste with a blend of acid, though there is a slight bitterness caused by the seeds[194, K]. The fruit is much liked by children[194, K]. It is dried and used like raisins in India[2, 3, 177, 183]. The fruit contains about 2.3% protein, 12% sugars, 2% ash, 0.6% tannin, 0.4% pectin[194]. There is 4.6mg vitamin C per 100ml of juice[194]. The fruit is about 7mm x 4mm[194] - it can be up to 10mm long[200]. Plants in the wild yield about 650g of fruit in 4 pickings[194]. Flower buds - added to sauces[177, 183].

tcanta Dye Fuel TanninA yellow dye is obtained from the root and the stem[46, 61, 272]. An important source of dyestuff and tannin, it is perhaps one of the best tannin dyes available in India[194]. The wood is used as a fuel[146]. The spiny branches are used for making fencing around fields[272].

dwatta Alterative Antibacterial Antiperiodic Bitter Cancer Deobstruent Diaphoretic Dysentery Laxative Malaria Ophthalmic Tonic Vitamin CThe dried stem, root bark and wood are alterative, antiperiodic, deobstruent, diaphoretic,

For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 6.2.44 Asimina triloba

Panay

5 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 4.5 m hkuc

hmimhtut cyutli tcup hwicli jlut hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Asimina triloba is a deciduous Shrub growing to 4.5 m (14ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed contains a toxic alkaloid and is poisonous[106, 274]. The leaves can cause dermatitis in a small number of sensitive people[222, 274]. Other reports say that handling the fruit can cause dermatitis[200, 227].

kcākta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[2, 3, 11, 46, 62, 99]. A very good size, it can be up to 16cm long and 4cm wide[82, 200]. Of variable quality, some forms (with orange skins) are exquisite with the flavour of banana custard whilst others (with yellow, white or dark brown skins) can be unpleasant[57, 85, 183]. Another report says that the white fruits are mildly flavoured and later ripening than the orange fruits[227]. The fruit can also be used for making preserves, pies, ice cream and other sweet desserts[183]. The fruit falls from the tree in autumn and is then stored until fully ripe[227]. The fruit can cause gastrointestinal unsets for some people[274].

tcanta Dye Fibre Insecticide Parasiticide WoodA fibre from the inner bark is used for making strong rope and string[61, 82, 227, 257]. The seed has insecticidal properties[222]. A yellow dye is made from the ripe flesh of the fruit[229]. Wood - light, soft, weak, spongy, coarse grained[82]. It weighs 24lb per cubic foot[227]. It is not used commercially[229]. Landscape Uses: Border, Pest tolerant, Specimen, Woodland Forest garden - a good understory tree. Shelter for wildlife [1-2].

dwatta Antiemetic Diuretic Emetic Laxative Narcotic ParasiticideThe fruit is used as a laxative[222]. The leaves are diuretic[222]. They are applied externally to boils, ulcers and abscesses[4, 222]. The seed contains the alkaline asiminine, which is emetic and narcotic[222, 227]. They have been powdered and applied to hair to kill lice[222]. The bark is a bitter tonic[4]. It contains the alkaline analobine, which is used medicinally[227].

nrakta South-eastern N. America - New Jersey to Florida, west to Texas and Nebraska. ksacta An understorey tree of woodlands, growing in deep rich moist soils of river valleys and bottomlands, often forming dense thickets[229].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. The seed usually germinates in 1 - 3 months at 15°c[134]. Stored seed requires stratification, it has embryo dormancy and an impermeable seedcoat and can take up to 18 months to germinate[113, 134]. Dried seed quickly loses its viability. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for t least their first winter. If trying them outdoors, plant them into their permanent positions in early summer once the plants are more than 15cm tall. Consider giving them some protection from winter cold for their first winter outdoors. Layering.

nwatta Pawpaw is a forest understory tree. Prefers a rich loamy soil with plenty of moisture and a sunny position[1, 134, 160]. Full sun to part shade. Pawpaw is shade tolerant and would prefer some afternoon shade from

other trees or perhaps the shade of a building. Spreads by root suckers to form colonies, so give it room to spread (nfs.unl.edu). Plants are hardy to about -20°c according to one report[184], whilst another says that they are hardy to -35°c when fully dormant[160]. The papaw produces a delicious edible fruit which is a potentially commercial crop[61]. The wild-collected fruit is often sold in local markets in America[82]. The tree commences bearing in 4 - 6 years from seed and yields up to 30 kilos per tree[160]. There are some named varieties[183]. The mature fruit is rarely seen in Britain[182], only ripening after a long hot summer[200]. A small tree growing against a south-facing wall at Bristol Botanical Gardens had a small crop of immature fruit in early September 1996 (following the hot summer of 1995) - this was the first time it had been seen to bear fruit[K]. Flowers are formed in the leaf axils of wood produced the previous summer[82, 229]. Established plants resent root disturbance, the best plants are obtained by planting them out into their permanent positions as young as possible though young plants should be given some protection for their first year or two[200]. The leaves emit a heavy unpleasant odour when crushed[82, 229]. Plants are untroubled by pests or diseases[160]. Special Features: North American native, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1). For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is suckering with suckers sent up away from the trunk from rhizomes, roots, or stolons [1-2]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2]. Form: Rounded, Upright or erect. Flowers are strongly protogynous, self-incompatible and require cross-pollination. However, some trees may be self-compatible; it is an excellent idea to plant two or more trees for cross-pollination.

# 6.2.45 Smilax china

China Root

5 tlin 9 cyuc 4 kcak 0 tcan 3 dwat 4.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Smilax china is a deciduous Climber growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Leaves RootEdible Uses: Rutin TeaRoot - cooked[4, 105, 177]. Rich in starch[2], the large and fleshy roots can be dried and ground into a powder[11]. The root is harvested by severing larger roots near the crown and leaving the smaller roots to grow on[238]. Young shoots and leaves - raw or cooked[105, 159, 177, 179]. Used as a potherb[183]. The leaves are said to contain rutin, but no details of quantity were given[218]. Fruit - raw. Eaten to quench the thirst[105, 177, 183]. The fruit is about 9mm in diameter[200]. A tea is made from the leaves[177, 179, 193]

nrakta Western N. America - British Columbia to California. A garden escape in Britain[17]. ksacta Usually found in wetlands from sea level to 3000 metres[276].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a greenhouse[1, 200]. Germination should take place within a couple of weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. It should also be possible to sow the seed in situ in mid spring. It might be necessary to protect the sowing from mice. Division in March. Difficult. Basal cuttings, April in a cold frame. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Agroforestry Services: Nitrogen Management: Standard New Crop Staple Crop: ProteinAn easily grown plant, succeeding in any moderately good soil in a sunny position[1, 200]. It strongly dislikes excessive winter wet[1]. Requires an acid to neutral soil[200]. Succeeds in poor soils[60]. Plants can be naturalized in the wild garden, especially on stream banks and for flowering above rough grass, where they may be short-lived but will self-seed[200]. Plants dislike root disturbance. There are some named varieties, selected for their ornamental value[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.26 Lathyrus davidii

tfo2n 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lathyrus davidii is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been found for this plant, the seed of some species in this genus contain a toxic amino acid that can cause a severe disease of the nervous system known as 'lathyrism' if they are eaten in large amounts (although small quantities are said to be nutritious)[65, 76]. Great caution is advised.

kcakta Edible Parts: Flowers Leaves Seed SeedpodEdible Uses: Seed - cooked[105, 177]. Some caution is advised, see the notes above on toxicity. Young seedpod - cooked[1077]. Young plant, including the inflorescence - cooked and used as a potherb or added to soups etc[105, 177, 183].

nrakta E. Asia - northern China, Japan, Korea, Manchuria, Russia. ksacta Woods and thickets all over Japan[58]. Hill slopes, forest sides and bush-woods, usually at altitudes lower than 1800 metres in northern China[266].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, then it can also be sown in situ in mid spring[200]. Division in spring. It may not transplant well so care should be taken[200].

nwatta An easily grown plant, succeeding in any moderately good garden soil but preferring a position in full sun[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.27 Onobrychis viciifolia

Sainfoin

tho2n 5 tlin 9 cyuc 1 kcak 4 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hyishrasjlut hpa7tli priklwisslip hpa7tmwatli dyatxre7t hjonli drutta Onobrychis viciifolia is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: One report says that the plant is edible[20], but does not say what part of the plant is used.

tcanta Soil conditioner Soil stabilizationA good soil conditioner for poor light soils[115]. The plants can be grown on the land for a number of years, the deep tap roots breaking up the sub-soil and bringing up minerals from below. Plants can be cut during the growing season but care must be taken not to cut too low because the tap root tends to rise above ground level and the plant can be killed if this is cut off[115]. The plant has an extensive root system and is useful for stabilizing soils[160, 2001. Nitrogen Fixer.

nrakta Europe, including Britain, from France south and east to Spain, Siberia, Caucasus and Iran. ksacta Grassland on chalk and limestone[17].

propta Seed - pre-soak for 12 hours in warm water and so in situ in the spring[1, 200]. Seed can also be sown in situ in the autumn. If seed is in short supply then it might be wiser to sow it in pots in a cold frame in early spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in early summer. Division in the spring just before new growth commences[200]. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a well-drained neutral to alkaline sandy loam in full sun[1, 200]. Succeeds in poor soils[115] and in shallow soils over chalk[200]. Dislikes shade. Does not succeed in wet soils[115]. A good border plant for the vegetable garden[18, 20], the deep tap root helps to break up the subsoil[115]. Plants are resistant to alefalf as tem nematodes[160] and are immune to bacterial wilt disease and attacks by the alfalfa stem weevil[160]. A good bee plant[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 6.1.28 Ulex europaeus

Gorse, Common gorse

tfo2n 5 tlin 9 cyuc 1 kcak 5 tcan 1 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatorik hpa7tmwatli xre7t hionli

drutta Ulex europaeus is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower all year, and the seeds ripen all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: FlowersEdible Uses: TeaThe flower buds are pickled in vinegar and then used like capers in salads[183]. A tea is made from the shoot tips[177, 183].

tcanta Dye Fertilizer Fuel Hedge Hedge Insecticide Pioneer Soap making Soil stabilizationA beautiful yellow dye is obtained from the flowers[4]. It is orange according to another report[168]. Gorse is very tolerant of maritime exposure, it can be used as a windbreak hedge in the most exposed positions, making an impenetrable barrier with its vicious thorns[4, 49, 75, 200]. Planted for soil stabilization on

sandy substrates[200], it is very good for stabilizing road-side banks on poor soils[186]. Gorse is an excellent pioneer species for poor soils and areas with maritime exposure. It is fast-growing, feeds the soil with nitrogen and provides good conditions for woodland trees to become established. These trees will eventually out-compete the gorse, which is unable to reproduce well in the shady conditions and will thus gradually die out[K]. The plant has an old reputation as a pesticide, the soaked seed being used against fleas[4]. The wood burns very well, it was much used in the past for kindling, heating bakers ovens etc[11, 66]. The ashes from the burnt wood are rich in potassium and can be used in making soap[4, 115]. This soap can be made by mixing the ashes with a vegetable oil, or mixing them with clay and forming them into balls[4]. The ashes are also an excellent fertilizer[4, 115].

dwatta BachGorse has never played much of a role in herbal medicine, though its flowers have been used in the treatment of jaundice and as a treatment for scarlet fever in children[4]. The seed is said to be astringent and has been used in the treatment of diarrhoea and stones[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Hopelessness' and 'Despair'[209].

nrakta Western Europe, including Britain, from Scandanavia to Spain. ksacta Moors, commons and heaths, preferring dry soils[4, 11].

propta Seed - pre-soak 24 hours in hot water and sow in individual pots in a greenhouse in late winter to early spring. Germination should take place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants are very intolerant of root disturbance and so should be planted into their permanent positions as soon as possible, though not until after the last expected frosts[78]. Cuttings of half-ripe wood, 7cm with a heel, July/August in a frame. Pot up in spring as soon as rooting commences and plant out into their permanent positions as soon as possible[78].

nwatta An easily grown plant, it requires a poor soil and a sunny position to be at its best[11]. It does well on dry sunny banks or in poor gravelly soils[11]. It is intolerant of shade, nor does it do well on rich soils[11, 182]. Prefers a neutral to slightly acid soil[200], disliking alkaline soils[17]. Plants are very intolerant of root disturbance[11]. Very tolerant of maritime exposure and, once established, drought[75, 186, 200]. Although native to Britain and said to be hardy to about -20°c[184], gorse often suffers badly in severe winters[4, 17], but the plants usually recover[186]. They often accumulate dry dead spines at their centre, this can be a fire risk in dry summers[186, 200]. The plants often resprout from the base after a fire[200] and, even if killed. numerous seedlings will soon spring up to replace the dead plants[186]. Hybridizes freely with other members of this genus[200]. The flowers are strongly scented of coconut[K]. Another report says that the flowers have a smell of vanilla with undertones of orange or pineapple[245]. It is one of the most refreshing of all flower scents[245]. A food plant for the caterpillars of several lepidoptera species[30]. Plants often form dense thickets and these are ideal nesting areas for many species of birds[186]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant

# 6.1.29 Melilotus indicus

Annual Yellow Sweetclover tfo2n 5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Melilotus indicus is a ANNUAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to October.

The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The dried leaves can be toxic, though the fresh leaves are quite safe[76, 218]. This is due to the presence of coumarin, the substance that gives some dried plants the smell of new mown hay. If taken internally it can prevent the blood from clotting.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105].

tcanta Fodder RepellentThe leaves repel insects. They have been placed in beds to repel bedbugs [257].

dwatta Antibacterial Anticoagulant Astringent Emollient Laxative Narcotic PoulticeThe seed is made into a gruel and used in the treatment of bowel complaints and infantile diarrhoea[218, 240]. The plant is discutient, emollient, astringent, strongly laxative and narcotic[218, 240, 257]. It is used externally as a poultice or plaster on swellings[218, 240]. The plant contains coumarin, which is an anticoagulant[218]. The plant also contains dicumarol, which is a broad spectrum bactericide[218].

nrakta Europe - Mediterranean to E. Asia. Naturalized in Britain. ksacta Fields and waste places in S. England and Wales[17].

propta Seed - sow spring to mid-summer in situ[87]. Presoaking the seed for 12 hours in warm water will speed up the germination process, particularly in dry weather[K]. Germination will usually take place within 2 weeks.

nwatta Dislikes shade. This species is often cultivated as a fodder crop and cultivars low in coumarin have been developed[218]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

#### 6.1.30 Caragana sinica

Chinese Pea Shrub

tfo2n 5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Caragana sinica is a deciduous Shrub growing to 1. m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not martitime exposure.

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw or cooked[46, 61, 105, 177]. Boiled and washed[179].

dwatta Antiinflammatory Restorative Tonic VDThe root contains a number of medically active constituents including saponins, stilbenes and caraganosides[279]. It has been shown to have antiinflammatory activity and is used in Korea in the treatment of arthritis, neuralgia, diarrhoea and bone weakness[279]. It is said to be restorative and tonic[74]. The stem is made into a broth with other foods and used in the treatment of advanced syphilis[218].

nrakta E. Asia - N. China, Korea. ksacta Open slopes on mountains in Korea[279].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It usually germinates in 2 weeks[K]. Stored seed should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen then scarify it and re-soak for another 12 hours before sowing[138]. Germination usually takes place within 2 - 3 weeks at  $20^{\circ}$ c[138]. Good percentage[11]. As soon as they are large enough to handle, prick the seedlings out into individual pots

# 6.2.42 Crataegus champlainensis

Quebec hawthorn

5 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 6 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crataegus champlainensis is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A nice sweet flavour, the fruit is about 1.5cm in diameter[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Northern N. America - Quebec to New York and Ontario. ksacta Thickets, streambanks and hillsides[204]. Limestone ridges[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Closely related to C. submollis[200], and included in that species by some botanists[82]. This species is possibly no more than a

part of C. rotundifolia[204].

# 6.2.43 Mespilus germanica

Medla

5 tlin 8 cyuc 4 kcak 1 tcan 1 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Mespilus germanica is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds contain the toxic hydrocyanic acid (the substance that gives almonds their flavour) and should not be eaten in quantity[7].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 5, 7, 12]. The fruit does not always ripen fully in cooler temperate zones such as Britain. However it can be harvested in late autumn (preferably after it has had some frost) whilst still hard and then needs to be bletted before it can be eaten raw. This entails storing it, stalk end upwards, in a cool place for a short while until it is on the point of (but not quite) rotting[200], a state described as incipient decay. At this stage the flesh turns from white to brown, becomes very soft and is quite sweet with an absolutely delicious flavour that somewhat resembles a luscious tropical fruit[K]. The fruit of the wild species is up to 25mm in diameter, though some cultivars can be 65mm or more in diameter[200].

tcanta WoodWood - hard, flexible[100].

dwatta Astringent LaxativeThe pulp of the fruit is laxative[7]. The leaves are astringent[7]. The seed is lithontripic[7]. It is ground up for use, but caution should be employed since the seeds contain the toxin hydrocyanic acid[7]. The bark has been used as a substitute for quinine, but with uncertain results[7].

nrakta S.E. Europe to W. Asia. Occasionally naturalized in Britain. ksacta Woods and hedgerows[7, 17].

propta Seed - best sown as soon as it is ripe in late autumn in a cold frame[78]. The seed has a very hard and impermeable seedcoat and will not usually germinate until it has gone through two winters. Commercially, such seeds are soaked for a short while in sulphuric acid to break down the seed coat and allow the seed to take up moisture, this is a very delicate procedure and difficult to do on a small scale. A home gardener could try soaking the seed for 24 hours in warm water then cold stratifying it for 2 - 3 months at 1 - 5°c before sowing it. Alternatively, if you can harvest the seed green (as soon as it is mature but before the seed coat has dried and hardened), then sow it immediately in a cold frame you might reduce the time needed for it to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood, November in a cold frame. Poor percentage. Layering in autumn or early spring. Takes 18 months[78].

nwatta Succeeds in most soils[11], preferring one that is moist and well-drained[1, 37, 200]. Prefers a sunny position[1, 3] and a fertile soil[188]. Occasionally cultivated for its edible fruit, there are some named varieties[183, 200]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.)

flavour to stewed fruits, jellies and jams (especially gooseberry jam)[238]. They are often used to make a sparkling wine[183]. A sweet tea is made from the dried flowers[21, 183]. The leaves are used to impart a green colouring to oils and fats[183].

tcanta Compost Cosmetic Dye Fungicide Hedge Hedge Insecticide Litmus Microscope Musical Pioneer Pipes Repellent WoodThe plant is a valuable addition to the compost heap[14, 18], its flowers are an alternative ingredient of 'QR' herbal compost activator[32] and the roots of the plant improve fermentation of the compost heap when growing nearby[18]. The leaves are used as an insect repellent[4, 6, 14, 66], very effective when rubbed on the skin though they do impart their own unique fragrance[K]. They can be powdered and placed amongst plants to act as a deterrent[14], or made into a spray when they act as an insecticide[7]. This is prepared by boiling 3 - 4 handfuls of leaves in a litre of water, then straining and allowing to cool before applying[201]. Effective against many insects, it also treats various fungal infections such as leaf rot and powdery mildew[201]. The dried flowering shoots are used to repel insects, rodents etc[101]. The flowers are used in skin lotions, oils and ointments[238]. Tolerant of salt-laden gales, this species can be grown as a shelter hedge in exposed maritime areas[29, 75], it is rather bare in the winter though[K]. This is an excellent pioneer species to use when re-establishing woodlands. It is very tough and wind-resistant, grows quickly and provides shelter for longer-lived and taller woodland species to establish. It will generally maintain itself in the developing woodland, though usually in the sunnier positions[K]. A dye is obtained from the fruit and the bark[13, 15]. The bark of older branches and the root have been used as an ingredient in dveing black[4]. A green dve is obtained from the leaves when alum is used as a mordant[4]. The berries yield various shades of blue and purple dyes[4]. They have also been used as a hair dye, turning the hair black[4]. The blue colouring matter from the fruit can be used as a litmus to test if something is acid or alkaline. It turns green in an alkaline solution and red in an acid solution[4]. The pith in the stems of young branches pushes out easily and the hollow stems thus made have been used as pipes for blowing air into a fire[4]. They can also be made into musical instruments[4]. The pith of the wood is used for making microscope slides and also for treating burns and scalds[46, 61, 100]. The mature wood is white and fine-grained. It is easily cut and polishes well[4]. Valued highly by carpenters, it has many used, for making skewers, mathematical instruments, toys etc[4, 13, 100, 244]. A good forage for animals: mule deer, elk, sheep and small birds. It is classified as nesting habitat for many birds, including hummingbirds, warblers, and vireos. Elderberries are a favorite food for migrating band-tailed pigeons in northern Califor-

dwatta Antiinflammatory Aperient Diaphoretic Diuretic Emetic Emollient Expectorant Galactogogue Haemostatic Laxative Ophthalmic Purgative Salve StimulantElder has a very long history of household use as a medicinal herb and is also much used by herbalists[4]. The plant has been called 'the medicine chest of country people' [4]. The flowers are the main part used in modern herbalism, though all parts of the plant have been used at times[238]. Stimulant[9, 53, 165]. The inner bark is collected from young trees in the autumn and is best sun-dried[4]. It is diuretic, a strong purgative and in large doses emetic[4, 7]. It is used in the treatment of constipation and arthritic conditions[238]. An emollient ointment is made from the green inner bark[4]. The leaves can be used both fresh or dry. For drying, they are harvested in periods of fine weather during June and July. The leaves are purgative, but are more nauseous than the bark[4]. They are also diaphoretic, diuretic, expectorant and haemostatic[4, 7]. The juice is said to be a good treatment for inflamed eves[4]. An ointment made from the leaves is emollient and is used in the treatment of bruises, sprains, chilblains, wounds etc[4]. The fresh flowers are used in the distillation of 'Elder Flower Water'. The flowers can be preserved with salt to make them available for distillation later in the season[4]. The water is mildly astringent and a gentle stimulant. It is mainly used as a vehicle for eye and skin lotions[4]. The dried flowers are diaphoretic, diuretic, expectorant, galactogogue and pectoral[4, 7]. An infusion is very effective in the treatment of chest complaints and is also used to bathe inflamed eyes[4]. The infusion is also a very good spring tonic and blood cleanser[4]. Externally, the flowers are used in poul-

tices to ease pain and abate inflammation[4]. Used as an ointment, it treats chilblains, burns, wounds, scalds etc[4]. The fruit is depurative, weakly diaphoretic and gently laxative[4, 7]. A tea made from the dried berries is said to be a good remedy for colic and diarrhoea[4]. The fruit is widely used for making wines, preserves etc., and these are said to retain the medicinal properties of the fruit[4]. The pith of young stems is used in treating burns and scalds[46, 61, 1001. The root is no longer used in herbal medicine but it formerly had a high reputation as an emetic and purgative that was very effective against dropsy[4]. A homeopathic remedy is made from the fresh inner bark of young branches[4]. It relieves asthmatic symptoms and spurious croup in children[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Sambucus nigra for cough and bronchitis, fevers and colds (see [302] for critics of commis-

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Hedgerows, scrub, woods, roadsides, waste places etc, especially on disturbed base-rich and nitrogen rich soils[9, 17].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78]. Division of suckers in the dormant season.

nwatta Industrial Crop: Dye Industrial Crop: Medicinal Management: Standard Minor Global CropLandscape Uses:Border, Container, Massing, Pollard, Standard, Seashore, Specimen. A very easily grown plant, it tolerates most soils and situations[11, 28, 98], growing well on chalk[28, 98, 186], but prefers a moist loamy soil[200]. Grows well in heavy clay soils. Tolerates some shade but fruits better in a sunny position[37, 200]. Tolerates atmospheric pollution and coastal situations [200]. Another report says that it is intolerant of very smoky atmospheres[186]. The elder is very occasionally cultivated for its edible fruit, there are some named varieties though most of these have been developed for their ornamental value[182]. The subspecies S. nigra alba has white/green fruits that are nicer than the type species and are quite nice raw[K]. The elder also has a very long history of folk use, both medicinally and for a wide range of other uses. All in all it is a very valuable plant to have in the garden. The leaves often begin to open as early as January and are fully open in April[186]. The leaves fall in October/November in exposed sites, later in sheltered positions[186]. Young stems can be killed by late frosts but they are soon replaced from the ground level[186]. Very tolerant of pruning, plants can be cut back to ground level and will regrow from the base[186]. The flowers have a sweet. almost overpowering smell, not exactly pleasant when inhaled near to for it has fishy undertones, but from a distance its musky scent is appealing[245]. Very resistant to the predations of rabbits[17, 186]. The flowers are very attractive to insects[186]. The fruit is very attractive to birds[186] and this can draw them away from other cultivated fruits[14, 186]. The elder is an early colonizer of derelict land, the seed arriving in the defecations of birds and mammals[186]. It is a very good pioneer species for re-establishing woodlands. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage. Not North American native, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[113]. Layering in spring.

nwatta Prefers full sun and a light sandy dry or well-drained soil[1, 11, 200]. Does not require a rich soil, succeeding on marginal land[11]. This species prefers a continental climate with hot summers and cold winters, it does not grow so well in mild maritime areas such as western Britain. The bark smells like liquorice[182]. This plant is closely related to C. ussuriensis. (Rel.)Pojark. (with which it was once united), a low shrub of rocks, forest glades and roadsides[74]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.31 Lespedeza buergeri

tfo2n 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lespedeza buergeri is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: LeavesEdible Uses: Young leaves and plant tops - cooked[105, 177].

nrakta E. Asia - China, Japan. ksacta Rocky places by rivers in mountains, C. and S. Japan[58]. Mountain slopes, forests, roadsides and ditches below 1500 metres in China[266].

propta Pre-soak the seed for 24 hours in warm water and then sow it in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in individual pots in a frame. It can be difficult to get the cuttings through their first winter, it is best to plunge the pots in a bed of ashes in a sheltered border outdoors[78].

nwatta Easily grown in a light loam in full sun[1]. The top growth is not very cold tolerant, although the rootstock is considerably hardier. Plants are usually cut back to the ground in all but very mild winters, though they generally resprout well from the base in the following spring and flower in late summer[182]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 6.1.32 Psoralea orbicularis

Roundleaf Leather Root

tfo2n 5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Psoralea orbicularis is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable  $\operatorname{PH}$ : mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no specific mention of toxicity for this species has been found, at least some members of this genus contain furanocoumarins, these substances can cause photosensitivity in some people[65].

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105, 161, 257].

tcanta Soil stabilizationThe plant is a good soil stabilizer in its natural environment[200].

dwatta Blood purifier FebrifugeA decoction of the root used as a blood purifier and in the treatment of fevers[257].

nrakta South-western N. America. ksacta Moist places below 1500 metres in California[71].

propta Pre-soak the seed for 24 hours in warm water and then sow in early to mid spring in a greenhouse. Either sow the seed in individual pots or pot up the young seedlings as soon as possible in order to avoid root disturbance. Grow them on in the pots until planting out in their final positions. It is usually impossible to transplant this species without fatal damage to the root[200]. Division in spring. With great care since the plant resents root disturbance. It is virtually impossible to divide this species successfully[200].

nwatta Succeeds in an ordinary garden soil[1]. We have very little information on this species but it is growing at Kew in the system beds and seems to be thriving there[K]. Plants are very intolerant of root disturbance, they are best planted out into their permanent positions whilst still small[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 6.1.33 Alnus cordata

Italian Alder

tfo2n 5 tlin 9 cyuc 0 kcak 4 tcan 0 dwat 25 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Alnus cordata is a deciduous Tree growing to 25 m (82ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from April to December, in flower in March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil. The plant can tolerate maritime exposure.

tcanta Hedge Pioneer ShelterbeltAn excellent windbreak for maritime areas[75], it grows quite quickly and establishes well even in very windy sites[K]. Trees 5 years old from seed have reached 4 metres in height and are showing no signs of wind-shaping in a very exposed site in Cornwall[K]. This is an excellent pioneer species for reestablishing woodlands on disused farmland, difficult sites etc. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in guite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K].

nrakta Europe - S. Italy, Corsica. ksacta Very rarely self-sown in Britain, but not naturalised.

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Thrives on poor and dryish soils, even on chalk, but prefers to be near water[11, 200]. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils. Tolerates very infertile sites[11, 200]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. A very ornamental tree[1], it is very fast growing, reaching 12 metres tall in 20 years in an exposed maritime position at Rosewarne in N. Cornwall[75]. Very tolerant of salt winds, it establishes rapidly in exposed positions[75]. According to World Economic Plants, the correct author of this species is (Loisel.)Loisel, and not Desf. as we have given here. However, since all our other sources have guoted Desf., we have decided not to alter it at this time (1999)[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 6.1.34 Gleditsia aquatica

Water Locust

tfo2n 5 tlin 9 cyuc 0 kcak 0 tcan 0 dwat 12 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Gleditsia aquatica is a deciduous Tree growing to  $12 \ m$  (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from July to August, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil. It can tolerate atmospheric pollution.

tcanta Soil stabilization WoodHaving an extensive root system, it is planted for stabilizing wet banks and marshes[200]. Wood - heavy, very hard, strong, durable in contact with the soil, coarse-grained[82, 229]. It weighs 46lb per cubic foot[235]. The wood is extremely durable and is used primarily for making fence posts[229].

nrakta South-eastern N. America - N. Carolina to Florida, west to Texas, Indiana and Arkansas. ksacta Rich lands of river valleys that are subject to inundation, often for a considerable part of the year[82, 229].

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo[78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within 2 - 4 weeks at 20°c. As soon as they are large enough to handle, prick the seedlings out into individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Easily grown in a loamy soil, requiring a sunny position[11]. Succeeds in most soils[200]. Tolerates atmospheric pollution[200]. Rather tender when young, it grows best in S. Britain[11]. A slow-growing tree[11], it is growing well at the Hillier Arboretum in Hampshire where a tree was 7 metres tall and 8 metres wide in 1993[K]. Trees have a light canopy, they come into leaf late in the spring and drop their leaves in early autumn[200] making them an excellent top storey tree in a woodland garden. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.35 Caragana decorticans

tfo2n 5 tlin 9 cyuc 0 kcak 0 tcan 0 dwat 5.4 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Caragana decorticans is a deciduous Shrub growing to 5.4 m (17ft 9in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Leather StringThe bark is used as a binding material [146], it takes a good polish and when new resembles leather in appearance [11].

nrakta E. Asia - Afghanistan to northern Pakistan. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[200]. It usually germinates in 2 weeks[K]. Stored seed should be pre-soaked for 24 hours in warm water then sown in a cold frame[78, 113, 200]. If the seed has not swollen then scarify it and re-soak for another 12 hours before sowing[138]. Germination usually takes place within 2- 3 weeks at  $20^{\circ} \text{cl} 138$ ]. Good percentage[11]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7- 10cm with a heel, July/August in a frame[113]. Layering in spring.

nwatta Prefers full sun and a light sandy dry or well-drained soil[1, 11, 200]. Does not require a rich soil, succeeding on marginal land[11]. This species is hardy to at least 15°c[200], it prefers a continental climate with hot summers and cold winters so it does not grow so well in the milder western half of Britain[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 6.1.36 Coronilla emerus

Scorpion Senna

tfo2n 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 2.7 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Coronilla emerus is an evergreen Shrub growing to 2.7 m (8ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no mention of toxicity has been seen for this species, some members of the genus are poisonous[9, 13, 19, 65] and so some caution is advised.

dwatta Cardiac DiureticThe plant is cardiac and di-

nrakta C. and S. Europe to N. Africa. ksacta Thin woodland and rocky places in limestone hills[11, 45].

propta Seed - scarify and then pre-soak the seed for 1 -  $2\ hours$  in warm water[164]. A period of cold stratification is also said to be helpful[200]. Sow the seed in spring in a greenhouse. Germination usually takes place in 4 -  $6\ weeks$  at  $15^{\circ}c[164]$ . Pot up the seedlings as soon as possible into individual pots and plant them out in the following spring[164]. Cuttings of greenwood, June in a frame with bottom heat[11]. Cuttings of half-ripe wood, July/August in a frame[11]. Cuttings of nearly mature side shoots, firm at the base and 7-  $10\ cm$  long with a heel, October/November in a frame. Plants are well rooted after  $12\ months$ . Good percentage[78].

out in the summer or following spring. Division in spring as new growth begins[1]. Very easy, you can plant the divisions straight out into their permanent positions if required[K]. Basal cuttings in March. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses: Ground cover. Screen. Easily grown in a good garden soil in sun or semi-shade[1, 53] Prefers a deep rich loam[37] and a warm sheltered position[187]. Plants can succeed in dry shade if plenty of humus is incorporated into the soil, once established they are also somewhat drought tolerant[190]. Hops are reported to tolerate an annual precipitation of between 31 and 137cm. an annual temperature in the range of 5.6 to 21.3°C and a pH of 4.5 to 8.2[269]. Plants are very hardy tolerating temperatures down to about -20°c when dormant[187]. The young shoots in spring, however, can be damaged by any more than a mild frost[269]. A climbing plant, supporting itself by twining around the branches of other plants[219]. Hops are frequently cultivated, both commercially and on a domestic scale, in temperate zones for their seed heads which have many medicinal qualities and are also used as a flavouring and preservative in beer. There are many named varieties[183]. They grow best between the latitudes of 35 - 51°N and 34 - 43°S, with mean summer temperatures of 16 - 18°C[269]. Generally, for beer making, the unfertilized seed heads are preferred and so most male plants are weeded out[4]. Hops are fairly deep rooted, but with a network of shallow feeding roots. These horizontal feeding roots spread out at depth of 20 - 30 cm in the soil and give rise to fibrous roots in upper layers of soil[269]. The vertical roots develop downwards to a depth of about 150 cm with a spread of 183 - 244 cm and have no fibrous roots[269]. The bruised leaves are refreshingly aromatic whilst the flowers cast a pleasing scent[245]. A food plant for many caterpillars[30]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Edible, Invasive, Naturalizing, Attracts butterflies, Suitable for dried flowers, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 6.2.40 Phyllostachys aureosulcata

Yellow-Groove Bamboo

5 tlin 11 cyuc 4 kcak 2 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys aureosulcata is an evergreen Bamboo growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - raw or cooked. They have very little bitterness, even when eaten raw[183, 195]. The canes of plants grown in Britain are about 25mm in diameter[K], though they can reach up to 4cm in diameter[266]. The shoots are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level. Young culms are green with yellow grooves.

tcanta Plant support WoodThe canes are not of the best quality but make good plant supports[195]. A good screen plant.

nrakta E. Asia - N.E. China. ksacta Not known

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take  $3 \cdot 6$  months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position One report says that this is a very hardy plant, withstanding temperatures down to about -20°c, whilst another says that it dislikes prolonged exposure to hard frosts[200]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. The rootstock is running but only slightly so in the cooler climate of Britain. In warmer climates (e.g. US South West) it can spread indefinitely if not confined with an underground barrier. The bottoms of some culms have large kinks in them, this limits their use for timber etc but makes them more ornamental. Heat zone: 12-3.

### 6.2.41 Sambucus nigra

Elderberry - European Elder, Black elderberry, American black elderberry, Blue elderberry, Europea  $5 \, \mathrm{lin} \, 7 \, \mathrm{cyuc} \, 4 \, \mathrm{kcak} \, 5 \, \mathrm{tcan} \, 3 \, \mathrm{dwat} \, 6 \, \mathrm{m} \, \mathrm{hkuc}$ 

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Sambucus nigra is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender It is in leaf from March to November, in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista The leaves and stems are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: Colouring TeaFruit - raw or cooked[2, 3, 5, 46, 61]. The flavour of the raw fruit is not acceptable to many tastes, though when cooked it makes delicious jams, preserves, pies and so forth[K]. It can be used fresh or dried, the dried fruit being less bitter[12, 183, 238]. The fruit is used to add flavour and colour to preserves, jams, pies, sauces, chutneys etc, it is also often used to make wine[13, 183]. The fruit is about 8mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked[2, 5, 12, 53]. They can also be dried for later use[21]. The flowers are crisp and somewhat juicy, they have an aromatic smell and flavour and are delicious raw as a refreshing snack on a summers day, though look out for the insects[K]. The flowers are used to add a muscatel

nrakta E. Asia. Occasionally self-sows in Britain[17]. ks-acta Mountain thickets and rocky slopes[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. A very hardy species, tolerating temperatures down to at least -18°c[202]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

### 6.2.39 Humulus lupulus

Hop, Common hop, European Hop, 5 tlin 7 cyuc 4 kcak 3 tcan 5 dwat 6 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Humulus lupulus is a PERENNIAL CLIMBER growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Skin contact with the plant causes dermatitis in sensitive people[222]. Hops dermatitis has long been recognized. Not only hands and face, but legs have suffered purpuric eruptions due to hop picking. Although only 1 in 3,000 workers is estimated to be treated, one in 30 are believed to suffer dermatitis[269]. Dislodged hairs from the plant can irritate the eyes[222]. Sedative effect may worsen depression. Avoid during pregnancy (due to antispasmodic action on uterus). Avoid with breast, uterine and cervical cancers [301]

kcakta Edible Parts: Leaves Root ShootsEdible Uses: Drink Rutin TeaYoung leaves and young shoots - cooked[2, 4, 5, 7, 9, 33, 37]. The flavour is unique and, to many tastes, delicious[183]. Young leaves can be eaten in salads[1, 183]. Use before the end of May[12]. The leaves contain

rutin[218]. The fleshy rhizomes are sometimes eaten[183]. A tea is made from the leaves and cones[183]. It has a gentle calming effect[4]. The dried flowering heads of female plants are used as a flavouring and preservative in beer[2, 183]. They are also medicinal[2]. The flowering heads are sprinkled with bitter-tasting yellow translucent glands, which appear as a granular substance[4]. This substance prevents gram-negative bacteria from growing in the beer or wort[269]. Much of the hop's use as a flavouring and medicinal plant depends on the abundance of this powdery substance[4]. The seeds contain gamma-linolenic acid, an essential fatty acid that is said to have many important functions in the human body and is rarely found in plant sources[218]. The essential oil in the flowering heads is used as a flavouring in cereal beverages and mineral waters[269]. Extracts from the plant, and the oil, are used as flavouring in non-alcoholic beverages, frozen dairy desserts, candy, baked goods and puddings, with the highest average maximum use level of 0.072% reported for an extract used in baked goods[269].

tcanta Dye Essential Fibre PaperA fine brown dye is obtained from the leaves and flower heads[4, 100, 269]. An essential oil from the female fruiting heads is used in perfumery[213, 238]. Average yields are 0.4 - 0.5%[240]. Extracts of the plant are used in Europe in skin creams and lotions for their alleged skin-softening properties[269]. A fibre is obtained from the stems[46]. Similar to hemp (Cannabis sativa)[100] but not as strong[115], it is used to make a coarse kind of cloth[4]. It is sometimes used for filler material in corrugated paper or board products, but is unsuited for corrugated paper because of low pulp yield and high chemical requirement, or for production of high-grade pulp for speciality paper[269]. The fibre is very durable but it is difficult to separate, the stems need to be soaked beforehand for a whole winter[4]. A paper can also be made from the fibre, the stems are harvested in the autumn, the leaves removed and the stems steamed until the fibres can be removed. The fibre is cooked for 2 hours with lye and then hand pounded with mallets or ball milled for 2½ hours. The paper is brown in colour[189].

dwatta Anodyne Antianxiety Antibacterial Antiseptic Antispasmodic Appetizer Diuretic Dysentery Febrifuge Galactogogue Hypnotic Leprosy Nervine Sedative Stomachic TonicHops have a long and proven history of herbal use, where they are employed mainly for their soothing, sedative, tonic and calming effect on the body and the mind. Their strongly bitter flavour largely accounts for their ability to strengthen and stimulate the digestion, increasing gastric and other secretions[254]. The female fruiting body is anodyne, antiseptic, antispasmodic, diuretic, febrifuge, hypnotic, nervine, sedative, stomachic and tonic[4, 9, 21, 46, 165, 192, 218]. Hops are widely used as a folk remedy to treat a wide range of complaints, including boils, bruises, calculus, cancer, cramps, cough, cystitis, debility, delirium, diarrhoea, dyspepsia, fever, fits, hysteria, inflammation, insomnia, jaundice, nerves, neuralgia, rheumatism, and worms[269]. The hairs on the fruits contain lupulin, a sedative and hypnotic drug[213, 218]. When given to nursing mothers, lupulin increases the flow of milk - recent research has shown that it contains a related hormone that could account for this effect[7]. The decoction from the flower is said to remedy swellings and hardness of the uterus[269]. Hop flowers are much used as an infusion or can also be used to stuff pillows where the weight of the head will release the volatile oils[213]. The fruit is also applied externally as a poultice to ulcers, boils, painful swellings etc[4, 218], it is said to remedy painful tumours[269]. The female flowering heads are harvested in the autumn and can be used fresh or dried[238]. Alcoholic extracts of hops in various dosage forms have been used clinically in treating numerous forms of leprosy, pulmonary tuberculosis, and acute bacterial dysentery, with varying degrees of success in China. The female fruiting body contains humulone and lupulone, these are highly bacteriostatic against gram-positive and acid-fast bacteria[240]. A cataplasm of the leaf is said to remedy cold tumours[269]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Humulus lupulus for nervousness and insomnia (see [302] for critics of commission E).

nrakta Much of Europe, including Britain, to W. Asia. ksacta Hedgerows, woodlands and sunny waste ground[7].

propta Seed - sow spring in a cold frame[37]. Germination is fairly quick. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant

nwatta Succeeds in a sunny position in most well-drained soils[184], preferring a moderately rich loamy soil[11, 182, 200]. An easily grown plant[11], it is hardy to about -20°c[184] if it is sheltered from cold winds[200]. Plants can be pruned almost back to the base if required, they usually resprout freely[200]. The flowers are sweetly scented[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Plants in this genus are notably resistant to honey fungus[200].

# 6.1.37 Centrosema virginianum

Butterfly Pea, Spurred butterfly pea tfo2n 5 tlin 9 cyuc 0 kcak 0 tcan 0 dwat 2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli frusflat priklwis hpa7tmwatli xre7t hjonli

drutia Centrosema virginianum is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Green manure Soil stabilizationThe plant can be allowed to grow without supports and it will then sprawl over the ground as an effective ground cover[200]. Plants have been grown as a green manure[200]. The plants extensive root system makes it useful for stabilizing soils and controlling erosion[200].

nrakta South-eastern N. America, as far north as New Jersey, southwards into the Tropics. ksacta Dry sandy soils in woodlands[200].

propta Seed - pre-soak for 12 hours in warm water and sow in a greenhouse in the spring. Prick out the seedlings into individual pots once they are large enough to handle and plant out in the summer

nwatta Succeeds in any sandy or loamy soil in a sunny position[200]. Tolerant of poor acid soils, dry soils and drought[200]. A climbing plant, supporting itself by twining around other plants[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 6.1.38 Lespedeza formosa

Oriental lespedeza tfo2n 5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lespedeza formosa is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in September, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta BroomThe twigs are used in making brooms [151].

nrakta E. Asia - China, Japan. ksacta Mountain slopes, forest margins, roadsides and thickets below 2800 metres[266].

propta Pre-soak the seed for 24 hours in warm water and then sow it in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August

in individual pots in a frame. It can be difficult to get the cuttings through their first winter, it is best to plunge the pots in a bed of ashes in a sheltered border outdoors[78].

nwatta Easily grown in a light loam in full sun[1]. The top growth is not very cold tolerant, although the rootstock is considerably hardier. Plants are usually cut back to the ground in all but very mild winters, though they generally respret well from the base in the following spring and flower in late summer[182]. A very ornamental plant[1]. This species is extremely variable in the shape of leaflets, size of flowers and split-length of calyx. However, these characters are continuous and overlapping, without a clearly defined concept and cannot be used to distinguish different species or infraspecies[266]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.39 Ceanothus species

tfo2n 5 tlin 9 cyuc 0 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ceanothus species is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta A green dye is obtained from the flowers[168]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K].

nrakta A collection of garden hybrids of uncertain parentage. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place in 1 - 2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. This is a garden hybrid and it will not breed true from seed. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel. October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. Some of the cultivars included here are tolerant of clay soils[260]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is

other plants growing nearby[200, 212].

# 6.1.40 Thermopsis villosa

Aaron's rod. Carolina lupine

tfo2n 5 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Thermopsis villosa is a PERENNIAL growing to 1.5 m (5ft) by 0.7 m (2ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Foliage is toxic [1-2].

kcakta None Known

tcanta Nitrogen Fixer. Invertebrates shelter: beneficial for insects and other arthropods [1-2].

nrakta Native only to forest openings in the Appalachians, but it is adaptable to rich garden soils throughout the eastern United States. ksacta Woodland clearings, open meadows, prairies, road banks and disturbed fields.

propta Root Division, Seed-scarify seedcoat, germinate at room temperature or with bottom heat. Mature plants may be divided in the fall.

nwatta An herbaceous perennial plant in the legume family with a flower head resembling yellow lupins. Soil Moisture: Dry to Medium. Light Requirement: Sun , Part Shade. Soil pH: Acidic (pH<6.8). Soil: Humus-rich, welldrained soil. Bloom Time: July. Bloom Description: Yellow. Flower: Showy. Tolerates Drought and Dry Soils. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Sometimes still sold as Thermopsis caroliniana.

# 6.1.41 Indigofera kirilowii

Kirilow's indigo. Indigo

tfo2n 5 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Indigofera kirilowii is a deciduous Shrub growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

dwatta OphthalmicOphthalmic[151].

nrakta E. Asia - China, Japan, Korea. ksacta Grassy places and scrub in sunny positions[200].

propta Pre-soak the seed for 12 hours in warm water and sow February in a warm greenhouse. The germination can be variable. Prick out the seedlings when large enough to handle and overwinter the young plants in a greenhouse for the first winter, planting out in late spring or early summer after the last expected frosts[78]. Cuttings of half-ripe wood, 5 - 8cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Overwinter the young plants in a greenhouse for the first winter and plant out in late spring or early summer[11]. Root cuttings 3cm long in December. Good percentage[78]. Suckers. Remove them in the dormant season, preferably towards the end of winter, and plant out into their permanent positions.

nwatta Landscape Uses:Border, Erosion control, Ground cover, Massing, Rock garden, Specimen, Requires a light or medium well-drained soil and a sunny position[11, 200]. Succeeds on chalk[11]. The rootstock is hardy to about -20°c[200] and plants resprout from the base if they are cut back by winter cold. Plants are only sometimes cut to the ground in the winter[11]. They flower on the current years growth[184] and flower more freely if they are pruned to the

utilized by the growing plant but some can also be used by ground during the winter. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Not North American native, Attracts butterflies, Attractive flowers or blooms

### 6.1.42 Desmodium elegans

tfo2n 5 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Desmodium elegans is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Fibre FuelA fibre from the bark is used for ropes and paper making[146, 158]. The wood is a good fuel[146, 1581.

dwatta Carminative Cholera Diuretic TonicThe roots are carminative, diuretic and tonic[240, 272]. They are used in the treatment of bilious complaints [240, 243]. The juice of the root, sometimes combined with the bark juice of Bauhinia malabarica, is used in the treatment of cholera[272]. The juice of the bark is used in the treatment of peptic ul-

nrakta E. Asia - Himalayas to W. China. ksacta Dry grassy slopes and in glades in deodar forests to 2700 metres[146]. Forest margins, forests, thickets, mountain slopes, rocky places, roadsides and ditches at elevations of 1000 - 4000 metres[266].

propta Seed - best sown as soon as it is ripe in a greenhouse. Scarify and pre-soak stored seed for 5 hours in warm water then sow March in a greenhouse. The seed usually germinates within 1 - 4 months at 25°c. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer and consider giving them some protection from frost in their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in a frame. Division as the plant comes into growth in the spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings in winter.

nwatta Succeeds in most soils so long as they are welldrained[182, 200]. Requires a sunny sheltered position[175, 1821. Plants are hardy to about -15°c[184]. Requires long hot summers to be at its best, the flowers are produced on the current years growth and do not open in cold wet seasons[11]. Plants send up new shoots 1 - 1.5m long annually from a woody base[11]. If the plant is not cut back to the ground by winter cold then it is best to prune it hard in late winter in order to encourage better flowering[182]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 6.1.43 Sophora flavescens

Ku Shen. Shrubby sophora

tfo2n 5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 1.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sophora flavescens is an evergreen Shrub growing to 1.5 m (5ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and

poorly[200]. They hybridize freely with other members of this genus[200]. This species is sometimes held to include a number of very similar species which are here treated as separate entities[81, 82]. See P. edulis, P. monophylla and P. quadrifolia. These species differ mainly in the number of leaves in a bundle[1]. The sub-species P. cembroides orizabensis. D. Baill. has larger seeds than the type[200]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

# 6.2.37 Cvdonia oblonga

5 tlin 9 cyuc 4 kcak 3 tcan 2 dwat 7.5 m hkuc pcimhmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cydonia oblonga is a deciduous Tree growing to 7.5 m (24ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is poisonous[200]. Like many of the species in the family Rosaceae it contains hydrogen cyanide (this is the substance that gives almonds their characteristic flavour). In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: Flowers FruitEdible Uses: Drink Gum Pectin PectinFruit - raw or cooked[4]. When grown in warm temperate or tropical climates, the fruit can become soft and juicy and is suitable for eating raw[4]. In cooler climates such as Britain, however, it remains hard and astringent and needs to be cooked before being eaten[4]. It is used in jellies, preserves etc[9, 183]. The cooked fruit adds a delicious flavour to cooked apples[3, 37, 46, 61]. Strongly aromatic with a firm but rather gritty flesh[200]. The fruit is rich in pectin[200]. The fruit is about 10m long and 9cm wide, tapering to the stalk[200]. A nutritional analysis is available[218]. A drink can be made by adding the dried crushed seed to water, simmering for 5 minutes and sweetening to taste[183]. Flowers[183]. No further details are given.

tcanta Gum Pectin Pectin Rootstock SizeA mucilage obtained from the seed coat is used as a gum arabic substitute to add gloss to material[61, 74]. The seed contains 20% mucilage and 15% fatty oils[74]. The fruit is rich in pectin[200]. Pectin is said to protect the body against radiation[201]. The leaves contain 11% tannin[240].

dwatta Antiinflammatory Antivinous Astringent Cardiac Carminative Demulcent Digestive Diuretic Emollient Expectorant Hypotensive Laxative Pectoral Refrigerant Restorative Stimulant TonicThe stem bark is astringent, it is used in the treatment of ulcers[218]. The seed is a mild but reliable laxative, astringent and anti-inflammatory[9]. When soaked in water, the seed swells up to form a mucilaginous mass. This has a soothing and demulcent action when taken internally[4] and is used in the treatment of respiratory diseases, especially in children[240]. This mucilage is also applied externally to minor burns etc[9]. The fruit is antivinous, astringent, cardiac, carminative, digestive, digretic, emollient, expectorant, pectoral, peptic, refrigerant, restorative, stimulant and tonic[4, 9, 46, 218]. The unripe fruit is very astringent, a syrup made from it is used in the treatment of diarrhoea and is particularly safe for children[4, 254]. The fruit, and its juice, can be used as a mouthwash or gargle to treat mouth ulcers, gum problems and sore throats[254]. The leaves contain tannin and pectin[240]. Tannin can be used as an astringent whilst pectin has a beneficial effect on the circulatory system and helps to reduce blood pressure[K].

nrakta Europe - Mediterranean. An occasional garden escape in Britain[17], ksacta Damp rich soils in hedgerows and thickets[50, 254].

propta Seed - probably best sown in a cold frame as soon as it is ripe[K], it can also be sown in February[78]. It requires stratification[98], pre-chill the seed for 18 weeks if it is fresh, whilst old seed will require 2 weeks of warm stratification first and then 18 weeks cold treatment[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood, November in a cold frame[3, 37]. Layering in spring. Takes 1 year[78]. Suckers, removed in spring[200].

nwatta Succeeds in most soils but prefers a light moist fertile soil and a sunny position[3, 37, 200]. Dislikes very dry or waterlogged soils[202]. Succeeds in semi-shade but does not fruit so well in such a position[202]. Plants also tolerate guite deep shade[219], though they will often not fruit at all in such a position[K]. Plants are hardy to about -15°c[202], though the fruit seldom ripens in the north of Britain unless it is grown against a sunny wall[4]. The quince has been cultivated for over two thousand years for its edible fruit and its seed, though it is not a widely grown crop[4, 46, 61, 132]. It is also much used as a dwarfing rootstock for pears and some other fruits[200]. There are some named varieties[200]. Plants require warm summers in order to fully ripen their fruit[200]. The var. 'Maliformis' ripens well in cooler summers[200]. The plant is heat tolerant in zones 9 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones. 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

# 6.2.38 Crataegus laciniata

5 tlin 9 cvuc 4 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus laciniata is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. A pleasant acid taste[74]. The fruit is about 1.5cm in diameter[200]. A nice taste with a very good flesh to seed ratio, it can be eaten in quantity for dessert[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta WoodWood - heavy, close-grained, hard and tough. Used for tool handles etc[82, 74].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

728 753 oilLandscape Uses: Specimen, Espalier. Requires a welldrained moisture-retentive fertile soil in a warm sunny position[11, 200]. Succeeds in light shade but fruits better in a sunny position[200]. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but is apt to become chlorotic if too much is present[11]. Prefers a pH in the range 6.5 to 7.5[200]. Dislikes clay soils[37, 61]. Intolerant of saline soils[200]. Trees drop their fruit buds if there is a summer drought[200]. The apricot is widely cultivated for its edible fruit in temperate areas that have long hot summers, there are many named varieties[183, 200]. The tree is perfectly hardy in Britain but it usually flowers very early in the spring and the flowers are then liable to be destroyed by frosts[11]. It really requires a more continental climate (with its clearly defined seasons) than it gets in Britain. However, if given the benefit of a south or west facing wall and some protection from frosts when it is in flower, reasonable crops can usually be produced in southern England[1, 219]. The plants are self-fertile[200], but hand pollination would be advisable since they are normally flowering before many pollinating insects are active. In Britain apricots are usually grown on plum rootstocks, 'St. Julien A' is the most widely used[200]. The dwarfing rootstock 'Pixie' is also a possibility, but this must be double worked with 'St. Julien A' because it is incompatible with apricots[200]. Any pruning should be carried out in the summer to allow rapid healing and therefore less risk of infection[201]. Oats should not be grown near apricots because their roots have an antagonistic effect on the roots of the apricot[201]. Tomatoes and potatoes are also bad companions for apricots[201]. If nasturtiums (Tropaeoleum spp) are grown under apricots they will make the fruit less palatable to insects, though this is not detectable by the human palate[201]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Edible, Not North American native, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

# 6.2.36 Pinus cembroides

Mexican Pine Nut, Pinyon Pine 5 tlin 8 cyuc 4 kcak 4 tcan 2 dwat 8 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus cembroides is an evergreen Tree growing to 8 m (26ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Inner bark SeedEdible Uses: CondimentSeed - the oily seed kernel is eaten raw, roasted, ground into a powder for making bread, cakes etc or made into a nut butter[1, 2, 11, 34, 62, 63, 92, 94, 183]. An excellent flavour[227]. A good size, the seeds are up to 15mm long[200]. Said to be the highest in protein and lowest in starch of all the piñons[183]. The seed contains about 14.6% protein, 62% fat. 17.3% carbohydrate[85]. This species pro-

vides a major source of seeds for sale in Mexico[229]. Inner bark - only used in times of dire need[85]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Adhesive Dve Herbicide Pitch WoodA tan or green dve is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201], A gum pitch is used as a glue for waterproofing and repairing pottery[117, 227]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - soft, light, close-grained[82]. Somewhat fragrant when burnt[227]. Used for fuel and posts, but rarely for lum-

dwatta PoulticeThe gum exuding from damaged areas of the tree is used to treat sore throats[92, 117]. The turpenine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta Southern N. America - Arizona to Texas, south to Mexico. ksacta Hot arid mountain slopes above 2000 metres, with juniper and scrub oak[82, 181]. Usually in poor, shallow, rocky or gravelly soils[229].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Management: Standard Regional Crop Staple Crop: Protein-oilLandscape Uses:Pest tolerant, Screen, Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought, succeeding in hot, dry positions[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between 5 and -10°c[200]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. A slow growing plant[81, 120], it takes 25 years from seed before cones are formed[117]. The tree takes 250 - 350 years to reach full maturity[181]. The cones open and shed their seed whilst still attached to the tree[226]. Plants are strongly outbreeding, self-fertilized seed usually grows

female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The plant contains cytosine, which resembles nicotine and is similarly toxic[238]. The plant is poisonous when used in quantity[74, 174].

tcanta Insecticide Parasiticide ParasiticideThe plant is a source of an insecticide and parasiticide[74, 176]. No further details

dwatta Anthelmintic Antibacterial Antifungal Antipruritic Astringent Bitter Carminative Diuretic Dysentery Eczema Febrifuge Leprosy Parasiticide Parasiticide Pectoral Stomachic Tonic UrinaryThe root is anthelmintic, antibacterial, antifungal, antipruritic, astringent, bitter, carminative, diuretic, febrifuge, parasiticide, pectoral, stomachic and tonic[61, 147, 174, 176, 178, 218, 279]. It is used internally in the treatment of jaundice, dysentery, diarrhoea and urinary infections[238]. It is used both internally and externally in the treatment of vaginitis, eczema, pruritis, ringworm, leprosy, syphilis, scabies and itching allergic reactions[238]. The root is harvested in the autumn and dried for later use[238]. The plant is anthelmintic and diuretic[218]. It also has antibacterial activity, inhibiting the growth of Mycobacterium tuberculosis and Trichomonas vaginitis[176. 2181.

nrakta E. Asia - Russia to China. ksacta Scrub on mountain slopes, river valleys[74], especially on sandy soils[11]. Grassy places in lowland and waste ground, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Pre-soak stored seed for 12 hours in hot (not boiling) water and sow in late winter in a greenhouse[78]. Prick out the seedlings as soon as they are large enough to handle into individual pots in the greenhouse, and grow then on for 2 years under protected conditions. Plant them out into their permanent positions in early summer of their third year. Cuttings of young shoots with a heel, July/August in a frame[11]. Air-layering[200].

nwatta Succeeds in a well-drained moderately fertile soil in full sun[200]. Requires the protection of a sunny wall if it is to flower[182], and succeeds only in the mildest areas of the country. It grows best in the warmer areas of the country where the wood will be more readily ripened and better able to withstand winter cold[219]. Although hardy to at least -15°c[238], this species does not do very well in the relatively cool summers of Britain, the plant gradually weakens and eventually succumbs[11]. It can be grown in the milder areas of the country and be treated like a herbaceous perennial, growing afresh from the base each spring[233]. An important medicinal herb in China[61]. Plants should be containergrown and planted out whilst young, older plants do not transplant well[219]. A polymorphic species[58]. The flowers are produced on the current years growth[182]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 6.1.44 Gleditsia macracantha

tfo2n 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gleditsia macracantha is a deciduous Tree growing to 18 m (59ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

tanta SoapA soap substitute is obtained from the seedpods[46, 61, 109]. Wood - strong, durable, coarse-grained[82].

dwatta AnaestheticThe twigs and the leaves contain the alkaloids gleditschine and stenocarpine[4]. Stenocarpine has been used as a local anaesthetic whilst gleditschine causes stupor and loss of reflex activity[4].

nrakta E. Asia - China. ksacta Streamsides and open country at low altitudes[109].

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo[78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within  $2\cdot 4$  weeks at  $20^{\circ}\mathrm{c}.$  As soon as they are large enough to handle, prick the seedlings out into individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Easily grown in a loamy soil, requiring a sunny position[11]. Succeeds in most soils[200] including sandy ones[188]. Tolerates drought once established[1] and atmospheric pollution[200]. Rather tender when young, it grows best in S. Britain[11]. Trees have a light canopy, they come into leaf late in the spring and drop their leaves in early autumn[200] making them an excellent top storey tree in a woodland garden. The flowers have a delightful vanilla fragrance[245]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.45 Cytisus decumbens

Prostrate Broom

tfo2n 5 tlin 8 cyuc 0 kcak 4 tcan 0 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslio hpa7tmwatli hionli

drutta Cytisus decumbens is an evergreen Shrub growing to  $0.2 \, \mathrm{m}$  (off 8in) by  $1 \, \mathrm{m}$  (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate droudht.

pcista Can cause paralysis or death in extreme cases [1-2]

kcakta None Known

tcanta Soil stabilizationNitrogen fixer. Groundcover. A reasonable groundcover shrub with a medium density. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2]. Container gardening. Erosion control.

nrakta Native to Europe. ksacta Central France to Albania and southern Italy, on open hillsides.

propta

nwatta A flowering deciduous shrub with branching stems that are wirv and hairy leaves. Sun: Full Sun. Partial Shade. Soil Type: Sandy, Loamy. Soil Moisture: Dry, Moderate. Soil pH: 5.0 - 8.0. Drought: Tolerant. Root Type: Fibrous ShallowGrowth Rate: Moderate. Life Span: Short. Form: Prostrate. Texture: Medium. Fungal Types: Endomycorrhizal. Seasonal Interest: Spring-Summer. Notes: This plant needs good drainage but is tolerant of nutrientpoor soils. Fruit Type: Pod. Flower Color: Yellow. USDA Hardiness Zones: 5 - 8. Flood: Sensitive.Salt: Intolerant. Soil Compaction: Intolerant. Cold Injury: Infrequent. Wind Storm Damage: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor. Animal Damage: Deer. Bloom Time: Late Spring - Early Summer [318-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2].

### 6.1.46 Genista hispanica

Spanish Gorse

tto 2n 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.8 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Genista hispanica is a deciduous Shrub growing to 0.8 m (2ft 7in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Hedge HedgePlants can be grown as a low hedge[29]. A good ground cover for sunny positions[190]. Plants take about 2 years to form an effective cover[197]. They should be spaced about 60cm apart each way and can be pruned back hard if they become open or straggly with age[208].

dwatta DiureticThe flowers have been used in the treatment of dropsy[4].

nrakta W. Europe - France to Spain. ksacta Scrub and open rocky hills in lowland and mountains[184].

propta The seed requires a period of cold stratification and is best sown autumn in a cold frame. Pre-soak stored seed for 24 hours in warm water and sow February in a cold frame. Good germination[78]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Cuttings of half-ripe wood, 5 - 10 cm with a heel, July/August in a frame. Roots are formed in the spring[11]. Cuttings of ripe wood, 5 - 10 cm with a heel, September/October in a frame. Good percentage. Plant out the following autumn[78].

nwatta Easily grown in a light well-drained soil in a sunny position[1]. Prefers a rather dry stony or sandy soil and does better in one on the poor side[11]. Established plants are drought tolerant[190]. Plants are hardy to about -20°c[184]. Resents root disturbance and should be planted into its permanent position whilst small[11]. A very ornamental plant[1], it grows well on the top of walls and on hot dry banks, covering them with a dense mass of prickly greenery[182]. The flowers have a sweet refreshing perfume, like ripe apples or pineapples[245]. Plants occasionally die back in the centre of the clump, especially after cold wet winters. Cut out the dead growth and layer living shoots into the gap[200]. Closely related to G. tournefortii. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 6.1.47 Lotus uliginosus

Greater Bird's Foot Trefoil

tfo<br/>2n 5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.4 m hkuc htut cyutli tcuphja<br/>7n hwicli hyishrasjlutnyik hpa7tli frusflat-

priklwis hpa7tmwatli xre7t hjonli

drutta Lotus uliginosus is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista No reports of toxicity have been seen for this species but at least one member of the genus contains toxic cyanogenic glycosides[65, 76].

kcakta None Known

tcanta Insecticide Soil reclamationAn insecticide is obtained from the plant[153]. No more details are given. This species is used as a pioneer plant in the reclamation of peat and pumice soils and on other wet acid soils that are unsuitable for the more commonly used Trifolium spp[200]. Nitrogen Fixer.

nrakta S.W. Europe - Portugal, Spain. ksacta Marshes, ditches, freshwater margins and wet grassland[50, 200].

propta Pre-soak the seed for 24 hours in warm water and then sow in situ in the spring or autumn. The seed usually germinates in 2 - 4 weeks at 15°c. If seed is in short supply, it can be sown in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring or early summer.

nwatta Succeeds in wet acid soils[200]. Dislikes shade[200]. Does well on poor soils[61]. Suitable for naturalistic and conservation plantings in situations that approximate to its natural habitat[200]. A good bee plant[74]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 6.1.48 Colutea x media

tfo2n 5 tlin 9 cyuc 0 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Colutea x media is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

tcanta Hedge Hedge Soil stabilizationThis species has an extensive root system and is useful for planting on dry sunny banks for stabilizing the soil[200]. Plants can be grown as a hedge[200].

nrakta A hybrid of garden origin, C. arborescens x C. orientalis[200]. ksacta Not known in the wild.

propta Seed - pre-soak for 24 hours in hot water and sow late winter in a greenhouse[113]. Scarification can help speed up the germination process[164]. Germination can be slow and erratic[200], though treated seed usually germinates in 1 - 3 months at 20°c[164]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts. This species is a hybrid and so is unlikely to breed true from seed. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings are not very long-lived[78].

nwatta Requires a well-drained soil and a sunny sheltered position[182, 200]. Succeeds in poor and in dry soils, growing well on sunny banks[182]. Tolerates atmospheric pollution and salt-laden winds[200]. Plants are hardy to about -20°c[200]. Flowers are produced on the current year's growth[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 6.1.49 Genista pilosa

Hairy greenweed, silkyleaf broom tfo2n 5 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslio hpa7tmwatli hionli

drutta Genista pilosa is an evergreen Shrub growing to 0.3 m (1ft) by 0.6 m (2ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Desperation', 'Fear of losing control of the mind' and 'Dread of doing some frightful thing'[209]. It is also one of the five ingredients in the 'Rescue remedy'[209]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta W. Asia? Original habitat is obscure. Often planted in hedgerows in Britain but rarely naturalized. ksacta Not known in a truly wild situation.

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame. Softwood cuttings from strongly growing plants in spring to early summer in a frame. Layering in spring. Division of suckers in the dormant season. They can be planted out direct into their permanent positions.

nwatta Landscape Uses:Specimen. Requires a welldrained moisture retentive soil[1, 11]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. A very ornamental plant[1], it is sometimes cultivated for its edible fruit. unfortunately this is not often borne in large quantities in Britain[3, 17], but large crops are produced every 4 years or so[K]. There are some named varieties[183]. Included as a part of P. divaricata by some botanists[11] though others include P. divaricata as a sub-species under this species[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attractive foliage, Not North American native, All or parts of this plant are poisonous, Blooms are very showy. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base

# 6.2.35 Prunus armeniaca

Apricot

Apiroci 5 tlin 7 cyuc 4 kcak 4 tcan 3 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Prunus armeniaca is a deciduous Tree growing to 9 m (29th) by 6 m (19th) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to April, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This species produces hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. Usually present in too small a quantity

to do any harm, any very bitter seed or fruit should not be eaten[65]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death. Oral doses of 50g of hydrogen cyanide can be fatal (= 30g of kernels or 50-60 kernels at 2 mg HCN/g kernel) [301].

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Gum Oil OilFruit - raw, cooked or dried for later use[1, 2, 3, 4]. The best forms are soft and juicy with a delicious rich flavour[K]. Wild trees in the Himalayas yield about 47.5kg of fruit per year[194]. The fruit of the wild form contains about 6.3% sugars, 0.7% protein, 2.5% ash, 2.5% pectin. There is about 10mg vitamin C per 100g of pulp[194]. The fruit is about 5cm in diameter and contains one large seed[200]. Seed - raw or cooked[183]. Bitter seeds should be eaten in strict moderation, but sweet ones can be eaten freely[132]. The bitter seeds can be used as a substitute for bitter almonds in making marzipan etc[4]. An edible gum is obtained from the trunk[64]. The seed contains up to 50% of an edible semi-drying oil[4, 57, 61, 183].

tcanta Adhesive Dye Gum Oil Oil WoodAn edible semidrying oil is obtained from the seed[57]. Used for lighting[194]. The oil has a softening effect on the skin and so it is used in perfumery and cosmetics, and also in pharmaceuticals[4, 61]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - handsome, hard, durable. Agricultural implements etc[146, 194]. Espalier: tree or other plants that is trained to grow flat against a support (such as a trellis or wall).

dwatta Analgesic Anthelmintic Antiasthmatic Antidote Antipyretic Antiseptic Antispasmodic Antitussive Demulcent Emetic Emollient Expectorant Laxative Ophthalmic Pectoral Sedative Tonic Vitamin C VulneraryApricot fruits contain citric and tartaric acid, carotenoids and flavonoids[283]. They are nutritious, cleansing and mildly laxative[254. They are a valuable addition to the diet working gently to improve overall health. The salted fruit is antiinflammatory and antiseptic[283]. It is used medicinally in Vietnam in the treatment of respiratory and digestive diseases[283]. Antipyretic, antiseptic, emetic, ophthalmic[194]. The flowers are tonic, promoting fecundity in women[218]. The bark is astringent[254]. The inner bark and/or the root are used for treating poisoning caused by eating bitter almond and apricot seeds (which contain hydrogen cyanide)[218]. Another report says that a decoction of the outer bark is used to neutralize the effects of hydrogen cyanide[238]. The decoction is also used to soothe inflamed and irritated skin conditions[254]. The seed is analgesic, anthelmintic, antiasthmatic, antispasmodic, antitussive, demulcent, emollient, expectorant, pectoral, sedative and vulnerary[176, 218]. It is used in the treatment of asthma, coughs, acute or chronic bronchitis and constipation[176, 279]. The seed contains 'laetrile', a substance that has also been called vitamin B17[218]. This has been claimed to have a positive effect in the treatment of cancer, but there does not at present seem to be much evidence to support this[K]. The pure substance is almost harmless, but on hydrolysis it yields hydrocyanic acid, a very rapidly acting poison - it should thus be treated with caution[218]. In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238]. nrakta E. Asia - N. China, Mongolia, ksacta Most trees

nrakta E. Asia - N. China, Mongolia. ksacta Most trees growing apparently wild have escaped from cultivation but there are pure stands of the trees in Tibet on mountain slopes in sparse forests at elevations of 700 - 3000 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Difficult[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Difficult. Layering in spring.

nwatta Global Fruit Crop Industrial Crop Oil Management: Standard Staple Crop: Protein

730 751

nrakta E. Asia - China, Japan, Korea. ksacta Woodland, 1200 - 1800 metres in W. China[109]. Mountains, slopes, forest margins and forests a elevations of 400 - 1500, occasionally to 2100 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80. 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

mwatta Landscape Uses:Border, Massing, Standard, Specimen, Street tree. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. A very ornamental plant[1], it is very closely related to C. mas[1, 11] but is more tree-like in its habit[K]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive flowers or blooms.

### 6.2.33 Akebia trifoliata

Akebia. Threeleaf Akebia

5 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 9 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Akebia trifoliata is a deciduous Climber growing to 9 m (29ft 6in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw. Sweet but insipid[2, 3, 46, 61, 105]. The fruit has a delicate flavour and a soft juicy texture[K]. The flavour can be enhanced by the addition of a little lemon juice. Valued more as a novelty, the fruit looks somewhat like a deep-purple coloured sausage[183]. The fruit is 7 - 13cm long[200]. The dried young leaves are used as a tea substitute[46, 61, 105, 183].

tcanta BasketryThe peeled stems are very pliable. They can be bleached and used in basket making[46, 61]. Landscape Uses: Arbor. The flowers are purple. The flowers have a sweet scent.

dwatta Analgesic Antibacterial Antifungal Antiinflammatory Antitumor Blood tonic Cardiotonic Diuretic Emmenagogue Galactogogue UrinaryThe stems are analgesic, antibacterial, antifungal, anti-inflammatory, antitumor. blood tonic, cardiotonic, diuretic, emmenagogue and galactogogue[147, 176]. Taken internally, it controls gram-positive bacterial and fungal infections and is used in the treatment of urinary tract infections, lack of menstruation, to improve lactation etc[176, 238]. The stems are harvested in the autumn and dried for later use[238].

nrakta E. Asia - China, Japan, Korea. ksacta Rocky places in woods and thickets to 1800 metres[58]. Semideciduous forest margins, open forest along valleys, scrub on hillsides and by streams at elevations of 200 - 2100 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Surface sow in a light position[133]. The seed usually germinates in 1 - 3 months at 15°c[133]. Stored seed should be given 1 month cold stratification[113, 133] and can be very difficult to germinate. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first

winter. Plant out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[11, 113]. The cuttings can be slow to root[200]. Cuttings can also be taken of soft wood in spring[113]. Root cuttings, December in a warm greenhouse[113]. Layering in early spring[1]. Very easy, the plants usually self-layer and so all you need to do is dig up the new plants and plant them out directly into their permanent positions.

nwatta Requires a well-drained moisture-retentive loamy soil[11, 200]. Succeeds in acid or alkaline soils[200]. Prefers partial shade but succeeds in full sun[3, 200]. Grows well on a north facing wall[219]. Dormant plants are hardy to about -20°c but they can be somewhat tender when young[200]. Another report says that this species is not as hardy as A. guinata, only tolerating temperatures down to -10°c. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species grows very well in S.W. England. Resentful of root disturbance, either grow plants in containers prior to planting them out or plant them out whilst very young[219]. Plants are evergreen in mild winters[11]. Fast growing, it can be invasive. It grows well on deciduous trees[28]. Plants are not normally pruned, if they are growing too large they can be cut back by trimming them with shears in early spring[202]. Plants are shy to fruit, they possibly require some protection in the flowering season, hand pollination is advisable[3, 11]. Plants are probably self-sterile[182], if possible at least 2 plants should be grown, each from a different source. The flowers are sweetly scented[245]. The fruits are sold in local markets in Japan [46]. The ssp. A. trifoliata australis. (Diels.) Rehd. is used medicinally in China[176]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Fragrant flowers. Attractive flowers or blooms.

### 6.2.34 Prunus cerasifera

Cherry Plum, Myrobalan Plum, Newport Cherry Plum, Pissard Plum

5 tlin 8 cyuc 4 kcak 3 tcan 1 dwat 9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus cerasifera is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower in March, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked in pies, tarts, jams etc[2, 5, 12, 34, 183]. The size of a small plum with a thin skin and a nice sweet flavour[183]. The flesh is somewhat mealy but is also juicy[K]. The fruit can hang on the tree until October[K]. The fruit is about 30mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge Hedge Rootstock ShelterbeltA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Makes quite a good windbreak hedge though it cannot stand too much exposure[1, 11, 29]. Often used as a rootstock for the cultivated plums, giving them a semi-dwarfing habit[61].

kcakta None Known

tcanta A good high density groundcover. Nitrogen Fixer. Location: Border, Ground Cover, Mass Planting, Rock Garden, Wildlife Garden, Woodland Garden. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2].

nrakta Europe. Native range from southern Sweden to the Mediterranean: in dry summer areas, ksacta

propta Seed: Easy. Cover seed and germinate at 55-65F/13-18C. Chipping and soaking may aid germination. Do not transplant. Cuttings taken in summer, or by simple layering. Tip cuttings about 3-6 cm may be taken in mid-summer and rooted in a mist chamber or shaded frame.

nwatta Evergreen prostrate perennial (mostly) to erect shrub. Flowers, golden-yellow, cover the plants in late spring to early summer. Poor, dry, sandy, and stony soils. Full sun or part shade and well drained soil. Soil pH: Acid/Neutral/Alkaline. Foot Traffic: Light. Drought tolerant. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

# 6.2 mran

### 6.2.1 Castanea sativa

Sweet Chestnut, European chestnut 5 tlin 7 cyuc 5 kcak 5 tcan 2 dwat 30 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Castanea sativa is a deciduous Tree growing to 30 m (98tf) by 15 m (49tf) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Coffee SweetenerSeed-raw or cooked[2, 4, 5, 9, 12, 34]. A somewhat astringent taste raw, it improves considerably when cooked and is delicious baked with a floury texture and a flavour rather like sweet potatoes[K]. The seed is rich in carbohydrates, it can be dried, then ground and used as a flour in breads, puddings, as a thickener in soups etc[7, 63, 132, 183]. The roasted seed can be used as a coffee substitute[183]. A sugar can be extracted from the seed[183].

tcanta Basketry Fuel Hair Starch Tannin WoodTannin is obtained from the bark[46, 223]. The wood, leaves and seed husks also contain tannin[223]. The husks contain 10 - 13% tannin[223]. On a 10% moisture basis, the bark contains 6.8% tannin and the wood 13.4%[223]. The meal of the seed has been used as a source of starch and also for whitening linen cloth[4]. A hair shampoo is made from the leaves and the skins of the fruits[7]. It imparts a golden gleam to the hair[7]. Wood - hard, strong, light. The young growing wood is very durable, though older wood becomes brittle and liable to crack[4]. It is used for carpentry, turnery, props, basketry, fence posts etc[4, 6, 7, 23, 46, 100]. A very good fuel[6].

dwatta Antidiarrhoeal Antiinflammatory Astringent Bach ExpectorantAlthough more commonly thought of as a food crop, sweet chestnut leaves and bark are a good source of tannins and these have an astringent action useful in the treatment of bleeding, diarrhoea etc. The leaves and bark are anti-inflammatory, astringent, expectorant and tonic[4, 7, 165]. They are harvested in June or July and can be used fresh or dried[4]. An infusion has been used in the treatment of fevers and ague, but are mainly employed for their efficacy

in treating convulsive coughs such as whooping cough and in other irritable conditions of the respiratory system[4, 7]. The leaves can also be used in the treatment of rheumatism, to ease lower back pains and to relieve stiff muscles and joints[254]. A decoction is a useful gargle for treating sore throats[254]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Extreme mental anguish', Hopelessness' and 'Despair'[209].

nrakta S. Europe. Long naturalized in Britain[17]. ks-acta Woods in mountains[100].

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter(K].

nwatta Global Crop Industrial Crop: Biomass Industrial Crop: Tannin Management: Standard Staple Crop: Balanced carbPrefers a good well-drained slightly acid loam in a sunny position but it also succeeds in dry soils[1, 11, 200] 238]. Once established, it is very drought tolerant[1, 11, 200, 238]. Plants are very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. Tolerates maritime exposure though it is slower growing in such a position[75]. The dormant plant is very cold-hardy in Britain, though the young growth in spring, even on mature plants, is frost-tender[K]. The sweet chestnut is often cultivated for its edible seed in warm temperate zones, there are several named varieties[46, 183]. Both 'Marron de Lyon' and 'Paragon' produce fruits with a single large kernel (rather than 2 - 4 smaller kernels) and so are preferred for commercial production[238]. Castanea sativa x crenata: The hybrid sweet chestnut 'Marigoule' is a good choice If you only want to grow one tree as Marigoule is a partly self-fertile cultivar. Sweet chestnuts require a warm dry summer in order to ripen their fruit properly in Britain[63] and even then these seeds are generally inferior in size and guality to seeds grown in continental climates[4]. Most species in this genus are not very well adapted for the cooler maritime climate of Britain, preferring hotter summers, but this species grows well here[11, 200]. An excellent soil-enriching understorey in pine forests[200]. Flowers are produced on wood of the current year's growth[229] and they are very attractive to bees[7].. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus[200]. At one time this tree was widely grown in coppiced woodlands for its wood, but the practise of coppicing has fallen into virtual disuse[11]. Trees regrow very quickly after being cut down, producing utilizable timber every 10 years. This species is not often seen in Cornwall though it grows very well there[59]. Trees take 30 years from seed to come into bearing[98]. Plants in this genus are notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 6.2.2 Sassafras albidum

Sassafras. Common Sassafras

5 tlin 9 cyuc 5 kcak 3 tcan 3 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik

hpa7tmwatli nyanhjen hjonli

drutta Sassafras albidum is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from April to October, in flower from May to June, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light

(sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The extracted essential oil is poisonous in large quantities[4, 165]. The essential il contains safrole which is known to be carcinogenic and potentially harmful to the liver[274]. The essential oil has been banned as a food flavouring in America, even though the potential toxicity is lower than that of alcohol[222].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. The young leaves can be added to salads whilst both old and young leaves can be used as a flavouring and as a thickening agent in soups etc[2, 20, 55, 62, 82, 102, 183]. They have a mild aromatic flavour Kl. The leaves are often dried and ground into powder for later use[82, 159, 183]. The young shoots have been used to make a kind of beer[4]. The dried root bark can be boiled with sugar and water until it forms a thick paste[183]. It is then used as a condiment[183]. The root and the berries can also be used as flavourings[55, 142]. Winter buds and young leaves - raw[62, 183]. A tea is made from the root bark, it is considered to be a tonic[18, 20, 55, 62]. The tea can also be made by brewing the root in maple syrup, this can be concentrated into a jelly[183]. A tea can also be made from the leaves and the roots. It is best in spring. A tea can be made from the flowers[2].

tcanta Companion Dye Essential Repellent WoodAn essential oil is obtained from the bark of the root[61] and also from the fruits[4]. One hundred kilos of root chips yield one litre of essential oil under steam pressure - this oil comprises about 90% safrol[245]. The oil is medicinal and is also used in soaps, the coarser kinds of perfumery, toothpastes, soft drinks etc[4, 46, 57, 82]. It is also used as an antiseptic in dentistry[61]. A yellow dye is obtained from the wood and the bark[4, 168]. It is brown to orange[168]. The plant repels mosquitoes and other insects[18, 20]. Wood - coarsegrained, soft, weak, fragrant, brittle, very durable in the soil. It weighs 31lb per cubic foot and is used for fence posts and items requiring lightness[46, 82, 171, 227].

dwatta Alterative Anodyne Antirheumatic Antiseptic Aromatic Carminative Diaphoretic Diuretic Stimulant VasodilatorSassafras has a long history of herbal use. It was widely employed by many native North American Indian tribes who used it to treat a wide range of complaints, valuing it especially for its tonic effect upon the body[257]. It is still commonly used in herbalism and as a domestic remedy. The root bark and root pith are alterative, anodyne, antiseptic, aromatic, carminative, diaphoretic, diuretic, stimulant and vasodilator[4, 21, 46, 165]. A tea made from the root bark is particularly renowned as a spring tonic and blood purifier as well as a household cure for a wide range of ailments such as gastrointestinal complaints, colds, kidney ailments, rheumatism and skin eruptions[222, 238, 257]. The mucilaginous pith from the twigs has been used as a poultice or wash for eve ailments and is also taken internally as a tea for chest. liver and kidney complaints[222]. An essential oil from the root bark is used as an antiseptic in dentistry and also as an anodyne[213]. The oil contains safrole, which is said to have carcinogenic activity and has been banned from use in American foods - though it is less likely to cause cancer than alcohol[222] In large doses the oil is poisonous causing dilated pupils, vomiting, stupor, collapse and kidney and liver damage[4, 238]. The oil has been applied externally to control lice and treat insect bites, though it can cause skin irritation[238]

nrakta Eastern N. America - Maine to Ontario, south to Florida and Texas. ksacta Deciduous woodlands and thickets on rich sandy well-drained soils[43, 62, 159, 165]. Found on moist soils[82].

propta Seed - best sown as soon as ripe in a cold frame[200]. Stored seed requires 4 months cold stratification at 4°c[113]. It is best sown as early in the year as possible. Prick out the seedlings into individual pots as soon as possible and grow them on in the greenhouse. One report says to harden off the plants as soon as possible[78]. but young plants are frost-tender[11] and so we recommend growing them on in the greenhouse for their first winter and then planting them out in early summer. Give the young trees some protection for at least their first winter outdoors[K]. Root cuttings, taken from suckers, 1 - 2cm long taken in December. Plant horizontally in pots in a greenhouse[78].

Suckers in late winter. Plant straight out into their permanent positions[200].

nwatta Landscape Uses:Pest tolerant, Massing, Specimen, Woodland garden. Requires a deep, fertile, welldrained, lime-free, near neutral soil in sun or light shade[11, 2001. Does well in a woodland garden[166], especially in a sheltered position along the edge[200]. The plant is tender when young, the young shoots of older trees can also be damaged by late spring frosts[11, 238]. A very ornamental plant[1] with a wide range of uses, it is occasionally cultivated and often gathered from the wild[61]. All parts of the tree contain essential oils and give off a pleasant spicy aroma when crushed[229]. The stem bark is highly aromatic, more so than the wood. The root stem bark is the most pleasant of all[245]. The flowers have a spicy perfume[245]. Trees are long-lived, moderately fast-growing and disease-free in the wild[227, 229]. They can begin flowering when only 10 years old and good seed crops are usually produced every 2 - 3 years[229]. The trees spread by root suckers and can form thickets[229]. Although some flowers appear to be hermaphrodite, they are functionally either male or female and most trees are dioecious[229]. Both male and female plants must be grown if seed is required. Special Features: North American native, Attracts butterflies, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 6.2.3 Cornus kousa chinensis

Japanese Dogwood

5 tlin 8 cyuc 5 kcak 2 tcan 0 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cornus kousa chinensis is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked[61, 177]. Sweet and juicv[11, 183], it is very nice in small quantities[K]. Very seedy[105]. The skin is rather tough and unpleasant, but the pulp is delicious with a custard-like texture[K]. This fruit gained very high marks from a group of 7 people in a fruit-tasting visit to various gardens[K]. The fruit is about 2cm in diameter[200]. Young leaves - cooked[105, 177, 183].

tcanta WoodWood - very hard and heavy. Used for mallets etc[151].

nrakta E. Asia - China. ksacta Thickets, 1200 - 2200 me-

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 1131. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as

the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Hard and gritty[11]. Firm crisp and juicy when fully ripe, they are eaten out of hand or used in fruit salads, pies or baked etc[183]. The fruit is up to 3cm long[200]. Up to 5cm in another report[194]. The average yield from wild trees in the Himalayas is 83kg per year, though some trees yield up to 200kg[194]. The fruit contains about 4.9% sugars, 3.2% protein, 0.9% pectin[194].

dwatta Antiseptic Astringent Febrifuge Nervine PectoralAntiseptic, astringent, febrifuge, nervine, pectoral[178].

nrakta E. Asia - China. ksacta Warm rainy regions at elevations of 100 - 1400 metres in China[266]. Naturalized in low mountains and around villages in C. and S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200]. A parent of the cultivated Asian pears[11]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and

# 6.2.31 Actinidia purpurea

Purple hardy kiwi

5 tlin 9 cvuc 4 kcak 1 tcan 0 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia purpurea is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen in November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105]. Sweet[177, 183, 200]. The fruit is up to 2.5cm long[198]. It contains a number of small seeds, but these are easily eaten with the fruit[K].

nrakta E. Asia - W. China ksacta Mountain forests, thickets, streamsides and moist places at elevations of 700 - 3600 metres[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the

last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. Dormant plants are very hardy but young spring growth is susceptible to frost damage[160]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. This is a climbing plant, supporting itself by twining around branches etc[200]. This species is possibly no more than a form of A. arguta[198], differing in its longer narrower leaves[126, 200]. It is treated as a synonym of A, arguta in the draft Flora of China[266]. At least one named variety has been developed for its edible fruit[183]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 6.2.32 Cornus officinalis

Shan Zhu Yu, Asiatic dogwood, Japanese Cornel Dogwood 5 tlin 8 cvuc 4 kcak 0 tcan 3 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cornus officinalis is a deciduous Shrub growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from February to March, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fully ripe fruit is quite pleasant but slightly astringent[K]. It is about 1.5cm long[200]. The fruit contains about 8.6% sugars, 2.9% malic acid, 0.74%

dwatta Antibacterial Antifungal Antiperiodic Antiseptic Antitumor Astringent Diuretic Hepatic Hypotensive Malaria Tonic UrinaryShan Zhu Yu has been used for at least 2,000 years in Chinese herbal medicine. It is a herb that "stabilizes and binds" and is used principally to reduce heavy menstrual bleeding and unusually active secretions including copious sweating, excessive urine, spermatorrhoea and premature ejaculation[147, 238, 254]. Like all herbs that suppress bodily fluids (even excessive ones), it will simply prolong or lead to a worsening of symptoms if it is used without tonic or detoxifying herbs[254]. It is, therefore, normally used in combination with herbs such as Rehmannia glutinosa and is an ingredient of the "Pill of eight ingredients" which is used in China to "warm up and invigorate the yang of the loins"[254]. The fruit is antibacterial, antifungal, hypotensive, antitumor, astringent, diuretic, hepatic and tonic[116, 147, 176, 178, 238]. The fruit, without the seed, is decocted for the treatment of arthritis, fever and a wide range of other ailments[218, 279]. It is used in the treatment of senile lumbago, diabetes, cystitis, tinnitus etc[174, 254, 279]. The fruit has an antibacterial action, inhibiting the growth of Bacillus dysenteriae and Staphylococcus[176]. The fruit is harvested when fully ripe and is dried for later use[238]. The stem bark is astringent, antimalarial and tonic[218]. The plant is antibacterial, diuretic, hypotensive and a urinary antisepwell-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Caution in diabetics on allopathic medication [301]

kcakta Edible Parts: Fruit LeavesEdible Uses: CoffeeFruit - raw or cooked[1, 2, 3, 100, 158]. Mealy and sweet[46]. A sourish-sweet flavour[174]. The fruit can be eaten fresh, dried like dates or cooked in puddings, cakes, breads, jellies, soups etc[183]. The dried fruit has the nicest taste[11, 132]. The fruits are often left to become wrinkled and spongy, which increases their sweetness, and are then eaten fresh or cooked[238]. The dried fruit can also be ground into a powder. This powder is used in the preparation of 'kochujang', a fermented hot pepper-soybean paste that resembles miso[183]. Fruits contain one or two seeds[238]. Average yields from wild trees in the Himalayas are 9.5kg per year[194]. The fruit contains about 8.7% sugars, 2.6% protein, 1.4% ash, 1.7% pectin and 1.3% tannin[194]. The fruit is about 25mm long, though it can be larger in cultivated varieties[200]. The fruit can be used as a coffee substitute[183]. Leaves - cooked. A famine food, they are only used when all else fails[179]. A nutritional analysis is available[218].

tcanta Charcoal Fuel Hedge Hedge WoodPlants can be grown as a hedge[178]. Wood - dense, hard, compact, tough. Used for turnery, agricultural implements etc[74, 146, 158]. It makes an excellent fuel[146] and a good charcoal[158]. Espalier: tree or other plants that is trained to grow flat against a support (such as a trellis or wall).

dwatta Anodyne Antidote Astringent Cancer Diuretic Emollient Expectorant Hypnotic Narcotic Pectoral Poultice Refrigerant Sedative Skin Stomachic Tonic Jujube is both a delicious fruit and an effective herbal remedy. It aids weight gain, improves muscular strength and increases stamina[254]. In Chinese medicine it is prescribed as a tonic to strengthen liver function[254]. Japanese research has shown that jujube increases immune-system resistance. In one clinical trial in China 12 patients with liver complaints were given jujube, peanuts and brown sugar nightly. In four weeks their liver function had improved[254]. Antidote, diuretic, emollient, expectorant[11, 61, 174, 178, 194]. The dried fruits contain saponins, triterpenoids and alkaloids[279]. They are anodyne, anticancer, pectoral, refrigerant, sedative, stomachic, styptic and tonic[4, 176, 218]. They are considered to purify the blood and aid digestion[240]. They are used internally in the treatment of a range of conditions including chronic fatigue, loss of appetite, diarrhoea, pharyngitis, bronchitis, anaemia, irritability and hysteria[176, 238, 279]. The seed contains a number of medically active compounds including saponins, triterpenes, flavonoids and alkaloids[279]. It is hypnotic, narcotic, sedative, stomachic and tonic[147, 176, 218]. It is used internally in the treatment of palpitations, insomnia, nervous exhaustion, night sweats and excessive perspiration[176, 238]. The root is used in the treatment of dyspepsia[218]. A decoction of the root has been used in the treatment of fevers[4, 240]. The root is made into a powder and applied to old wounds and ulcers[240]. The leaves are astringent and febrifuge[4, 218]. They are said to promote the growth of hair[218]. They are used to form a plaster in the treatment of strangury[240]. The plant is a folk remedy for anaemia, hypertonia, nephritis and nervous diseases[218]. The plant is widely used in China as a treatment for burns[218].

nrakta E. Asia - China, India, Sri Lanka, Nepal, Bhutan, Myanmar, Thailand, Malaysia, Indonesia to Australia. ksacta Dry gravelly or stony slopes of hills and mountains[74].

propta Seed - best sown in a cold frame as soon as it is ripe. Stored seed requires 3 months warm then 3 months cold stratification[113]. Germination should take place in the first spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant out in early summer. Root cuttings in a greenhouse in the winter[200]. Best results are achieved if a temperature of 5 - 10°c can be maintained[238]. Cuttings of mature wood of the current season's growth, November to January in a frame[238]. Division of suckers in the dormant season[174]. They can be planted out direct into their permanent positions if required.

nwatta Succeeds in most soils so long as they are welldrained[3, 200]. Prefers an open loam and a hot dry position[1, 3]. Succeeds in an alkaline soil[200]. Plants are fast growing, even in poor soils[146]. Plants are hardy to about -20°c[200]. Another report says that they are hardy to about -30°c when fully dormant[160]. The jujube is often cultivated in warm temperate zones for its edible fruit, there are many named varieties [50, 183]. The trees need a hot dry summer if they are to fruit well, which rather restricts their potential in a country like Britain[238, K]. The tree spreads by root suckers and self-sowing, often forming dense thickets. Where the climate suits it, the plant can escape from cultivation and become an invasive and problematic weed[274]. Trees are resistant to most pests and diseases[160]. Responds well to coppicing[146]. Trees form a deep taproot and should be planted into their permanent positions as soon as possible[200]. Fast growing and guick to mature, it can fruit in 3 - 4 years from seed[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 6.2.29 Pyrus pyrifolia culta

5 tlin 9 cyuc 4 kcak 0 tcan 1 dwat 10 m hkuc

hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus pyrifolia culta is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105]. Crisp, juicy with a fine flavour[178]. The fruit contains about 6 - 9.5% sugar and up to 0.56% fruit acids[179].

dwatta Antiseptic Astringent Febrifuge Nervine PectoralAntiseptic, astringent, febrifuge, nervine, pectoral[178].

nrakta A cultivated form of P. pyrifolia. ksacta Not known in the wild

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year. The seed of pear cultivars will not usually breed true to type.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200]. Cultivated for its edible fruit in China and Japan, there are many named varieties[183]. A hybrid between this plant and P. communis culta is more suitable for warmer climates[11].

# 6.2.30 Pyrus pyrifolia

Sand Pear. Chinese pear

5 tlin 9 cvuc 4 kcak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus pyrifolia is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April, and soon as they are large enough to handle and grow the plants medicines[4]. The root bark is antitussive, digretic, expectoon for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage [78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Does not like chalky soils according to other reports[184, 188]. Grows well in heavy clay soils. Prefers a rich well-drained loamy soil and a position that is at least partially sunny[11]. A very ornamental plant[1], it is hardy to about -20°c[184]. A number of named forms have been developed for their ornamental value[182]. Plants are slowgrowing when young, they speed up somewhat after a few years but then soon slow down again[202]. This sub-species of C. kousa grows more freely, flowering and fruiting better in Britain though it barely differs in appearance from the species[11]. Plants in this genus are notably resistant to honey fungus[200].

# 6.2.4 Morus nigra

Black Mulberry

5 tlin 9 cyuc 5 kcak 3 tcan 3 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Morus nigra is a deciduous Tree growing to 10 m (32ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. cooked or used in preserves[1, 2, 3, 4, 7, 9, 183], A delicious slightly acid flavour, it makes an excellent dessert fruit and can be eaten in quantity[K]. The fruit is juicy and refreshing, though it must be used as soon as it is ripe (from mid-August to September) otherwise it will start to rot[200]. The fruit falls from the tree as soon as it is fully ripe. It is best, therefore, to grow the tree in short grass to cushion the fall of the fruit but to still make it possible to find and harvest[K]. The fruit can also be dried and ground into a powder[183] The fruit is up to 25mm in diameter[200, 227]. White Mulberry (Morus alba) has edible young leaves and shoots eaten cooked[105, 183] but we have found no information for this plant.

tcanta Dye Fibre WoodA fibre used in weaving is obtained from the bark[7]. A red-violet to dark purple dve is obtained from the fruit[168]. A yellow-green dye is obtained from the leaves[168]. Wood - used in joinery[100].

dwatta Anthelmintic Astringent Homeopathy Hypoglycaemic Laxative Odontalgic Purgative UrinaryThe mulberry has a long history of medicinal use in Chinese medicine, almost all parts of the plant are used in one way or another[238]. The white mulberry (M. alba) is normally used. but this species has the same properties[238]. Recent research has shown improvements in elephantiasis when treated with leaf extract injections and in tetanus following oral doses of the sap mixed with sugar[238]. Analgesic, emollient, sedative[7, 176]. The leaves are antibacterial, astringent, diaphoretic, hypoglycaemic, odontalgic and ophthalmic[218, 238]. They are taken internally in the treatment of colds, influenza, eye infections and nosebleeds[238]. The leaves are collected after the first frosts of autumn and can be used fresh but are generally dried[238]. The stems are antirheumatic, diuretic, hypotensive and pectoral[218, 238]. A tincture of the bark is used to relieve toothache[7]. The branches are harvested in late spring or early summer and are dried for later use[238]. The fruit has a tonic effect on kidney energy[218, 238]. It is used in the treatment of urinary incontinence, tinnitus, premature greying of the hair and constipation in the elderly[238]. Its main use in herbal medicine is as a colouring and flavouring in other

rant and hypotensive[238]. It is used internally in the treatment of asthma, coughs, bronchitis, oedema, hypertension and diabetes[238]. The roots are harvested in the winter and dried for later use[238]. The bark is anthelmintic and purgative, it is used to expel tape worms[4, 240]. Extracts of the plant have antibacterial and fungicidal activity[218]. A homeopathic remedy is made from the leaves[9]. It is used in the treatment of diabetes[9].

nrakta W. Asia? ksacta Original habitat is obscure.

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive [78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113,200]. Bury the cuttings to threequarters of their depth. It is said that cuttings of older wood up to 2.5 metres long can be readily made to strike[4]. The cuttings are taken in February and planted 30cm deep in a shady sheltered position outdoors. The stem is wrapped in moss to prevent water loss by transpiration, with only the top few buds not being covered[4]. Layering in autumn[200].

nwatta Prefers a warm moist but well-drained loamy soil in a sheltered sunny position[1, 11]. Prefers a light soil[37]. Plants are very tolerant of atmospheric pollution[4]. Trees are hardy as far north as southern Sweden[4]. A slow growing[200] but very ornamental tree[1], the mulberry is sometimes cultivated in gardens for its delicious edible fruit[183]. The tree is not grown on a commercial scale because the fruit is too soft and easily damaged to allow it to be transported to market, and is therefore best eaten straight from the tree. There are some named varieties[183]. The mulberry takes many years to settle down and produce good crops of fruit, about 15 years being the norm[4]. Trees fruit well in southern and south-western Britain[59, 200] but they require the protection of a wall further north if the fruit is to ripen[200]. This is a good tree for growing grapes into[20]. It means that the grapes are difficult to pick, but they always seem to be healthier and free from fungal diseases[201]. Plants are late coming into leaf and also lose their leaves at the first autumn frosts though the tree in leaf casts guite a dense shade[200]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Once considered to be a very long-lived tree, doubts are now being cast on this assumption, it is probably fairly shortlived[11]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

# 6.2.5 Cornus kousa

Japanese Dogwood, Kousa dogwood, Chinese Dogwood, 5 tlin 8 cyuc 5 kcak 2 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cornus kousa is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked[61, 177]. Sweet and juicy[11, 183], it is very nice in small quantities[K]. Very seedy[105]. The skin is rather tough and unpleasant, but the pulp is delicious with a custard-like texture, it is one of our favourite late summer fruits[K]. The fruit is about 2cm in diameter[200]. Young leaves - cooked[105, 177, 183].

tcanta WoodWood - very hard and heavy. Used for mallets etc[151].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and scrub in the mountains of Sichuan[109]. Valleys, shaded slopes, by streams and roadsides, in mixed, sparse, and dense woods at elevations of 400 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Pest tolerant, Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility, from acid to slightly alkaline but dislikes shallow chalky soils[184, 188]. Grows well in heavy clay soils. Prefers a rich well-drained loamy soil and a position that is at least partially sunny[11]. A very ornamental plant[1], it is hardy to about -20°c[184]. A number of named forms have been developed for their ornamental value[182]. Plants are slow-growing when young, they speed up somewhat after a few years but then soon slow down again[202]. The sub-species of C. kousa chinensis grows more freely. flowering and fruiting better in Britain though it barely differs in appearance from the species[11]. This species has been known to hybridize with C. capitata[182]. The cultivar 'Norman Hadden' could be such a hybrid[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, Not North American native, Blooms are very showy. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 6.2.6 Crataegus pennsylvanica

5 tlin 9 cyuc 5 kcak 0 tcan 2 dwat 9 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Crataegus pennsylvanica is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in

flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Fruit - raw or cooked. A very good size fruit, up to 25mm in diameter, with a lovely semi-sweet flavour even when semi-ripe, it makes a delicious dessert[K]. It is also sometimes made into jellies[82] and can be dried for later use. The fruit is borne in clusters of 4- 12 and is very easily harvested[82, K]. There are up to five fairly large seeds in the centre of each fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America - Delaware to Pennsylvanica and W. Virginia. ksacta Open woods and thickets in moist fertile soils[43]. Meadows in low, moist soils[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species has a good potential as a fruit crop in Britain. It regularly produces heavy crops of high quality, the tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. A tree about 5 metres tall and wide at Kew fruits regularly and very heavily[K]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

litres per tree can be obtained[142]. The best sap production comes from cold-winter areas with continental climates. Seed - boiled then roasted[62, 105, 159]. The seed is about 6mm long and is produced in small clusters[82]. Inner bark cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 161].

tcanta Fuel Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood - close grained, tough, hard, heavy. Used for furniture, ship building, etc[46, 61, 82, 171]. It is a good fuel.

nrakta Western N. America - Rocky Mountains. ksacta Found in moist sites such as wet canyons, valleys and the banks of mountain streams at elevations of 1200 - 2100 metres 2291.

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. A lot of the seed is non-viable, it is best to cut a few open to see if there is an embryo[113]. An average of 95% germination can be achieved from viable seed[98]. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate, sometimes taking two years[125] The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen. Street tree. Of easy cultivation, it prefers a good moist well-drained soil but succeeds on most soils[11, 98]. Chlorosis can often develop as a result of iron deficiency when the plants are grown in alkaline soils. Grows well in heavy clay soils. Trees need full light and a lot of space if they are to grow well[98]. Plants are hardy to about -45°c when fully dormant[160]. This species is not a great success in Britain[1], though it does better than once thought[11]. It grows well in Cornwall[59]. Slow growing when young[11]. Plants produce prodigious root growth but very little top growth in first year from seed[133]. A very ornamental tree[1] but a bad companion plant, inhibiting the growth of nearby plants[18, 20]. This species is commercially exploited in America for its sap[1, 11]. Along with A. saccharum and the sub-species A. s. nigrum it is the major source of maple syrup[11]. There are some named varieties[183]. The sap can be tapped within 10 - 15 years from seed but it does not flow so well in areas with mild winters[160]. Special Features: North American native, Inconspicuous flowers or blooms.

# 6.2.27 Crataegus azarolus

Azarole

5 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus azarolus is a deciduous Tree growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerates atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, preserves etc[1, 2, 3, 11, 34, 183]. The fruit can be used fresh or dried for later use. A pleasant acid

taste[89]. In warm temperate areas the fruit develops more fruit sugars and has a fragrant sugary pulp with a slightly acid flavour[183]. It can be eaten out of hand. In cooler zones, however, the fruit does not develop so well and is best cooked or used in preserves[183]. The fruit is very variable in size and colour, it is up to 25mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta S. Europe to W. Asia. ksacta Dry hillsides and mountains in woods and hedges[50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit. they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. The azarole has long been cultivated for its edible fruit in S. Europe, though it is now going out of favour[3, 11]. There are some named varieties[46]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245] Hawthorns in general hybridize freely with other members of the genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

# 6.2.28 Ziziphus jujuba

Jujube

5 tlin 10 cyuc 4 kcak 3 tcan 3 dwat 10 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Ziziphus jujuba is a deciduous Tree growing to 10 m (32ft) by 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable forlight (sandy), medium (loamy) and heavy (clay) soils, prefers

seed is up to 25mm long[160]. Rich in oil, protein[183] and thiamine[160]. The seed contains about 15% protein[213]. An important item of food for the local Indians, it is also sold in local markets of Colorado and New Mexico[61, 82]. About 450,000 kilos of the seeds are sold in American markets each year[229]. The leaves can be brewed into a tea[183, 257]. Immature female cones - roasted. The soft centre forms a sweet syrupy food[183]. Inner bark - cooked. A sweet syrupy food[183]. Inner bark - cooked. A sweet shaven; it is cut into strips and cooked like spaghetti[183]. Inner bark can also be dried, ground into a powder and used as a thickening in soups or can be mixed with cereal flour when making bread etc[257]. The pitch from the trunk can be hardened and used as a chewing gum[257]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Adhesive Dye Fuel Gum Herbicide Ink Paint Plaster Resin WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. This species yields a resin, but it is not commercially important. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher vields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. The gum (this almost certainly means the resin[K]) is used in waterproofing baskets, canoes etc, for repairing pottery vessels and in making turquoise mosaic[216, 257]. It has also been used as a red paint on jars and bowls[257]. For waterproofing containers, the gum was melted and poured inside the container. The container was then turned round to ensure the gum came into contact with all parts of the inside. More gum would then be applied to the outside[257]. The resin has been used as a glue for fixing turquoise in jewellery[257]. The gum has been used, with sumac leaves (Rhus spp) and yellow ochre to make a black dye and ink[257]. The sumac leaves are boiled until there is a strong mixture. Whilst the sumac was boiling, the ochre was powdered and roasted. The gum was then added to the ochre and the whole roasted again. As the roasting proceeded, the gum melted and finally the mixture was reduced to a black powder. This was then cooled and thrown into the sumac mixture, forming a rich blue-black fluid that was essentially an ink[257]. Wood - light, soft, not strong, brittle. Used for fuel, fencing etc[61, 82]. A charcoal made from the wood is used in smelting[82]. The wood makes a good fuel, burning with few sparks being thrown out[257].

dwatta Antiseptic Depurative Diuretic Emetic Expectorant Pectoral Plaster Rubefacient VD VermifugeThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy in the treatment of kidney, bladder and rheumatic affections, and also in diseases of the mucous membranes and the treatment of respiratory complaints[4]. Externally it is used in the form of liniment plasters and poultices on cuts, boils. burns and various skin problems[4, 257]. The heated pitch has been applied to the face to remove facial hair[257]. The gum is used as a plaster on cuts and sores[216]. An infusion of the leaves has been used as an emetic to cleanse the stomach[257]. The leaves have been chewed in the treatment of venereal diseases[257]. The leaves have been burnt and the smoke inhaled as a treatment for colds[257]. The inner bark is expectorant[257].

nrakta South-western N. America - Rocky mountains. ksacta Eastern foothills of the outer reaches of the Rockies on arid mesas in pure stands or with junipers[120].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted

into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check hadly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Management: Standard Staple Crop: Proteinoil Wild Staple CropLandscape Uses:Border, Erosion control, Massing, Screen, Specimen. Thrives in a light welldrained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Succeeds in a hot dry position[200]. Prefers an acid soil in full sun[160]. A very hardy species, tolerating temperatures down to about -35°c when it is fully dormant[160]. A slow-growing but long-lived tree in the wild[185, 229], it takes about 25 years from seed before it produces seed[117]. It then produces good crops every 3 - 4 years[229]. The cones open and shed their seed whilst still attached to the tree[226]. Trees take about 250 - 350 years to reach full maturity[181]. This species is considered by some botanists to be no more than a form of P. cembroides, its main difference from that species is that it has leaves in bundles of two whereas P. cembroides usually has bundles of three[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow below the tree[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc., and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a nonsuckering single trunk [1-2]. An evergreen. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 6.2.26 Acer saccharum grandidentatum

Big-Tooth Maple, Canyon Maple, Rocky Mountain Sugar

5 tlin 8 cyuc 4 kcak 0 tcan 0 dwat 12 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Acer saccharum grandidentatum is a deciduous Tere growing to 12 m (39ft) by 8 m (26ft). See above for USDA hardiness. It is in flower from April to May, and the seeds ripen in September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It brefers moist soil.

kcakta Edible Parts: Inner bark Sap SeedEdible Uses: SweetenerThe sap is relatively rich in sugar and can be made into a drink or concentrated into a syrup by boiling off the water[1, 2, 11, 34, 57]. The syrup is used as a sweetener on many foods. It can be harvested in late winter or early spring[[142], the flow is best on a warm sunny day after a frost. Trees on southern slopes in sandy soils give the best yields. It is best to make a hole about 7cm deep and about 1.3 metres above the ground[171]. Yields of 40 - 100

#### 6.2.7 Amelanchier laevis

Allegheny Shadberry, Allegheny serviceberry, Smooth Serviceberry

5 tlin 8 cyuc 5 kcak 2 tcan 1 dwat 9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier laevis is a deciduous Shrub growing to 9 m (29ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[2, 11, 105, 159]. Succulent and sweet[82, 183]. This is one of the nicest fruits in the genus, it can be eaten and enjoyed in quantity[K]. The fruit can also be dried for winter use[183]. Up to 18mm in diameter[200]. The fruit is rich in iron and copper[226].

tcanta Miscellany WoodWood - heavy, exceedingly hard, strong, close grained. Used for tool handles etc[82].

dwatta MiscellanyAn infusion of the bark was used by expectant mothers[257].

nrakta Eastern N. America. Naturalized in Britain. ksacta Dry to moist thickets, woodland edges and edges of swamps in cool ravines and on hillsides[43, 82]. Naturalized in Britain on light acidic soils[17].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Landscape Uses:Firewood, Specimen, Woodland garden. Prefers a rich loamy soil in a sunny position or semishade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Found in the wild on light acidic soils[17]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals, this species is worthy of especial attention because of the quality of its fruit. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Trees come into bearing in about 12 years from seed[98]. Considerable confusion has existed between this species and A. arborea, A. canadensis and A. lamarckii, see [11] for the latest (1991) classification. It hybridizes with A. sanguinea, A. huronensis, A. wiegandii, A. stolonifera, A. canadensis, A. arborea and A. bartramiana. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. Special Features: Attracts birds, North American native, Attracts butterflies, Blooms are very showy.

# 6.2.8 Crataegus arnoldiana

Arnold Hawthorn

5 tlin 9 cyuc 5 kcak 0 tcan 2 dwat 7 m hkuc hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus arnoldiana is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy

to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Sub-acid[82]. A delicious flavour, it is sweet with a soft juicy flesh and makes an excellent dessert fruit[K]. It can also be cooked and used in pies, preserves etc and can be dried for later use. The fruit ripens in early September in southern Britain[K]. The fruit is about 2cm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta North-eastern N. America - Massachusetts and Connecticut. ksacta Wooded banks[43]. Thickets on a dry bank[82]

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit. they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This is a tree with an excellent potential as a fruit crop in Britain. The fruit is of very good quality and is freely borne, whilst the tree is of very easy cultivation and rarely troubled by pests or diseases[K]. A tree at the Hillier Arboretum in September 1993 was about 3 metres tall and 1.5 metres wide. The growth looked somewhat weak and the tree was leaning due to wind rock but it was carrying a heavy crop of fruit[K]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. A very ornamental plant[1], it is very closely related to C. mollis, and considered to be part of that species by many botanists[229]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

### 6.2.9 Prunus insititia

Damson

 $5\ tlin\ 9\ cyuc\ 5\ kcak\ 3\ tcan\ 1\ dwat\ 6\ m\ hkuc$ hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus insititia is a deciduous Tree growing to 6 m (19ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[1, 2, 46]. More acid than a plum but it is very acceptable raw when fully ripe, especially after being touched by frost[12, 34, K]. The fruit is about 3cm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge Hedge ShelterbeltA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Trees are fairly wind resistant and can be grown as a shelterbelt hedge[200].

dwatta Febrifuge Purgative StypticThe bark of the root and branches is febrifuge and considerably styptic[4]. An infusion of the flowers has been used as a mild purgative for children[4]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta S. W. Asia. Naturalized and often considered a native of Britain. ksacta Thickets, hedges and open woods[4, 17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring,

nwatta Requires a well-drained moisture retentive soil[1, 11]. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present[1]. Occasionally cultivated for its edible fruit, there are some named varieties[200]. It has been derived in cultivation from the bullace, differing in having a sweeter fruit[200]. Damsons can be grown successfully against a north facing wall[219]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Prunus institia L. is a synonym of

Prunus domestica subsp. insititia (L.) Bonnier and Layens For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

### 6.2.10 Prunus persica

Peach, Flowering Peach, Ornamental Peach, Common Peach 5 tlin 9 cyuc 5 kcak 3 tcan 3 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Prunus persica is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed can contain high levels of hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is readily detected by its bitter taste. Usually present in too small a quantity to do any harm, any very bitter seed or fruit should not be eaten[65]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Flowers Fruit Oil Oil SeedEdible Uses: Gum Oil Oil TeaFruit - raw, cooked or dried for later use[1, 2, 34, 46]. The fruit is often used in ice creams, pies. jams etc[183]. When fully ripe, the fruit of the best forms are very juicy with a rich delicious flavour[K]. Wild trees in the Himalayas yield about 36.5kg of fruit a year [194]. The fruit of the wild form contains about 5.2% sugars, 2% protein, 1.6% ash. Vitamin C content is 2.3mg per 100g[194]. The fruit is a good source of vitamin A[201]. Fruits of the wild peach are richer in nutrients than the cultivated forms[194]. The size of fruit varies widely between cultivars and the wild form, it can be up to 7cm in diameter and contains one seed[200]. Flowers - raw or cooked. Added to salads or used as a garnish[183]. They can also be brewed into a tea[183]. The distilled flowers yield a white liquid which can be used to impart a flavour resembling the seed[183]. Seed - raw or cooked. Do not eat if it is too bitter, seed can contain high concentrations of hydrocyanic acid. See the notes above on toxicity. A semidrying oil is obtained from the seed[57]. Although the report does not mention edibility it can be assumed that it is edible. The seed contains up to 45% oil[218]. A gum is obtained from the stem. It can be used for chewing [64].

tcanta Adhesive Cleanser Dye Cum Oil OilA green dye can be obtained from the leaves[168]. Yellow according to another report[257]. A dark grey to green dye can be obtained from the fruit[168]. A semi-drying oil is obtained from the seed[57]. It is used as a substitute for almond oil in skin creams[238]. The bruised leaves, when rubbed within any container, will remove strong odours such as garlic or cloves so long as any grease has first been fully cleaned off[4]. A gum obtained from the stem is used as an adhesive[64].

dwatta Alterative Anthelmintic Antiasthmatic Antihalitosis Antitussive Astringent Demulcent Diuretic Emollient Expectorant Febrifuge Haemolytic Laxative Sedative Vitamin CAntihalitosis[194]. The leaves are astringent, demulcent, diuretic, expectorant, febrifuge, laxative, parasiticide and mildly sedative[21, 218]. They are used internally in the treatment of gastritis, whooping cough, coughs and bronchitis[238]. They also help to relieve vomiting and morning sickness during pregnancy, though the dose must be carefully monitored because of their diuretic action[21]. The dried and powdered leaves have sometimes been used to help heal sores and wounds[21]. The leaves are harvested in June and July then dried for later use[4]. The flowers are diuretic, sedative and vermifuge[4, 21, 176, 194, 218]. They are used internally in the treatment of constipation and oedema[238]. A gum from the stems is alterative, astringent, demulcent and sedative[4, 21, 176, 194, 218]. The seed is antiasthmatic, antitussive, emollient, haemolytic, laxative and sedative[4,

propta Seed - best sown as soon as it is ripe in a cold frame [78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed [78, 80]. Stored seed germinates better if given 2 weeks warm then 14- 16 weeks cold stratification [98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two [11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils so long as they are not too poor or acid, in an open sunny position[1, 11]. Prefers clay soils[3, 11]. Tolerates moderate shade[188], but does not fruit so well in such a position[K]. Grows best in the eastern half of Britain[121]. Plants are susceptible to fireblight[188]. Plants respond well to coppicing[186]. When found in a truly wild situation this species is considered to be an indication of primary woodland[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 6.2.24 Pinus quadrifolia

Parry Piñon, Parry's Pinyon Pine, Four-leaved Pinyon 5 tlin 8 cyuc 4 kcak 0 tcan 2 dwat 15 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hionli

drutta Pinus quadrifolia is an evergreen Tree growing to  $15\,\mathrm{m}$  (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: SeedEdible Uses: CondimentSeed-raw or cooked[1, 81, 161]. An important food crop for the Indians of Baja California[82, 183], the oil-rich seed has a mild resinous flavour and a pleasant soft texture. A good size, up to 16mm long[200]. The seed contains about 11% protein, 37% fat, 44% carbohydrate[183]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Adhesive Basketry Cosmetic Dve Fuel Herbicide Roofing WoodA tan or green dye is obtained from the needles[168]. The roots have been used to make baskets[257] The bark has been used as a roofing material in houses[257]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile 641. The resins are obtained by tapping the trunk. or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher vields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. The pitch has been used as a face cream to prevent sunburn[257]. The pitch can be used as an adhesive on pottery etc[257]. Wood - light, soft, close grained[82]. It burns well and gives off a pleasant.odour[257].

dwatta Antiseptic Diuretic Pectoral Poultice Rubefacient Vermifuge VulneraryThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta South-western N. America - California. ksacta Arid mesas and low mountain slopes of lower California, to 1500 metres in the Santa Rosa mountains[82].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses: Screen, Specimen, Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought, succeeding in a hot dry position[200]. This species is closely related to P. cembroides and considered to be no more than a sub-species of it by some botanists[11]. The main difference is that this species has its leaves in bundles of four whilst P. cembroides has them in bundles of two or three[200]. Plants are strongly outbreeding, selffertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. It extensively hybridizes with P. californiarum in most of its range[200]. The cones open and shed their seed whilst still attached to the tree[226]. A slow growing tree, taking 25 years from sowing until it produces a crop of seeds[117]. The tree is longlived, taking 250 - 350 years to reach maturity[181]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native, Inconspicuous flowers or blooms.

#### 6.2.25 Pinus edulis

Rocky Mountain Piñon, Twoneedle pinyon, Nut Pine, Pinyon Pine, Rocky Mountain Pinyon Pine, Singlelea 5 tlin 8 cvuc 4 kcak 3 tcan 2 dwat 15 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli frusflatprik hpa7tmwatli dyat hjonli

drutta Pinus edulis is an evergreen Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness, It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Inner bark Seed SeedpodEdible Uses: Condiment Gum TeaSeed - raw or cooked[82, 177]. A slightly resinous flavour, but delicious raw or cooked[2, K]. The seed can be ground into a meal and used in stews, making bread, cakes etc and in making nut butter[183]. The

whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Buttons Repellent TanninA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. The seed cups are used as buttons[95]. The bark is a commercial source of tannin[46, 223]. Tannin is also found in the leaves and wood[223]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe - Hungary, S. Italy and the Balkans. ksacta Not known

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Seashore. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. This species thrives in Britain, despite our cooler summers, but it only bears acorns occasionally[11]. The acorns ripen in their first year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

#### 6.2.22 Vitis rotundifolia

Muscadine Grape, Muscadine, Southern Fox Grape, Scuppernong, Muscadine Grape

5 tlin 9 cyuc 4 kcak 1 tcan 0 dwat 25 m hkuc

hmimhtut cyutli kyuctcup hwicii hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Vitis rotundifolia is a deciduous Climber growing to 25 m (82ft 0in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves ShootsEdible Uses: Fruit - raw or dried for winter use[1, 2, 22, 46]. Thickskinned[61] with a pleasant musky flavour[11, 200, 219]. Pleasant to eat raw, the fruit is excellent in jellies, pies etc[183]. The fruit is up to 25mm in diameter[200] and is produced in small bunches[235]. Leaves - cooked[55]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked[55, 851].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta South-eastern N. America - Delaware to Indiana and Kansas, south to Florida, Texas and Mexico. ksacta Woods, thickets, sandhills and shores[43].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as

soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Landscape Uses: Arbor. Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Prefers a position in full sun[160] Plants climb by means of tendrils[182]. They grow particularly well up elm trees[18]. Cultivated for its edible fruit in N. America[46, 61], there are some named varieties[183]. Most plants are self-fertile[160], but there are some cultivars that only produce female flowers and require pollination[183]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Resistant to Phylloxera disease, a disease that almost destroyed the European grape crops. This species can be used as a rootstock in areas where the disease is prevalent and can also be used in breeding programmes with V. vinifera in order to impart resistance to that species[160]. Plants are . however, susceptible to infestation by aphis[160]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native, Inconspicuous flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

#### 6.2.23 Sorbus torminalis

Wild Service Tree, Checkertree 5 tlin 9 cyuc 4 kcak 2 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus torminalis is a deciduous Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 5, 11, 74, 115, 183]. The taste is best after a frost because it turns sweeter. The fruit can also be bletted if it is going to be eaten raw[3, 183]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit. Rich in vitamin C. The fruit is up to 1.5cm across[200] and is borne in bunches which makes it easier to harvest[K].

tcanta WoodWood - heavy, fine grained, polishes well. Used for turning, wood carving[74, 115].

nrakta Europe, from Britain and Denmark south and east to N. Africa, the Caucasus and W. Asia. ksacta Woods, usually on clay[186], sometimes on limestone[17].

21, 176, 194, 218]. It is used internally in the treatment of constipation in the elderly, coughs, asthma and menstrual disorders[238]. The bark is demulcent, diuretic, expectorant and sedative[4]. It is used internally in the treatment of gastritis, whooping cough, coughs and bronchitis[238]. The root bark is used in the treatment of dropsy and jaundice[218]. The bark is harvested from young trees in the spring and is dried for later use[4]. The seed contains 'laetrile', a substance that has also been called vitamin B17[218]. This has been claimed to have a positive effect in the treatment of cancer, but there does not at present seem to be much evidence to support this[K]. The pure substance is almost harmless. but on hydrolysis it yields hydrocyanic acid, a very rapidly acting poison - it should thus be treated with caution[218]. In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of

nrakta E. Asia - China. ksacta Not known in a truly wild situation, it is possibly derived in cultivation from P. davidi-

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. The stored seed is best given 2 months warm followed by 3 months cold stratification[113]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. A very low percentage[113]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Landscape Uses:Container, Espalier, Firewood. Requires a well-drained moisture retentive soil[1, 11]. Thrives in a loamy soil, doing well on limestone[11]. Best not grown in acid soils. Prefers some chalk in the soil but it is apt to become chlorotic if too much is present[1]. Prefers a pH in the range 6 to 7[200]. Succeeds in light shade but fruits better in a sunny position[11]. Requires shelter from north and north-east winds[11] and also from spring frosts[200]. Widely cultivated for its edible fruit in warm temperate areas and continental climates, there are many named varieties[183]. There are numerous divisions of the varieties according to skin colour etc. Perhaps the most useful from the eaters point of view is whether it is free-stone (the flesh parts easily from the seed) or cling-stone (the flesh adheres to the seed)[200, K]. Trees are normally hardy in southern Britain[11], tolerating temperatures down to about -20°c when they are dormant[184], but they require some protection if cropping is to be at all reliable[11]. This is not due so much to lack of cold hardiness, more to the cooler summers in Britain which do not fully ripen the wood and the fruit, plus the unpredictable winters and springs which, in a mild spell, can excite the tree into premature flowering and growth which is then very liable to damage in any following cold spell. Hand pollination at this time can improve fruitset[200]. The cultivar 'Rochester' is more likely than most cultivars to succeed outdoors in Britain[200]. In general it is best to site peaches in a very warm sheltered sunny position, preferably against a south or west facing wall[200, 219]. Most cultivars are self-fertile[200]. Trees are often grafted onto plum or other rootstocks but are said to be better when grown on their own roots in southern Britain[11]. Trees are not generally long-lived[200], this is partly because of the need for the tree to produce a constant supply of new wood since most fruit is formed on one-year old wood (though some fruit spurs are formed)[200]. Garlic is a good companion for this plant, helping to prevent disease, especially peach leaf curl[20, 201]. Tansy grown below peach trees helps to keep them healthier[201]. Peach leaf curl can also be prevented by protecting the plants from winter and early spring rains. perhaps by covering them in plastic[200]. Plants grown or overwintered indoors do not suffer from leaf curl[260]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Edible. Not North American native, All or parts of this plant are poisonous, Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter tempera-

tures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a nonsuckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface. The root pattern is suckering with new plants from runners away from the plant [2-1].

# 6.2.11 Crataegus schraderana

Blue hawthorn

5 tlin 9 cyuc 5 kcak 0 tcan 2 dwat 6 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus schraderana is a deciduous Tree growing to 6 m (19ft 8in). It is not frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Fruit - raw or cooked[74]. A reasonable size, about 15 - 20mm in diameter[K]. This is one of the nicest tasting fruits of the genus I have tried to date. When fully ripe it is juicy with an extremely pleasant flavour and almost literally melts in the mouth[K]. I would far rather eat this fruit than a strawberry[K]. It ripens in late September and hangs on the tree in good condition for at least 4 weeks[K]. The ripe fruit is so soft that it is best eaten fresh from the tree[K]. The fruit can also be used in making pies, preserves etc, and can be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Although no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta S. Europe - Greece. ksacta Mountainous ar-

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species has an excellent potential as a fruit crop in Britain. The fruit is about the size of a cherry, it is very freely borne and the best forms are of excellent dessert quality[K]. The tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. Grafted specimens can produce fruit in their third year[K]. A very ornamental plant [74], it grows well in Britain flowering and fruiting well at Kew and Wisley[K]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

# 6.2.12 Crataegus ellwangeriana

Scarlet Hawthorn

5 tlin 7 cyuc 5 kcak 2 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus ellwangeriana is a deciduous Tree growing to 6 m (19th) by 6 m (19th). See above for USDA hardiness. It is hardy to UK Zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Juicy and acid[82]. An excellent dessert fruit, it has an acid yet sweet flavour, is juicy but with a mealy texture, it makes very pleasant eating[K]. The fruit can also be used in making pies, preserves etc, and can be dried for later use. A reasonable size, it is about 15mm in diameter[200]. A specimen at Kew has fruits up to 25mm in diameter[K]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

nrakta Eastern N. America. ksacta Not known in the wild, it is possibly of hybrid origin.

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. This species is possibly of hybrid origin, involving C. pedicellata, though some botanists view it as no more than part of C. pedicellata[82]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[11].

### 6.2.13 Prunus domestica italica

Gages, Greengage

5 tlin 8 cyuc 5 kcak 2 tcan 2 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyikfrip h

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutia Prunus domestica italica is a deciduous Tree growing to 5 m (16ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

death. kcakta Edible Parts: Flowers Fruit Oil SeedEdible Uses: OilFruit - raw or cooked. Often considered to be the finest of the dessert plums, they have a delicious flavour[K]. The greengages. The usually green, globose fruit is usually 30 - 400mm in diameter. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity. An edible gum is obtained from points of damage on the trunk[64]. The seed contains about 20% of an edible semi-drying oil[4], 57]. It has an agreeable almond smell and flavour[4]. The flowers are eaten. They are used as a garnish for salads and ice cream or brewed into a tea[183].

growth habit is a clumper with limited spread [1-2]. The root about 20 years old, the best period of production being be-

# 6.2.20 Carva illinoinensis

Peca

5 tlin 9 cyuc 4 kcak 2 tcan 1 dwat 50 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyif hjonli

drutta Carya illinoinensis is a deciduous Tree growing to 50 m (164ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from June to October, in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Milk Oil TeaSeed - raw or cooked[46, 82]. Sweet and delicious, they make an excellent dessert and are also often added to ice cream, used in cakes, bread etc[149, 183]. A milk can be made from the seed and is used to thicken soups, season corn cakes, hominy etc[183]. The seed is up to 4cm long and is produced in clusters of 3 -11[82, 229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. An edible oil is obtained from the seed[177, 183]. The leaves are said to be used as a tea[177, 183]. Carbon farming - Staple Crop: oil.

tcanta Fuel Oil Parasiticide WoodWood - coarse-grained, hard, heavy, brittle, not strong. It weighs 45 lb. per cubic foot. It is not as valuable a timber as other members of this genus and is used mainly for fuel and occasionally to make wagons and agricultural implements[46, 82, 227, 235]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astringent Parasiticide TBThe bark and leaves are astringent[227]. A decoction of the bark has been used to treat TB[257]. The pulverized leaves have been rubbed on the skin to treat ringworm[257].

nrakta Southern N. America - mainly along the Mississippi river valley. ksacta Rich moist soils of bottom-lands[229], especially along the sides of streams[235].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Global Crop Management: Standard Other Systems: Strip intercrop Staple Crop: OilLandscape Uses:Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Tolerates a pH in the range 4.5 to 8.3. Trees are fairly fast growing[200]. Trees do not grow very well in Britain, requiring hotter summers than are normally experienced here in order to fruit and fully ripen their wood[200]. However, a tree at Cambridge botanical gardens was 20 metres tall in 1985. Trees are said to be hardy to about -12°c, the same report also says that they are hardy to zone 5[200], which would experience considerably lower temperatures than this. Trees are probably much hardier when grown in areas with hot summers. In the wild, trees grow best in areas where summer temperatures average 24 - 30°c and the humidity is high[229]. Often cultivated for its edible seed, there are some named varieties[183]. Trees come into bearing when

tween the ages of 75 to 225 years old[229]. Mature trees regularly give yields of 225 kilos, whilst yields of 450 kilos have been recorded[229]. A number of cultivars have been developed in N. America that succeed quite far north in that country[200]. These cultivars include:- 'Carlson 3'. Early maturing, it is being trialled in Canada[183]. 'Devore'. An early fruiting form with small nuts that have an excellent flavour[183], 'Gibson', Precocious, protandrous, the nuts are of medium size with a good flavour[183]. 'Green Island'. Amongst the hardiest of cultivars, it has been selected for nut size, flavour and productivity[183], 'Mullahy', Hardy, precocious and very productive, it has ripened in Ontario[183]. Nuts are fairly large with an excellent flavour. 'Voiles 2'. Usually ripens as far north as Ontario and New York[183]. The wind-blown pollen is a significant cause of hay fever in the Unitd States[274]. This species is the State Tree of Texas[274]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have guite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Special Features: North American native, Inconspicuous flowers or blooms. Carbon Farming - Climate: cold temperate subtropical, tropical highlands. Humidity: humid. Cultivation: global crop. Management: standard. Other Systems: strip intercrop. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down

#### 6.2.21 Ouercus frainetto

Hungarian Oak, Italian Oak, Forest Green Oak 5 tlin 8 cyuc 4 koak 0 tcan 2 dwat 30 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis haa7tmwatli hionli

drutta Quercus frainetto is a deciduous Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked. The seed is up to 3.5cm long and 1.2cm wide[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. If the seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach

738 743

good source of sulphur and iron[201]. A nutritional analysis is available[218]. The bulbs are rather small, and rarely exceed 10mm in diameter [200]. They can be harvested with the leaves still attached and be used as spring onions[K]. They have a pleasant mild onion flavour. The flowers can be used as a garnish in salads etc[183]. The flowers of this species are rather dry and less desirable than the flowers of many other species[K]

tcanta Fungicide RepellentLandscape Uses: Border, Container, Massing, Rock garden, Forest Garden. The juice of the plant is used as an insect repellent, it also has fungicidal properties and is effective against scab, mildew etc[14, 18, 20, 201]. The growing plant is said to repel insects and moles[14, 20, 200]. Dynamic accumulator. Ground cover.nectary, Ground Cover. Aromatic.

dwatta Appetizer Digestive Hypotensive TonicThe whole plant has a beneficial effect on the digestive system and the blood circulation. It improves the appetite, is digestive, hypotensive and tonic[201]. It has similar properties to garlic (A. sativum), but in a much milder form, and it is rarely used medicinally[238].

nrakta Most of Europe, including Britain, east to the Himalayas and Japan. ksacta Rocky pastures and damp meadows, preferring calcareous soils[17, 90].

propta Seed - sow spring in a cold frame. Germination is usually free and easy, pot up the seedlings as soon as they are large enough to handle easily and plant out in the following spring. Division can be carried out at almost any time of the year but is probably best done in spring. The clumps should be divided at least every 3 or 4 years in order to maintain vigour[200], the divisions can be planted out direct into their permanent positions.

nwatta An easily grown plant[203], it prefers a sunny position in a rich moist but well-drained soil[14, 37], though it succeeds in most soils[1, 37, 200] and also in light shade[203]. Grows well in heavy clay soils[203]. Tolerates a pH in the range 5.2 to 8.3. Chives are commonly cultivated in the garden for their edible leaves which are available from late winter to the beginning of the following winter[K]. The bulbs divide rapidly and large clumps are quickly formed. There are some named varieties[183, 200, 203]. Chives are very tolerant of heavy harvesting, regular cutting of the leaves ensures a continuous supply of young leaves and prevents the plants flowering[33]. Plants can be moved into a frame or other protected environment in the autumn and will then produce leaves throughout the winter[33]. Do not do this every year or it weakens the plants. The bulbs should be planted fairly deeply[1]. A good bee plant[24]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. Helps to reduce the incidence of scab when it is grown under apple trees[201]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: North American native, Edible, Fragrant foliage, Invasive, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

# 6.2.19 Allium fistulosum

Welsh Onion

5 tlin 9 cyuc 5 kcak 2 tcan 2 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hionli drutta Allium fistulosum is a BULB growing to 0.6 m (2ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy

to UK zone 6 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2]. A strong onion flavour, it can be used in salads, as a cooked vegetable or as a flavouring in cooked foods[22, K]. The bulbs are rather small, usually 10 25mm in diameter though they can be up to 45mm[266], and are sometimes used as spring onions[183]. A nutritional analysis is available[218]. Leaves - raw or cooked[2]. They have a mild onion flavour[183] and can be added to salads or cooked as a vegetable[116]. The leaves are often available all through the winter if the weather is not too severe[K]. They contain about 1.4% protein, 0.3% fat, 4.6% carbohydrate, 0.8% ash, some vitamin B1 and moderate levels of vitamin C[179]. Flowers - raw. A pleasant onion flavour, but they are rather on the dry side[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Antibacterial Antifungal Antipyretic Diuretic Expectorant Stomachic Vitamin CThe bulb contains an essential oil that is rich in sulphur compounds[283]. It is antibacterial, antiseptic, diaphoretic, diuretic, galactogogue, stomachic, vermifuge and vulnerary[176, 218]. It is used in the treatment of colds and abdominal coldness and fullness[176]. A tea made from the roots is a children's sedative[218]. Use of the bulb in the diet impedes internal parasites[218]. Externally, the bulb can be made into a poultice to drain pus from sores, boils and abscesses[254].

nrakta E. Asia, possibly western China, though the original habitat is obscure, ksacta Cultivated for over 1000 years. it is not known in the wild

propta Seed - sow spring in a greenhouse. The seed germinates over a wide range of temperatures, it is faster at higher temperatures[206]. Prick out the seedlings into individual pots when they are large enough to handle. When well-grown, the plants should be ready to be planted out in the summer. If they are not large enough at this time, grow them on in the greenhouse for their first winter and plant them out in late spring. Division of the plants is very easy and can be done at almost any time of the year though the spring is probably best. The divisions can be planted out straight into their permanent positions if required

nwatta An easily grown plant[203], it prefers a sunny position in a light well-drained soil[1] but tolerates most soils[1, 521 including those that are damp and acid[203] Prefers a pH in the range 6.5 to 7.5[206], but it tolerates a pH in the range 4.9 to 7.5. A very hardy species, it is related to the cultivated onion (A. cepa) and could be of value in breeding programmes. It is sometimes cultivated in the garden for its edible leaves which can be produced throughout the winter if the weather is not too severe[K]. A very popular cultivated vegetable in the Orient[206], it probably arose through cultivation from A. altaicum[203]. The oriental forms of this species, known as bunching onions, tend to be hardier and more robust than the welsh onion[206]. There are two basic forms, multi-stem types and single-stem types. The single-stem types divide less freely than the multistems[206]. Plants will often retain their leaves even when covered in snow[206]. They are also tolerant of high temperatures and can be grown in the tropics[206]. The plants are often eaten by slugs[K]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant

tcanta Adhesive Cosmetic Dye Oil WoodA green dye can many), Washington (USA). be obtained from the leaves [168]. A dark grey to green dye can be obtained from the fruit [168]. A yellow dye is obtained from the bark [115]. A gum obtained from points of damage along the stem can be used as an adhesive [64]. The ground up seeds are used cosmetically in the production of face-masks for dry skin [7]. A semi-drying oil is obtained from the seed [64]. No details of its uses. The reddish-brown wood is very close-grained, hard, compact. Liable to warp and split. It is used for musical instruments [115, 146].

dwatta Digestive Febrifuge Laxative Purgative Stomachic StypticThe dried fruit, known as prunes, is a safe and effective laxative and is also stomachic [4, 7, 21, 238]. The bark is sometimes used as a febrifuge and is styptic [4, 7]. An infusion of the flowers has been used as a mild purgative for children [4]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being [238].

nrakta A cultivated plant, not known in the wild. ksacta Not known in a truly wild situation

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe [200]. Sow stored seed in a cold frame as early in the year as possible [200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate [113 1. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. The various cultivars of plum are unlikely to breed true (though the green forms of the gage generally do) - they will usually produce a range of plants from seed with differing characteristics from their parent, Cuttings of half-ripe wood with a heel, mid summer in a frame [11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame [200] Layering in spring.

nwatta The greengages are a group of cultivars of the common European plum. Gages are often cultivated as a fruit crop, especially in western Europe. Of excellent quality, though their delicate skins makes it difficult to get them to market in good condition and so they are more likely to be grown on a garden scale or be used for canning etc. Prunus domestica subsp. italica requires a well-drained moisture retentive soil [1, 11]. Succeeds in light shade but fruits better in a sunny position [11, 200]. Thrives in a loamy soil, doing well on limestone [11]. Grows well in heavy clay soils. Prefers some chalk in the soil but apt to become chlorotic if too much is present [1]. The various gages are often cultivated for their edible fruits, especially on a garden scale. There are some named varieties [200]. The gage was first developed from the plum in the Middle East, later spreading via France into much of western Europe. Its cultivation has spread into most temperate regions, though it is often only grown on a small scale because of the difficulty of getting it to market in good condition. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged [238]. Plants in this genus are notably susceptible to honey fungus [200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1]. Prunus domestica italica is a deciduous shrub or a tree usually growing 2 - 6 metres tall, occasionally to 15 metres. We can infer from its cultivation that the species grows optimally in areas with cold winters and long warm summers as vernalisation is required for flowering. The species can tolerate frost, however, when this occurs after flowering the fruit quality is poor (Lim 2002). Widely grown cultivars include: Boddarts Reneclode (Germany), Bryanston (UK), Cambridge Gage (UK), Canerik (Turkey), Denniston's Superb (USA), Gojeh Sabz (Iran), Yasil Alca or Göv Alca (Azerbaijan), Golden Transparent (UK), Graf Althanns Reneklode (Germany), Green Vanilla (Mount Pelion, Greece), Große Grüne Reneklode (Germany) / Reine Claude Verte (France), Laxton's Gage (UK), Laxton's Supreme (UK), Meroldts Reneclode (Germany), Rainha Cláudia (Portugal), Regina Claudia (Italy), Reine Claude de Bavay (France), Reine Claude d'Oullins (France), Uhinks Reneklode (Ger-

### 6.2.14 Rubus fruticosus

Blackberry, Shrubby blackberry 5 tlin 9 cyuc 5 kcak 2 tcan 3 dwat 3 m hkuc

pcimhmimhtut cyutli hgattcup hwicli hyishrasilutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Rubus fruticosus is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from March to November, in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Fruit Leaves Root ShootsEdible Uses: TeaFruit - raw or cooked[5, 7, 9, 12, 183]. The best forms have delicious fruits and, with a range of types, it is possible to obtain ripe fruits from late July to November[K]. The fruit is also made into syrups, jams and other preserves[238]. Some people find that if they eat the fruit before it is very ripe and quite soft then it can give them stomach upsets[K]. Root - cooked. The root should be neither to young nor too old and requires a lot of hoiling[7]. A tea is made from the dried leaves[21] - the young leaves are best[61]. The leaves are often used in herbal tea blends[238]. Young shoots - raw. They are harvested as they emerge through the ground in the spring, peeled and then eaten in salads[244].

tcanta Dye Fibre PioneerA purple to dull blue dye is obtained from the fruit[168]. A fibre is obtained from the stem and used to make twine[66]. Plants are spread by seed deposited in the droppings of birds and mammals. They often spring up in burnt-over, logged or abandoned land and make an excellent pioneer species, creating the right conditions for woodland trees to move in. The trees will often grow in the middle of a clump of blackberries, the prickly stems protecting them from rabbits[K].

dwatta Antidiarrhoeal Astringent Depurative Diuretic Dysentery Tonic VulneraryThe root-bark and the leaves are strongly astringent, depurative, diuretic, tonic and vulnerarv[4, 7, 9, 165, 254]. They make an excellent remedy for dysentery, diarrhoea, haemorrhoids, cystitis etc, the root is the more astringent[4, 238]. Externally, they are used as a gargle to treat sore throats, mouth ulcers and gum inflammations[238, 254]. A decoction of the leaves is useful as a gargle in treating thrush and also makes a good general mouthwash[7].

nrakta Europe, including Britain, to the Mediterraneanand Macaronesia, ksacta A very common and adaptable plant, found in hedgerows, woodland, meadows, waste ground etc[17, 244].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood. July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil[1, 11, 200]. Succeeds in acid and calcareous soils[186]. Tolerates poor soils[202]. Established plants are drought resistant[132]. Succeeds in sun or semi-shade[1, 11, 200], though it fruits less well in the shade[202]. Plants will also fruit when grown in fairly deep shade or against a north facing wall, though the fruit will ripen later[219]. Plants tolerate guite severe exposure[186]. Hardy to at least -18°c[202]. R. fruticosus is an aggregate species made up of several hundred slightly differing species. The reason for this is that most seed is produced by a non-sexual method (Apomixis) and is therefore genetically identical to the parent plant. On occasions when sexual production of seed takes place the offspring will all be slightly different from the parent plant and will then usually reproduce as a new species by means of apomixy. Modern treatment of this aggregate usually does not use the name R. fruticosus because of the confusion over which species it should apply to, the type species of the aggregate should be called R. ulmifolius[150]. The following members of the aggregate have been highly recommended for their fruit[150], R. badius, R. cyclophorus, R. gratus, R. nemoralis. R. oxyanchus. R. pyramidalis. R. separinus. R. winteri. The following members are said to be nearly as good. R. balfourianus, R. broensis, R. carpinifolius, R. foliosus, R. fuscoviridis. R. infestus. R. insericatus newbouldianus. R. koehleri. R. largificus. R. londinensis. R. ludensis. R. macrophyllus. R. obscurus. R. pseudo-bifrons. R. rhombifolius. R. riddelsdellii. R. scaber. R. thyrsiflorus. R. vallisparsus. R. vestitus. Plants form dense thickets and this makes excellent cover for birds[186]. They regenerate freely after being cut back[186]. This species is also a good plant for bees and butterflies[24]. This species has biennial stems, it produces a number of new stems each year from the perennial rootstock. these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 6.2.15 Ribes x culverwellii

Jostaberry

5 tlin 9 cyuc 5 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ribes x culverwellii is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from April to October, in flower from April to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies, jams etc[200]. Intermediate in size and flavour between gooseberries and blackcurrants, tasting more like a gooseberry when under-ripe and more like a blackcurrant when fully ripe[K]. The fruit is rich in vitamin C[183].

nrakta A range of garden hybrids. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. This plant is a cultivar and will not breed true from seed. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Best grown on a deep sandy loam[1]. Dislikes very heavy clay, chalky soils and thin dry soils, but it can succeed on most soil types if plenty of organic matter is incorporated[1]. Quite tolerant of shade though not fruiting so well in such a position[11]. A group of cultivars of hybrid origin, basically a cross between blackcurrants and gooseberries. Very vigorous plants, producing prolific crops of fruit. They are being grown increasingly in gardens. In general they resist American gooseberry mildew, blackcurrant leaf spot and gall

mite. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 6.2.16 Allium ampeloprasum

Wild Leek, Broadleaf wild leek

5 tlin 9 cyuc 5 kcak 2 tcan 3 dwat 1.8 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Allium ampeloprasum is a BULB growing to 1.8 m (6ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from October to August, in flower from July to August, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2, 27, 61, 105]. The small bulbs can vary considerably in size from 2 - 6cm[200], they have a fairly strong leek to garlic flavour and are nice as a flavouring in cooked foods[K]. The bulbs of selected cultivars are very large with a mild garlic flavour[183]. Leaves - raw or cooked[2]. A pleasant mild to strong garlic flavour, they are available from late autumn to the spring though they can become rather tough and fibrous as they get older[K]. Flowers - raw. A similar flavour to the leaves but they have a somewhat dry texture and are best used as a flavouring in cooked foods[K]. The bulblis have a mild garlic flavour and make a nice flavouring in salads and cooked foods. Although produced abundantly, they are quite fiddly to use because they are small[K]. They can also be pickled[142].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Anthelmintic Antiasthmatic Anticholesterolemic Antiseptic Antispasmodic Cholagogue Diaphoretic Diuretic Expectorant Febrifuge Stimulant Stings Stomachic Tonic VasodilatorThis species has the same medicinal virtues as garlic, but in a much milder and less effective form[238]. These virtues are as follows:- Garlic has a very long folk history of use in a wide range of ailments, particularly ailments such as ringworm. Candida and vaginitis where its fungicidal, antiseptic, tonic and parasiticidal properties have proved of benefit[218]. It is also said to have anticancer activity[218]. Daily use of garlic in the diet has been shown to have a very beneficial effect on the body, especially the blood system and the heart. For example, demographic studies suggest that garlic is responsible for the low incidence of arteriosclerosis in areas of Italy and Spain where consumption of the bulb is heavy[222]. The bulb is said to be anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, cholagogue, diaphoretic, diuretic, expectorant, febrifuge, stimulant, stomachic, tonic, vasodilator[4, 9, 14, 21, 46, 165]. The crushed bulb may be applied as a poultice to ease the pain of bites, stings etc[4, 9, 14, 21].

nrakta S. Europe to W. Asia. Possibly native in Britain in S.W. England and Wales[17]. ksacta Rocky places near the coast in S.W. England and Wales[17].

propta Seed - best sown as soon as it is ripe in a cold frame, though it can also be sown in a cold frame in the spring[200]. Prick out the seedlings into individual pots when they are large enough to handle. Well-grown plants can be planted out into their final positions in late summer or the autumn, otherwise grow them on for a further year in pots and plant them out the following summer. Division

in late summer or early autumn. Dig up the bulbs when the plants are dormant and divide the small bulblets at the base of the larger bulb. Replant immediately, either in the open ground or in pots in a cold frame. Bulbils - plant out as soon as they are ripe in late summer. The bulbils can be planted direct into their permanent positions, though you get better results if you pot them up and plant them out the following spring

nwatta Prefers a sunny position in a light well-drained soil[1]. Prefers a dry position[45]. Succeeds in clay soils[203]. Tolerates a pH in the range 5.2 to 8.3. The bulbs should be planted fairly deeply[1]. The wild leek is a rare native of Britain, found only in the south-west and Wales, though it should be hardy in most parts of the country. It comes into growth in the autumn, dying down in the summer, and makes a very pleasant winter leaf, either raw or cooked. It is a rather variable plant, especially in the amount of flowers and bulbils produced. The species produces mainly flowers with almost no bulbils, whilst the sub-species A. ampeloprasum babbingtonii (Babbington's Leek) produces lots of bulbils and almost no flowers[17]. The cultivated leek (A. ampeloprasum porrum) is believed to have been developed from this plant whilst, in Germany and Italy, other forms have been selected for their edible bulbils[142]. Allium ampeloprasum comprises several vegetables, of which the most important ones are: leek, elephant garlic or great-headed garlic, pearl onion, kurrat, Egyptian leek or salad leek, and Persian leek (Allium ampeloprasum ssp. persicum). The cultivar 'Perizweibel' is often used, the bulbils are solid rather than made up of layers and are popularly used for making pickles[183]. This cultivar does not set seed[183]. Another cultivated form of this plant produces very large, mild-garlic flavoured bulbs that are up to 500g in weight[183]. They are known as elephant garlic[183]. The wild leek grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root nattern is a hulh

# 6.2.17 Allium cernuum

Nodding Onion, New Mexican nodding onion 5 tlin 9 cyuc 5 kcak 2 tcan 2 dwat 0.5 m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis haa7tmwatli xre7t hionli

drutta Allium cernuum is a BULB growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from February to December, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2, 22, 161]. Strongly flavoured[46, 61, 159], it is mainly used as a flavouring[183, K]. The bulb is about 50mm tall and 15mm wide[235]. Leaves - raw or cooked[62, 85, 159]. A delicious, strong-onion flavour, they are very nice in salads[K]. The leaves are available from spring until the autumn and are one of the most favourite onions we are growing on our Cornish trial grounds[K]. Flowers - raw or cooked. A delicious strong onion flavour, somewhat stronger than the leaves especially if the seeds are starting to set[K]. They make a very decorative and tasty addition to the salad bowl[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and

moles[20]. The juice can be applied to exposed skin in order to repel biting insects[257].

dwatta Lithontripic PoulticeThe whole plant has mild medicinal activity similar to the action of garlic (Allium sativum)[222]. It is used specifically as a poultice on the chest for the treatment of respiratory ailments and the juice has been used in the treatment of kidney stones[222]. The juice of the plant is used in treating colds, croup, sore throats etc[257]. A poultice of the plant is applied externally to various infections such as sore throats, sores, swellings, chest and pleurisy pains[257].

nrakta N. America - Canada to Mexico. ksacta Ledges, gravels, rocky or wooded slopes and crests ascending to high altitudes[43]. Widely distributed on moist soils in mountainous and cool regions to 3500 metres[270].

propta Seed - sow spring in a cold frame. Prick out the sedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta An easily grown plant[203], it prefers a sunny position in a light well-drained soil[1]. Succeeds in clay soils[203]. Established plants are fairly drought tolerant[190]. Plants succeed in maritime gardens[233]. A very ornamental plant, it makes a very decorative edging to flower beds[K]. This species is self-sowing quite freely in our Cornwall garden[K]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203], though this species has tolerated considerable neglect in our Cornwall garden[K]. The cultivar 'Major' is a more vigorous form with larger flower clusters[90]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. A widespread and very variable species[1]. It is closely allied to A. stellatum[1, 270]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

# 6.2.18 Allium schoenoprasum

Chives, Wild chives, Flowering Onion 5 tlin 11 cyuc 5 kcak 3 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Allium schoenoprasum is a BULB growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from February to December, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw, cooked or dried for later use. The leaves have a mild onion flavour and are an excellent addition to mixed salads, they can also be used as a flavouring in soups etc[2, 4, 5, 9, 27, 33]. The leaves are often available from late winter and can continue to produce leaves until early the following winter, especially if they are in a warm, sheltered position[K]. A

soil and a sheltered sunny position[200]. Plants are hardy to about -15°c[200]. A very ornamental plant, it is usually grown as a biennial due to its susceptibility to the fungal disease 'rust'[1, 200]. There are many named varieties[238]. Young plants, and also the young growth in spring, are very attractive to slugs[K]. Special Features: Attracts birds, Attracts butterflies, Suitable for cut flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 10 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a 6.2.137 Zanthoxylum piperitum clumper with limited spread [1-2].

# 6.2.136 Hydrangea macrophylla

French hydrangea , Florist's Hydrangea, Bigleaf Hydrangea 5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Hydrangea macrophylla is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: SweetenerThe young leaves, when dried and rubbed between the hands, become very sweet and are used to make a sweet tea called 'tea of heaven', it is used in Buddhist ceremonies[183]. The leaves contain phellodulcin (its chemical formula is C16 H14 O), a very sweet substance that can be used as a sugar substitute[116, 183]. One small leaf is sufficient to sweeten a cup of tea[218]. The older leaves can be dried, powdered and used as a flavouring on foods[105, 177]. The young leaves and shoots are also eaten cooked[105, 177]. Young leaves contain the toxin hydrocyanic acid, this reduces as the leaves grow older, often to zero levels[218].

tcanta Hedge HedgeA useful hedging plant because of its vigorous growth. The Hortensias or mop-head cultivars are recommended[200].

dwatta Antiperiodic Antitussive Diuretic MalariaThe leaves, roots and flowers are antimalarial, antitussive and diuretic[218, 240]. They are said to be a more potent antimalarial than quinine, due to the presence of an alkaloid[240].

nrakta E. Asia - Japan. ksacta Sunny places near the coast of E. Japan[11].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses:Container, Seashore, Specimen. Tolerates most soil[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11. 2001. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Prefers a shady position[1]. Does well on very acid soils with a pH around 4.5[200]. Plants also tolerate alkaline soils, though they become chlorotic on shallow soils over chalk[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil[200]. A very wind resistant plant when grown in mild areas[166]. Dormant plants are hardy to about -10°c[184], though the young growth in spring is frost-tender[K]. A very ornamental plant and polymorphic species[200], there are many named varieties[184]. This species was named for a sterile (or 'mop head') cultivar so that the true species should really be referred to as H. macrophylla normalis[182]. Plants are cultivated for their leaves in China and Japan. Plants are very tolerant of pruning and can be cut back into old wood if reguired[188]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, All or parts of this plant are poisonous, Suitable for cut flowers, Suitable for dried flowers, Blooms are very showy.

Japanese Pepper Tree 5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Zanthoxylum piperitum is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy) medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Leaves SeedEdible Uses: CondimentSeed - cooked. It is ground into a powder and used as a condiment, a pepper substitute[1, 2, 11, 34, 183]. The fruit can also be used [116]. It is often heated in order to bring out its full flavour and can be mixed with salt for use as a table condiment[183]. The ground and dry-roasted fruit is an ingredient of the Chinese 'five spice powder' [238]. The bark and leaves are used as a spice[2, 105, 238]. Young leaves raw or cooked. They are used in soups or as a flavouring in salads[177, 179, 183].

tcanta ParasiticideIn Japan, the thick wood of the tree is traditionally made into a gnarled and rough-hewn wooden pestle, to use with suribachi

dwatta Antibacterial Antifungal Antiperiodic Antitussive Carminative Diuretic Parasiticide Stimulant StomachicAntiperiodic, antitussive, carminative, diuretic, parasiticide, stimulant[178]. The fruit contains a essential oil, flavonoids and isoguinoline alkaloids[279]. It is anthelmintic, antibacterial, antifungal and stomachic[279]. It inhibits the synthesis of prostaglandin and, in larger doses, is toxic to the central nervous system[279]. It is used in Korea in the treatment of tuberculosis, dyspepsis and internal parasites[279]. The resin contained in the bark, and especially in that of the roots, is powerfully stimulant and tonic[82].

nrakta E. Asia - N. China, Japan, Korea. ksacta Scrub and hedges in hills and mountains in Japan[58, 184].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent posi-

nwatta Easily grown in loamy soils in most positions, but prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. A very ornamental plant[1], it is hardy to about -15°c[184]. Flowers are formed on the old wood[206]. The bruised leaves are amongst the most powerfully aromatic of all leaves [245]. Dioecious. Male

tcanta Hedge HedgeCan be grown as a low hedge[29], it is guite wind tolerant.

nrakta E. Asia - Japan. ksacta Found only on Amagi mountain in the wild[174].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Tolerates most soil[200], thriving in a welldrained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Best grown in an acid soil, doing well on very acid soils (pH 4.5). There is some confusion over the correct name for this plant. We have used the name in [174] but the Flora of Japan[58] says that the correct name is H. macrophylla angustata. Plants are hardy to about -25°c when dormant[200], but the young growth in spring can be killed by late frosts[K]. This species is notably susceptible to honey fungus[200].

# **6.2.50** Lycium chinense

Chinese Boxthorn, Chinese desert-thorn 5 tlin 9 cyuc 4 kcak 3 tcan 3 dwat 2.5 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lycium chinense is a deciduous Shrub growing to 2.5 m (8ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Some caution should be exercised with this species, particularly with regard to its edible leaves, since it belongs to a family that often contains toxins. However, use of the leaves is well documented and fairly widespread in some areas.

kcakta Edible Parts: Fruit Leaves Seed ShootsEdible Uses: Coffee TeaFruit - raw, cooked in soups etc or dried for later use[174, 178, 183]. Sweet with an aniseed-like flavour[183]. The fruit is an oblong berry about 15mm long by 8mm wid[266]. Only the fully ripe fruits should be eaten[K]. Leaves and young shoots - raw or cooked[61, 174, 178]. A peppermint-like flavour, the leaves are used in salads or used as a potherb[183]. Rich in vitamin A., the leaves also contain about 3.9% protein, 2.25% carbohydrate, 0.7% fat, 1.4% ash[179]. The roasted seed is a coffee substitute[183]. The dried leaves are a tea substitute[183].

tcanta Hedge Hedge Soil stabilizationCan be grown as an informal hedge, succeeding in maritime exposure[200]. Plants have an extensive root system and can be planted to stabilize banks[200].

dwatta Antibacterial Antipyretic Cancer Haemostatic Hepatic Hypoglycaemic Infertility Kidney Ophthalmic Tonic VasodilatorChinese boxthorn is a major Chinese tonic herb with a history of almost 2.000 years of medicinal use[254]. Both the berries and the root are used and traditionally the plant is believed to promote long life[254]. The fruit is one of the most popular tonics used in Chinese herbal medicine[176, 218]. A decoction is used to clear the vision, strengthen the kidneys, restore semen and nourish the liver[147]. The fruit protects the liver from damage caused by exposure to toxins[254]. It is also used in the treatment of diabetes mellitus, vertigo, nocturnal emissions and aching back and legs[176]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The seed is used as a haemostat for the control of bleeding, with a special action on the kidneys and sex organs[218]. The root bark is antibacterial, antipyretic, hepatic, hypoglycaemic and vasodilator[176]. It stimulates the parasympathetic nervous system, which controls involuntary bodily functions such as digestive secretions[254]. The root is used in the treatment of pulmonary tuberculosis and pneumonia in small children[147], chronic febrile disease, night sweats, cough and asthma, tuberculosis, hypertension and diabetes mellitus[176]. The root can be harvested at any time of the year but traditionally it is harvested in the spring and can be dried for later use[254]. The root bark contains betaine. This can increase the rate of growth of farm animals and increase the weight and amount of eggs, it is used in the treatment of achlorhydria, atherosclerosis and hepatic diseases[176]. Haemostatic[174].

nrakta E. Asia - China, Japan, Naturalized in Britain, especially by the sea. ksacta Thickets and river banks in lowland C. and S. Japan[58].

propta Seed - sow early spring in a greenhouse. Germination is usually good and fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Pinch out the shoot tips of the young plants in order to encourage bushy growth[78]. Cuttings of half-ripe wood, 5 - 10cm with a heel if possible. July/August in individual pots in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, autumn to late winter in a cold frame. High percentage[78, 200]. Division of suckers in late winter. Very easy, the suckers can be planted out direct into their permanent positions. Layering.

nwatta An easily grown plant, it does not require a rich soil, flowering and fruiting better in a well-drained soil of moderate quality[1, 11, 200]. Succeeds in impoverished soils[200]. Requires a sunny position[200]. Tolerates maritime exposure[200]. A very hardy plant, tolerating temperatures down to about -23°c[200]. This species is widely cultivated for its edible young shoots in China. There is much confusion between this species and the closely related L. barbarum. Most, if not all, of the plants being grown as L. chinense in Britain are in fact L.barbarum[11, 50, 200].

#### 6.2.51 Scorzonera hispanica

Scorzonera

5 tlin 9 cvuc 4 kcak 1 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scorzonera hispanica is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: CoffeeRoot - cooked[2, 27, 33, 37, 105]. A sweet agreeable flavour[1]. The root is usually eaten at the end of its first year of growth, but it can be grown on for a second year without becoming tough[200]. The root is rich in inulin[46] - this is a starch that is not easily digested by humans and so generally passes straight through the digestive system and is excreted. Inulin can cause flatulence in some people[K]. Leaves - raw[27, 33, 52]. The tender young shoots are usually eaten in early spring[183]. Flower buds - raw[57]. Added to salads[183]. The petals have their own distinctive flavour and can also be added to salads[183]. The roasted root is used as a coffee substitute[183].

tcanta RepellentThe growing plant is said to repel carrot root fly from carrots growing nearby[18].

800 761 nrakta S. Europe. ksacta Cultivated ground, rocks and bushy places[50].

propta Seed - sow spring in situ. If the weather is dry, it will be advisable to water the seed in well or germination will be delayed. The seed can also be sown in situ in August. Division in autumn or as growth commences in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any soil in sun or light shade[200]. Prefers a light soil[37]. Occasionally cultivated for its edible root, there are some named varieties[183]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 6.2.52 Fagopyrum spp.

Perennial Buckwheat

5 tlin 10 cyuc 4 kcak 2 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Fagopyrum spp. is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves raw or cooked[105, 160, 272]. Boiled or steamed and used like spinach[183]. Of excellent quality according to one report[2], but we have been less than impressed by the flavour, which has a distinct bitterness especially when eaten raw[K]. The leaves are rich in rutin (see below for details of its uses) and so they do make a healthy addition to the diet[K]. Seed - it can be sprouted and eaten raw, or cooked and used as a cereal[4]. Dried and ground into a powder, it can serve as a thickening agent in soups etc. The seed is rich in vitamin B6. Unfortunately, it is not freely produced in Britain[2]. Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta Animal feed, An ornamental plant.

dwatta The whole plant is anodyne, anthelmintic, antiphlogistic, carminative, depurative and febrifuge. It stimulates blood circulation[147]. A decoction is used in the treatment of traumatic injuries, lumbago, menstrual irregularities, purulent infections, snake and insect bites[147]. A decoction of the roots is used in the treatment of insect bites, dysmenorrhoea, inflammation, lumbago, snakebite and traumatic injuries[218]. The leaves are rich in rutin which is a capillary tonic, antioedemic, anti-inflammatory, antispasmodic and hypotensive[218]. Rutin also inhibits carcinogenesis and protects against radiation[218].

nrakta Eurasia. ksacta Forests and cultivated areas from Pakistan to S.W. China, 1500 - 3400 metres[51]. Found alongside ditches on shady damp and fertile soils in China[147].

propta Seed - sow spring in a greenhouse. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in the summer. Division is very easy at almost any time in the growing season, though it is best avoided in early spring because the young growth can be damaged by late frosts. The divisions can be planted out direct into their permanent positions.

nwatta Hypothetical Crop Management: Standard Staple Crop: Balanced carbClimate: boreal to cold temperate. Humidity: arid to semi-arid. Carbon Farming Solutions - Cultivation: hypothetical - F. esculentum could be crossed with F. cymosum. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

# nrakta S. Europe. ksacta Cultivated ground, rocks and 6.2.53 Gaylussacia baccata

Black Huckleberry

5 tlin 9 cyuc 4 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflat

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusfla hpa7tmwatli xre7t hjonli

drutta Gaylussacia baccata is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 55]. Deliciously spicy and sweet, they can be eaten out of hand or used in pies, preserves etc[183]. They can also be dried for later use[62]. The dried fruit can be ground into a powder then mixed with cereal flours to make bread[257]. The fruit is rather seedy[235]. The fruit is about 8mm in diameter[200].

dwatta Astringent Dysentery MiscellanyAn infusion of the leaves, or the bark, has been used in the treatment of dysentery[257]. An infusion of the leaves has been used in the treatment of Bright's disease[257].

nrakta Eastern N. America - Newfoundland to Georgia, Manitoba, Wisconsin and Kentucky. ksacta Dry or moist woods, thickets and clearings[43], on acidic sandy soils[200].

propta Seed - best sown in the autumn in a cold frame[200]. Seeds are short-lived and difficult to germinate. Stored seed requires 1 month warm stratification followed by 2 months cold[113]. When large enough to handle, prick the seedlings out into individual pots of lime-free compost and grow them on in light shade in a greenhouse or cold frame for at least their first winter. Plant out into their permanent positions in late spring or early summer when they are at least 15cm tall. Cuttings of half-ripe wood, July/August in a frame[200]. Layering, Division in spring.

nwatta Requires a lime-free moist peaty soil, thriving in sun or part shade[3, 182, 200]. Plants are hardy to about -15°c[200]. Occasionally cultivated for its edible fruit, there are some named varieties selected for their larger fruits[22, 461. The small oval leaves are covered with globules on the underside from which a resinous gum is exuded[245]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 6.2.54 Abelmoschus esculentus

)kra

5 tlin 11 cyuc 4 kcak 2 tcan 3 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Abelmoschus esculentus is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista The hairs on the seed pods can be an irritant to some people and gloves should be worn when harvesting. These hairs can be easily removed by washing[200].

"heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 6.2.134 Rhus punjabensis

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 12 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikly hpa7tmwatli nyanhjen hjonli

drutta Rhus punjabensis is a deciduous Tree growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There are some suggestions that the sap of this species can cause a skin rash in susceptible people, but this has not been substantiated. See also notes in 'Cultivation Details'

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - raw or cooked[2, 105, 145]. The fruit is small with very little flesh, but it is produced in fairly large panicles and so is easily harvested. When soaked for 10 - 30 minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[K]. The mixture should not be boiled since this will release tannic acids and make the drink astringent.

tcanta Dye Mordant OilAn oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The leaves are rich in tannin[145]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169].

dwatta Antiseptic Astringent HaemostaticAn excrescence produced on the leaf by an insect Melaphis chinensis or M. paitan is antiseptic, astringent and haemostatic[176]. It is used in the treatment of persistent cough with blood, chronic diarrhoea, spontaneous sweating, night sweats, bloody stool, urorrhoea and bloody sputum. It is used applied externally to burns, bleeding due to traumatic injuries, haemorrhoids and ulcers in the mouth[176].

nrakta E. Asia - C. and W. China. ksacta Thickets and woodland margins in W. China[109].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. This soak water can be drunk and has a delicious lemon-flavour. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, JulylAugust in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 2001. Suckers in late autumn to winter[2001].

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. The young growth in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. This species is closely related to R. potaninii[11]. R. punjabensis sinica is the form of

this plant that is most usually grown in Britain[200]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

# 6.2.135 Alcea rosea

Hollyhock

5 tlin 9 cvuc 3 kcak 3 tcan 2 dwat 2.4 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Alcea rosea is a PERENNIAL growing to  $2.4~\mathrm{m}$  (7ft) by  $0.6~\mathrm{m}$  (2ft in) at a fast rate. See above for USDA hardness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakťa Edible Parts: Flowers Leaves Oil Root StemEdible Uses: Oil TeaYoung leaves - raw or cooked[2, 55, 177]. A mild flavour, but the texture leaves something to be desired[K]. They have been used as a pot-herb, though they are not particularly palatable[4]. They can also be chopped up finely and added to salads[K]. Inner portion of young stems -raw[101]. Flower petals and flower buds - raw. Added to salads[183]. A nutritious starch is obtained from the root[183]. A refreshing tea is made from the flower petals[183].

tcanta Compost Dye Litmus Oil PaperA fibre obtained from the stems is used in papermaking[189]. The fibres are about 1.9mm long. The stems are harvested in late summer, the leaves are removed and the stems are steamed until the fibres can be removed. The fibres are cooked with lye for 2 hours and then ball milled for 3 hours or pounded with mallets. The paper is light tan in colour[189]. The flowers are an alternative ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The seed contains 12% of a drying oil[114, 240]. The red anthocyanin constituent of the flowers is used as a litmus[114]. A brown dye is obtained from the petals[168].

dwatta Antiinflammatory Astringent Demulcent Diuretic Dysentery Emollient FebrifugeThe flowers are demulcent, diuretic and emollient[4, 21]. They are useful in the treatment of chest complaints[4], and a decoction is used to improve blood circulation, for the treatment of constipation, dysmenorrhoea, haemorrhage etc[218]. The flowers are harvested when they are open and are dried for later use[238]. The shoots are used to ease a difficult labour[218]. The root is astringent and demulcent[240]. It is crushed and applied as a poultice to ulcers[218]. Internally, it is used in the treatment of dysentery[240]. The roots and the flowers are used in Tibetan medicine, where they are said to have a sweet, acrid taste and a neutral potency[241]. They are used in the treatment of inflammations of the kidneys/womb, vaginal/seminal discharge, and the roots on their own are used to treat loss of appetite[241]. The seed is demulcent, diuretic and febrifuge[240].

nrakta The original habitat is obscure, it is probably of hybrid origin. A garden escape in Britain[17]. ksacta Not known in a truly wild situation.

propta Se-d - sow April/May or August/September in pots or in situ[200, 238]. Easily grown from seed, which usually germinates in about 2 - 3 weeks at  $20^{\circ} \text{c}[133, 268]$ . When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering. Only use rust-free specimens. Root cuttings in December. Basal cuttings at almost any time of year.

nwatta Landscape Uses:Border, Container, Foundation, Specimen. Succeeds in most soils[1]. Poor soils should be enriched with organic matter[1, 111]. Prefers a heavy rich

All parts of the plant, but especially the root, are antiinflammatory, antiseptic, aromatic, astringent, diaphoretic, febrifuge, stomachic, styptic and tonic[4, 9, 21, 165, 238]. An infusion is taken internally in the treatment of diarrhoea, intestinal disorders, stomach upsets, irritable bowel syndrome and liver disorders, it is also applied externally as a wash to haemorrhoids, vaginal discharges etc[238, 254] and to treat various skin afflictions - it is said to remove spots, freckles and eruptions from the face[4, 9]. The root is best harvested in the spring, since at this time it is most fragrant[4]. Much of the fragrance can be lost on drying, so the root should be dried with great care then stored in a cool dry place in an airtight container, being sliced and powdered only when reguired for use[4]. The powdered root had a great reputation as a substitute for quinine in the treatment of intermittent fevers [301].

nrakta Europe, including Britain, from Norway south and east to N. Africa, Siberia, Himalayas and W. Asia. ksacta Woods, scrub, hedge banks, walls etc, usually on good damp soils[9, 13, 17].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer' Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Prefers shade[12, 21] and a soil rich in organic matter[200]. This species was widely cultivated as a pot-herb in the 16th century[5]. The bruised or dried root is pleasantly aromatic with a clove-like fragrance[245]. Plants self-sow freely when well-sited[238]. Hybridizes freely with other members of this genus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 6.2.132 Gaylussacia dumosa

Dwarf Huckleberry

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Gaylussacia dumosa is a deciduous Shrub growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked and used as a pie filling etc[3, 62, 183]. Juicy and deliciously spicy[183]. Watery and insipid[235], though commonly eaten according to another report[177]. Not much valued[11]. The fruit is about 8mm in diameter[235].

nrakta Eastern N. America - Newfoundland to Florida and Louisiana. ksacta Dry barrens and pinelands[43] near the coast[11].

propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 1 month warm stratification followed by 2 months cold[113]. When large enough to handle, prick the seedlings out into individual pots of lime-free compost and grow them on in light shade in a greenhouse or cold frame for at least their first winter. Plant out into their permanent positions in late spring or early summer when they are at least 15cm tall. Cuttings of half-ripe wood, fully/August in a frame[200]. Laverino. Division in spring.

nwatta Requires a lime-free moist peaty soil, thriving in sun or part shade[1, 182]. Prefers a sandy soil[11]. Succeeds in wetter soils than other members of this genus[200]. Plants are hardy to about  $-15^{\circ}$ c[200]. A very ornamental[1] and freely suckering shrub[182].

# 6.2.133 Calveanthus floridus

Carolina Allspice, Eastern sweetshrub, Strawberry Bush, Sweetshrub, Carolina Allspice

5 tlin 10 cyuc 3 kcak 2 tcan 2 dwat 2.7 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calycanthus floridus is a deciduous Shrub growing to 2.7 m (8ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Ruminants are reported to have a toxic reaction from grazing this plant[4, 222]. Calycanthus contains calycanthine, an alkaloid similar to strychnine, and it is toxic to humans and livestock[270].

kcakta Edible Parts: Edible Uses: CondimentThe aromatic bark is dried and used as a substitute for cinnamon[2, 11, 46, 61, 105, 161, 183]. Some caution is advised, see reports above on toxicity[270].

tcanta Disinfectant RepellentLeaves contain small quantities of camphor. They can be used as an insect repellent, perfume and disinfectant[169, 257].

dwatta Antiperiodic Antispasmodic Cardiac Disinfectant Diuretic Emetic Ophthalmic SkinAntispasmodic, disinfectant[106, 169]. The plant contains an alkaloid that has a powerfully depressant action on the heart[4]. A fluid extract has been used as an antiperiodic[4]. A tea made from the root or bark has been used as a strong emetic and diuretic for kidney and bladder ailments[222, 257]. A cold tea has been used as eye drops in the treatment of failing eyesight[222, 257]. An ooze from the bark has been used to treat children's sores, whilst an infusion has been used to treat hives[257].

nrakta South-eastern N. America - Virginia to Florida, west to Alberta and West Virginia. ksacta Rich low shady woodlands[4, 43]. Deciduous or mixed woodlands, along streams and rivers, margins of woodlands from sea level to 1850 metres [270].

propta Seed - best sown in a cold frame as soon as it is ripe. If the seed is harvested 'green' (as soon as it has fully developed but before it has dried on the plant) and sown immediately it can germinate in 3 weeks[113]. Dried seed germinates in 1 - 6 months at 15°c[138]. Stored seed requires between 3 weeks and 3 months cold stratification before sowing in the spring. When large enough to handle, prick out the seedlings into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. They can be difficult[113]. Layering in spring. Sever the new plants in a wet spell of weather about 15 months later and then lift them in the autumn[78]. High percentage[78]. Division of suckers in early spring[11]. Very easy, they can be planted straight out into their permanent positions if required.

nwatta Landscape Uses:Border, Pest tolerant, Screen, Specimen. Prefers a light loamy soil that is deep and moist but succeeds in most fertile soils[11, 182]. Requires a welldrained soil[188]. Prefers a sunny position but it tolerates shade when grown in warm temperate zones[11, 200]. Reguires a sheltered position, protected from cold winds[245]. Although the dormant plant is hardy to at least -20°c, the tender young growth in the spring can be damaged by late frosts[K]. All parts of the plant are richly fragrant[182]. The flowers have a refreshing scent of ripe apples[245]. The wood, leaves and roots smell strongly of camphor, whilst the bark smells like cinnamon[245]. This species is closely related to C. mohrii[182]. A very ornamental plant, there is at least one named variety developed for its ornamental value. 'Mrs Henry Type' is a large-flowered form[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Fragrant foliage, All or parts of this plant are poisonous, Wetlands plant, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of

kcakta Edible Parts: Fruit Leaves Oil Root SeedEdible Uses: Coffee Oil PectinImmature fruit - cooked on their own or added to soups etc[2, 27]. They can be used fresh or dried[183]. Mucilaginous[133], they are commonly used as a thickening for soups, stews and sauces[183]. The fruits are rich in pectin and are also a fair source of iron and calcium[240]. The fresh fruits contain 740 iu vitamin A[240]. The fruit should be harvested whilst young, older fruits soon become fibrous[133]. The fruit can be up to 20cm long[200]. Seed - cooked or ground into a meal and used in making bread or made into 'tofu' or 'tempeh'[183]. The roasted seed is a coffee substitute[2, 27, 133]. Probably the best of the coffee substitutes[74]. The seed contains up to 22% of an edible oil[55, 74, 177, 183, 240]. The leaves, flower buds, flowers and calvees can be eaten cooked as greens[183]. The leaves can be dried, crushed into a powder and stored for later use[183]. They are also used as a flavouring[133]. Root - it is edible but very fibrous[144]. Mucilaginous, without very much flavour[144].

tcanta Fibre Oil Paper Pectin SizeA fibre obtained from the stems is used as a substitute for jute[57, 61, 74, 169]. It is also used in making paper and textiles[171]. The fibres are about 2.4mm long[189]. When used for paper the stems are harvested in late summer or autumn after the edible seedpods have been harvested, the leaves are removed and the stems are steamed until the fibres can be stripped off. The fibres are cooked for 2 hours with lye and then put in a ball mill for 3 hours. The paper is cream coloured[189]. A decocion of the root or of the seeds is used as a size for paper[178].

dwatta Antispasmodic Demulcent Diaphoretic Diuretic Emollient Stimulant VulneraryThe roots are very rich in mucilage, having a strongly demulcent action[4, 21]. They are said by some to be better than marsh mallow (Althaea officinalis)[4]. This mucilage can be used as a plasma replacement[240]. An infusion of the roots is used in the treatment of syphilis[240]. The juice of the roots is used externally in Nepal to treat cuts, wounds and boils[272]. The leaves furnish an emollient poultice[4, 21, 240]. A decoction of the immature capsules is demulcent, diuretic and emollient[240]. It is used in the treatment of catarrhal infections, ardor urinae, dysuria and gonorrhoea[240]. The seeds are antispasmodic, cordial and stimulant[240]. An infusion of the roasted seeds has sudorific properties[240].

nrakta The original habitat is obscure. ksacta Not known in a truly wild situation.

propta Seed - sow early spring in a warm greenhouse. The seed germinates in 27 days at  $15^{\circ}$ C or 6 days at  $35^{\circ}$ C[133]. When large enough to handle, prick them out into individual pots and plant them out after the last expected frosts[200].

nwatta Industrial Crop: Fiber Management: Coppice Management: Standard Regional Crop Staple Crop: Protein-oilPrefers a well-drained humus rich fertile soil in full sun and a pH around 6 to 6.7[200] but it tolerates a wide range of soil types and pH from 5.5 to 8[200]. It prefers a soil with a high potash content[264]. The plant requires a warm sunny position sheltered from winds[200]. It likes plenty of moisture, both in the soil and in the atmosphere[133]. Okra is commonly cultivated in warm temperate and tropical areas for its edible seedpod, there are many named varieties[183]. 200]. Most cultivars require about 4 months from sowing before a crop is produced, though some early maturing varieties can produce a crop in 50 days in the tropics[264]. This species is not very hardy in Britain, it sometimes succeeds outdoors in hot summers but is really best grown in a greenhouse since it prefers daytime temperatures of 25°c or more[260]. Plants also dislike low night temperatures[133]. There are some early-maturing varieties that are more tolerant of cooler temperate conditions and these could be tried outdoors[200]. These include 'Clemson's Spineless', 'Emerald Spineless', 'Long Green' and 'Green Velvet'[200]. The flowers are much visited by bees but they may require syringing in order to improve fertilization when plants are grown in a greenhouse. Plants resent being transplanted[133].

# 6.2.55 Atriplex hortensis

Orach, Garden orache 5 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli drutta Atriplex hortensis is a ANNUAL growing to 1.8 m (6ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves. The seed contains saponins[240]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves - raw or cooked[2, 16, 27, 33]. Used like spinach[9], they have a bland flavour and are traditionally mixed with sorrel leaves in order to modify the acidity of the latter[183]. Another report says that the flavour is stronger than spinach[264]. Seed - cooked. It can be ground into a meal and used in soups etc or be mixed with flour when making bread[177, 183]. The seed is said to be a good source of vitamin A[240]. The seed is also said to contain some saponins[240]. See the notes above on toxicity. The seed is small and fiddly to harvest and

tcanta Biomass Companion DyeA blue dye is obtained from the seed[74, 100]. The plant is a potential source of biomass. Yields of 14 tonnes per hectare have been achieved in the vicinity of Landskrona and Lund, Sweden. Higher yields might be expected farther south. If the leaf-protein were extracted, this should leave more than 13 tonnes biomass as by-product, for potential conversion to liquid or gaseous fuels[269].

dwatta Antirheumatic Diuretic Emetic PurgativeThe leaves are diuretic, emetic and purgative[100, 269]. They are also said to be a stimulant to the metabolism and an infusion is used as a spring tonic and a remedy for tiredness and nervous exhaustion[9]. They have been suggested as a folk remedy for treating plethora and lung ailments[269]. The leaves are said to be efficacious when used externally in the treatment of gout[4]. The seeds, mixed with wine, are said to cure yellow jaundice. They also excite vomiting[269]. The fruits are purgative and emetic[269]. Limiments and emollients prepared from the whole plant, like the juice of the plant, are said to be folk remedies for indurations and tumours, especially of the throat[269].

nrakta Europe. An occasional garden escape in Britain[17]. ksacta Arable land, waste and disturbed ground, shingle etc[9].

propta Seed - sow March to August in situ, only just covering the seed[134]. Germination is usually good and rapid[K]

nwatta Orach is a very easily grown plant, doing equally well in a wide variety of well-drained soils, though rich, moisture-retentive soils give the quick growth that is necessary for the production of tender leaves[33, 37, 200, 269]. Plants require a position in full sun and are tolerant of saline and very alkaline soils[200]. They thrive in any temperate climate, and are drought resistant[269]. Orach is reported to tolerate an annual precipitation of 30 to 140cm, an average annual temperature in the range of 6 to 24°C, and a pH of 5.0 to 8.2[269]. Orach was formerly cultivated for its edible leaves, there are some named varieties[183]. It can be grown as a warm weather substitute for spinach[183]. Some forms of this species have bronze or deep red leaves and are occasionally grown as ornamental plants, their leaves taste the same as the green-leafed forms[K]. Plants are fastgrowing[238] and usually self-sow quite freely if the surrounding soil is disturbed by hoeing etc[K]. They tolerate hot weather well, but soon go to seed so successive sowings at 4 weekly intervals are required during the growing season if a continuous supply of leaves is required[269]. Leaves can be harvested 40 - 60 days after sowing the seed[269]. This species is a poor companion plant for potatoes, inhibiting their growth when growing close to them[20].

### 6.2.56 Gaultheria mucronata

Prickly heath

5 tlin 9 cyuc 4 kcak 3 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli nyanhjen hjonli

drutta Gaultheria mucronata is an evergreen Shrub growing to 1.5 m (5ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The lilac-coloured fruit does not look tremendously edible, and the texture is somewhat like polystyrene - but the fruit of some forms is juicy, almost melts in the mouth, has a very pleasant slightly sweet flavour and makes a very good dessert fruit[K]. The fruit is up to 12mm in diameter[200].

tcanta Hedge HedgeThe plant can be used to make a low hedge[29]. A good ground cover plant for a sunny position, forming dense thickets[197]. They are best spaced about 60cm apart each way[208]. Plants can be cut back in the spring if they are becoming too lanky and open in growth[208].

nrakta S. America - S. Chile, S. Argentina, ksacta Open wet Nothfagus and Drimys forest, dominant or co-dominant with Chiliotrichum in shrub communities fringing forests above high water mark and in transition to swamps and bogs from sea level to 700m

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and surface sow in a lime-free compost in a shady part of the greenhouse and keep moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. Watering them with care and making sure they get ample ventilation will reduce this risk. Watering them with a garlic infusion can help to prevent damping off[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts and so it might be wise to give them some protection in their first spring or two outdoors.. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins. 'Drop' the plants 12 months earlier by digging them up and replanting them deeper in the soil so that the branches are buried and can form roots. This works best in a sandy soil[78]. It is best to pot up the divisions and grow them on in a lightly shaded position in the greenhouse until they are established. Plant them out in the summer. Layering in September/October. Takes 12 months[78].

nwatta Requires a light well-drained lime-free soil[11]. Requires a moist acid soil according to another report[184]. Prefers a sunny position[11] but succeeds in light shade though it fruits less well in such a position[182]. A very hardy plant, tolerating temperatures down to about -20°c[184]. Plants spread guite freely, forming thickets by means of suckers[182]. Plants sometimes have hermaphrodite flowers but are usually dioecious[208] and at least one male plant is reguired for every 5 or 6 females if fruit is required. A very ornamental shrub, there are many named varieties[182]. 'Davis's Hybrids' is said to be hermaphrodite[182]. Plants in this genus are notably resistant to honey fungus[200].

### 6.2.57 Diplotaxis tenuifolia

Perennial Wall Rocket

5 tlin 9 cvuc 4 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Diplotaxis tenuifolia is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September, and the seeds ripen from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves raw. Used in salads, they are very strongly flavoured of cress[217]. The leaves have a hot flavour, very similar to rocket (Eruca vesicaria sativa) but more strongly flavoured they make an excellent addition to a mixed salad but are too strong to be used in quantity on their own[K]. The plant is very productive, producing leaves from early spring until the

nrakta Southern and central Europe, possibly including Britain, ksacta Old walls and waste places in S. England, a casual further north[17]. This plant is doubtfully native in

propta Seed - best sown in situ as soon as it is ripe, though it can also be sown in situ in the spring. The seed usually germinates in the autumn.

nwatta See the plants native habitat for ideas on its cultivation needs[K]. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

# 6.2.58 Atriplex nuttallii

Nuttall's Saltbush

5 tlin 9 cvuc 4 kcak 0 tcan 0 dwat 0.9 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli nyanhjen hjonli

drutta Atriplex nuttallii is an evergreen Shrub growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not selffertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and stems - cooked[161]. It is usually cooked with wheat[177]. The leaves and stems can be used to add a salty flavour to other cooked foods[257]. Seed - cooked. Used in piñole or ground into a meal and used as a thickener in making bread or mixed with flour in making bread.

nrakta Western N. America - Manitoba to Saskatchewan, south to Nebraska, Colorado and Nevada ksacta Strongly saline and dry soils[60, 235].

propta Seed - sow April/May in a cold frame in a compost of peat and sand. The seed usually germinates in 1 - 3 weeks at 13°c[134]. Pot up the seedlings when still small into individual pots, grow on in a greenhouse for the first winter and plant out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy. Pot up as soon as they start to root (about 3 weeks) and plant out in their permanent positions late in the following spring[K]. Cuttings of mature wood of the current season's growth, November/December in a frame. Very easy. Pot up in early spring and plant out in their permanent position in early summer[K].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or tolerate wet soils[Kl. cooked. A fairly acid lemony flavour, it can be eaten in quantity by those who like acid fruits - children seem particularly keen on it[K]. A very reliable cropper, the fruit is borne in abundance along the stems[1, K]. The fruit is about 7mm in diameter[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine [218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - W. China. ksacta Thickets and streamsides up to 2500 metres in Kansu and W. Szechwan[67, 109].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Hybridizes freely with other members of this genus, especially the closely related B. wilsonae[1]. The true species is seldom seen in gardens, having been replaced with its hybrid progeny [182]. The seedling 'Sibbertoft Coral' is very closely related to B. aggregata and fruits well in Britain[11]. Plants can be pruned back quite severely and will resprout well from the base[200].

#### 6.2.129 Cirsium foliosum

Elk thistle

5 tlin 9 cyuc 3 kcak 2 tcan 0 dwat 0.6 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cirsium foliosum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves Oil Root StemEdible Uses: OilRoot - cooked[61, 85, 105, 161]. About the size of a carrot, they are sweet and well-flavoured though require long preparation[207]. The root is likely to be rich in inulin, a starch that cannot be digested by humans. This starch thus passes straight through the digestive system and, in some people, ferments to produce flatulence[K]. Plant crown[85]. No more details are given. Stems - peeled[161]. The peeled stems are a sweet potherb[207]. Tender with a sweet delicate taste2121.

tcanta OilThe seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

nrakta N. America - Montana to Saskatchewan. ksacta Swales and other moderately moist and badly drained sites[60]

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°c[164]. Division in spring or autumn.

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position [200]. This species should

# 6.2.130 Smyrnium perfoliatum

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Smyrnium perfoliatum is a BIENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses CondimentLeaves and young shoots - raw in salads or cooked in soups, stews etc[2, 5, 8, 12, 27, 37, 115, 183]. The plant commences growth in the autumn and the leaves are often available throughout the winter[5, 52]. They have a rather strong celery-like flavour and are often blanched (by excluding light from the growing plant) before use[183]. Leafy seedlings can be used as a parsley substitute[183]. Stem raw or cooked[2, 5, 8, 12, 27, 37, 53, 115]. Tasting somewhat like celery[17], it is often blanched (by excluding light) before use[183]. This species is considered to be superior to the related S. olusatrum because it not only blanches better but is also more crisp and tender and not so harsh flavoured[183]. Flower buds - raw[12, 52]. A celery-like flavour, they can be added to salads. The spicy seeds are used as a pepper substitute[52, 183]. Root - cooked. Boiled and used in soups. the root is said to be more tender if it has been kept in a cool place all winter[183].

nrakta S. Europe to Asia. Occasionally naturalized in Britain. ksacta Mixed oak woods[17].

propta Seed - best sown in an outdoor seedbed in autumn and planted into its permanent position in late spring[1, 200]. Germination can be slow[200]. Can also be sown in situ in spring[188].

nwatta Succeeds in most soils but prefers an open sunny position in a well-drained moisture retentive soil[1, 200]. Self-sows freely with us in our Cornwall garden, in a suuny, sheltered position[K].

### 6.2.131 Geum urbanum

Wood Avens, Bennet's Root - Old man's whiskers, Herb ben-

5 tlin 9 cvuc 3 kcak 2 tcan 3 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Geum urbanum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

kcakta Edible Parts: Leaves RootEdible Uses: Condiment DrinkYoung leaves - cooked. Root - cooked. Used as a spice in soups, stews etc. and also as a flavouring in ale[4]. 5, 8, 13, 183]. It is a substitute for cloves with a hint of cinnamon in the flavour[12, 74, 183]. It is best used in spring[12]. The root is also boiled to make a beverage[161]. The root is up to 5cm long[4].

tcanta Repellent TanninThe freshly dug root has a clovelike fragrance[4], when dried it is used in the linen cupboard to repel moths[4, 53]. The root contains about 9% tannin[4].

dwatta Antidiarrhoeal Antiinflammatory Antiseptic Aromatic Astringent Diaphoretic Febrifuge Skin Stomachic Styptic TonicWood avens is an astringent herb, used principally to treat problems affecting the mouth, throat and gastrointestinal tract. It tightens up soft gums, heals mouth ulcers, makes a good gargle for infections of the pharynx and larynx, and reduces irritation of the stomach and gut[254].

52]. The leaves can be used fresh or dried and are available from late winter until late autumn. To ensure a good supply of the leaves in the summer, it is best to cut the plants down to the ground when flowering in the summer[K]. The young stem can be blanched and used like celery in salads or as a savoury flavouring in cooked foods[52, 183]. Seed - raw or cooked. A strong yeasty flavour, it is used as a flavouring in cakes, soups, salads etc[2, 21, 46, 200]. It can be used whole or ground into a powder. Root - cooked. A strong savoury taste, it can be used as a flavouring[142] or cooked as a vegetable[200]. It is best grated[200]. Best used when 2 - 3 years old[142]. Flowers[183]. No more details are given. A tea is made from the dried leaves. A strong savoury flavour, it tastes more like a broth[21, 183]. A tea can also be made from the grated roots[183]. An essential oil from the root is used commercially as a food flavouring[183, 238]. Yields of 0.5% are obtained[7].

tcanta EssentialAn essential oil from the plant is used in perfumery[7, 238].

dwatta Antispasmodic Aromatic Carminative Diaphoretic Digestive Digretic Emmenagogue Expectorant Skin Stimulant Stomachic UrinaryLovage is a warming and tonic herb for the digestive and respiratory systems. It is used primarily in the treatment of indigestion, poor appetite, wind, colic and bronchitis[254]. The roots, leaves and fruits are antispasmodic, aromatic, carminative, diaphoretic, digestive, diuretic, mildly expectorant and stimulant[4, 7, 21, 46, 165, 238]. They are used internally in the treatment of disordered stomachs, especially cases of colic and flatulence in children, kidney stones, cystitis, painful menstruation and slow labour[4, 238]. Externally, the root is used in the treatment of sore throats and aphthous ulcers[238]. The roots of plants 3 years old can be harvested in early spring or in the autumn and are used fresh or dried[9, 238]. The leaves are harvested before the plant comes into flower and either distilled for their oil or dried for later use[238]. The leaves, either eaten in salads or dried and infused as a tea, have been used as an emmenagogue[4]. The essential oil from the seeds is used by aromatherapists to remove freckles and spots from the face[244]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Levisticum officinale - Lovage for infections of the urinary tract, kidney and bladder stones (see [302] for critics of commission E).

nrakta Europe. Occasionally naturalized in Britain. ksacta Arable land and waste places[9] in damp soils[7, 14]. Mountain pastures and hedgerows near streams[244].

propta Seed - sow spring or early autumn in a cold frame. The seed can be slow to germinate so it is probably best sown as soon as it is ripe[K]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn. This can be quite hard work due to the size of the roots but the plant grows away very well afterwards. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation, An easily grown plant, it prefers a rich moist but well-drained soil in a sunny position[4, 52], though it tolerates some shade[14]. Loyage has very aromatic leaves. It is often grown in the herb garden as a culinary herb[7] and is occasionally grown commercially as a food flavouring[K]. If the plant is cut back to the ground during the growing season it will produce a new flush of young leaves[200]. If the weather is dry at this time, it will be necessary to water the plants in order to encourage fresh growth[K]. Lovage is a good companion plant, improving the health and flavour of other plants growing nearby[14, 20]. The flowers are very attractive to bees and also draw insect predators such as hoverflies into the garden[24]. Special Features: Edible, Fragrant foliage, Not North American native, Naturalizing, For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 6.2.127 Rumex patientia

Herb Patience

5 tlin 10 cyuc 3 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rumex patientia is a PERENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Plants can contain quite high levels of oxalic acid. which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[1, 2, 5, 37, 177]. Eaten like spinach or made into a delicious puree, they are often mixed with a quarter part of sorrel in order to add flavour to them[183]. A fairly mild flavour[183], they make an excellent vegetable[K]. The leaves are produced very early in the year [27]. Carbon Farming - The hybrid Rumex patientia x tianschanicus is a good staple crop: balanced carb.

tcanta Although no specific mention has been made for this species, dark green to brown and dark grey dyes can be obtained from the roots of many species in this genus, They do not need a mordant[168].

dwatta The juice, and an infusion of the root, has been used as a poultice and salve in the treatment of various skin problems[257]. An infusion of the root has been used in the treatment of constipation[257]. The leaves have been rubbed in the mouth to treat sore throats[257].

nrakta Europe. Naturalized in a few places in Britain[17]. ksacta Waste land in Britain[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in

nwatta Experimental Crop Industrial Crop: Biomass Management: Coppice Management: dard Staple Crop: Balanced carbA very easily grown plant, it succeeds in most soils, preferring a moist moderately fertile well-drained soil in a sunny position[200]. Formerly cultivated for its edible leaves[1, 2, 37, 50], these can be available in early February if the winter is mild[K]. An important food plant for the caterpillars of many species of butterfly[30]. The hybrid Rumex patientia x tianschanicus (Hybrid sorrel) is a good Carbon Farming plant. Rumex patientia x tianschanicus cultivation: new crop. Management: standard, coppice. Staple Crop: balanced carb. Industrial Crop: biomass.

# 6.2.128 Berberis aggregata

Salmon Barberry

5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis aggregata is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

nwatta Requires a light or medium well-drained but not 6.2.60 Gaultheria hispidula too fertile soil in a sunny position[11, 200]. Tolerates saline and very alkaline soils[200]. Succeeds in a hot dry position. Some modern works treat this species as a synonym of Atriplex gardneri aptera. This plant has more or less annual stems produced from a woody base[11]. Dioecious. Male and female plants must be grown if seed is required.

#### 6.2.59 Hemerocallis aurantiaca

5 tlin 9 cyuc 4 kcak 2 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli dvatxre7t hionli

drutta Hemerocallis aurantiaca is an evergreen Perennial growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from June to September. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Large quantities of the leaves are said to be hallucinogenic. Blanching the leaves removes this hallucinatory component[205]. (This report does not make clear what it means by blanching, it could be excluding light from the growing shoots or immersing in boiling water[K].)

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and young shoots - cooked[105, 177]. They must be consumed when very young or else they become fibrous[K]. Flowers and flower buds - raw or cooked. The tubular flowers are about 7.5cm long and 13cm in diameter[205]. Each stem carries 6 - 8 flowers[205]. The flowers contain carotene and starch[105, 177]. The flower buds contain about 43mg vitamin C per 100g, 983 IU vitamin A and 3.1% protein[205]. Root - raw or cooked. A radish-like flavour but not so sharp[205].

tcanta WeavingThe tough dried foliage is plaited into cord and used for making footwear[205].

dwatta Antidote Diuretic Vitamin CThe juice of the roots is an effective antidote in cases of arsenic poisoning[205]. A tea made from the boiled roots is used as a diuretic[205].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets, grasslands and streamsides at elevations of 300 - 1000 metres in Guangdong, Guangxi, and Taiwan[266].

propta Seed - sow in the middle of spring in a greenhouse. Germination is usually fairly rapid and good. Prick out the seedlings into individual pots when they are large enough to handle. Grow the plants on for their first winter in a greenhouse and plant out in late spring[K]. Seed is only set if the plant is fertilized by another species, thus seedlings will not be true to the species type[233]. Division in spring or after flowering in late summer or autumn[200]. Division is very quick and easy, succeeding at almost any time of the year[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils[1], including dry ones, preferring a rich moist soil[205]. Grows well in heavy clay soils. Succeeding in sun or shade, it produces more flowers in a sunny position though these flowers can be shorter-lived in very sunny positions[205]. Succeeds in short grass if the soil is moist[1]. Prefers a pH between 6 and 7[200]. Hybridizes freely with other members of this genus[200]. The roots have spindle-shaped swellings[205]. The cultivar 'Major' is smaller than the type species, but has larger flowers, it is sometimes cultivated for these edible flowers in Japan[205]. There is some doubt as to whether this cultivar really is a form of H. aurantiaca[205]. Individual flowers are very short-lived, opening in the morning and withering in the evening[205]. Plants take a year or two to become established after being moved[1]. Plants seem to be immune to the predations of rabbits[233]. The plants are very susceptible to slug and snail damage, the young growth in spring is especially at risk[200]. There is some doubt as to the origins of this plant, it might have arisen in cultivation at Kew[205]. It is cultivated in Japan, where it is believed to have come from China[58]. It is quite possibly a hybrid since it is sterile unless fertilized by another species[233].

Creeping Snowberry

5 tlin 9 cyuc 4 kcak 4 tcan 1 dwat 0.1 m hkuc hmim cyutli tcuphja7n hwicli hrasilut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Gaultheria hispidula is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked. Pleasantly acid and refreshing[3, 101], with a delicate flavour of wintergreen[183]. An agreeable subacid taste, similar to G, shallon[2, 11]. They can be made into delicious preserves[183]. The fruit is about 6mm in diameter[200]. Leaves - raw or cooked[207]. The leaves are used to make a tea[2, 95, 161, 257]. A mild flavour of wintergreen[183]. Said to be superior to china tea[207].

tcanta MiscellanyA useful fast growing ground cover plant for shady positions.

dwatta Cancer Cytostatic MiscellanyThe plant is said to remove the cancerous taint from the body[4]. An infusion of the leaves has been used as a tonic for a person who has

nrakta Northern N. America. ksacta Coniferous forests and mountains in the alpine and sub-alpine zones[62]. Cold wet woods and bogs[235].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping offKl. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Layering.

nwatta Prefers a moist but not boggy humus rich soil in shade or semi-shade[11]. A peat and moisture loving species, it requires a lime-free soil[11]. The fruit is sometimes sold in local markets[61]. A fast growing plant[200]. The plant can make a good nesting place for mice, these mice then eat the bark of the stems in winter causing die-back. Plants in this genus are notably resistant to honey fungus[200]. Gaultheria japonica bears a close resemblance to G. hispidula (L.) Bigelow of N. America and sometimes treated as a variety or subspecies of the latter. G. japonica, however, has calyx much longer than the bracteoles, ovate and acute calyx lobes, and shorter anther projections. In G. hispidula the calyx is as long as or slightly longer than the bracteoles, the calvx lobes are broadly ovate and obtuse or subacute, and the anthers have distinct projections. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 6.2.61 Apium graveolens rapaceum

Celeriac

5tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Apium graveolens rapaceum is a BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista If the plant is infected with the fungus Sclerotinia sclerotiorum, skin contact with the sap can cause dermatitis in sensitive people[65].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentLeaves - used as a flavouring in soups etc[200]. They can be eaten raw but have a very strong flavour[52]. Seed - a flavouring. An essential oil from the seed is also used as a flavouring. Root - raw or cooked[27, 33, 52]. It can be grated and added to salads, baked or added to soups, stews etc[183].

tcanta The growing plant is an insect repellent, it repels the cabbage white butterfly so is a good companion for brassicas[20].

dwatta Aperient Carminative Diuretic Emmenagogue Galactogogue Nervine Stimulant TonicAlthough not as medicinally active as wild celery, the cultivated forms of celery also have the same medicinal properties and, when used as an item of the diet will have a similar effect upon the body. These medicinal uses are as follows:- Wild celery is an aromatic bitter tonic herb that reduces blood pressure, relieves indigestion, stimulates the uterus and is antiinflammatory[238]. The ripe seeds, herb and root are aperient, carminative, diuretic, emmenagogue, galactogogue, nervine, stimulant and tonic[4, 7, 21, 165]. Wild celery is said to be useful in cases of hysteria, promoting restfulness and sleep and diffusing through the system a mild sustaining influence[4]. The herb should not be prescribed for pregnant women[238]. Seeds purchased for cultivation purposes are often dressed with a fungicide, they should not be used for medicinal purposes[238]. The root is harvested in the autumn and can be used fresh or dried[238]. The whole plant is harvested when fruiting and is usually liquidized to extract the juice[238]. The seeds are harvested as they ripen and are dried for later use[238]. An essential oil obtained from the plant has a calming effect on the central nervous system. Some of its constituents have antispasmodic, sedative and anticonvulsant actions. It has been shown to be of value in treating high blood pressure[254]. A homeopathic remedy is made from the herb[9]. It is used in treating rheumatism and kidney complaints[9].

nrakta A cultivated form of garden origin. ksacta Not known in the wild.

propta Seed - surface sow February in a greenhouse. The maincrop can be sown as late as mid-April. Germinates in 2 - 3 weeks at 15°c. Plant out in May. The seed can harbour certain diseases of celery, it is usually treated by seed companies before being sold but if you save your own seed you should make sure that only seed from healthy plants is used[1].

nwatta Prefers a rich moist soil and an open sunny situation[1, 27, 33, 52]. Requires abundant moisture in the growing season otherwise the root will be small and tough[1]. Tolerates a pH in the range 5.2 to 8.3. The root is hardy to about -12°c and can be left in the ground over winter, to be harvested as required[200]. Roots can also be stored in boxes of sand or other such material in a cool dry shed[200]. Celeriac is a form of A. graveolens that has been selected for its enlarged edible root. It is occasionally cultivated commercially but more often in the garden or allotment[46, 200], there are some named varieties[183]. Any side-shoots should be removed in order to encourage a larger root[200]. A good companion plant for leeks, tomatoes, French beans and brassicas[18].

### 6.2.62 Salvia officinalis

Sage, Kitchen sage, Small Leaf Sage, Garden Sage 5 tlin 10 cyuc 4 kcak 5 tcan 5 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Salvia officinalis is an evergreen Shrub growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant can be toxic when used in excess or when taken for extended periods[238] symptoms include: restlessness, vomiting, vertigo, tremors, seizures. Contraindicated during pregnancy. Avoid if predisposed to convulsions [301].

kcakta Edible Parts: Flowers LeavesEdible Uses: Condiment TeaLeaves and flowers - raw or cooked[2, 14, 27, 46, 52]. A very common herb, the strongly aromatic leaves are used as a flavouring in cooked foods[183]. They are an aid to digestion and so are often used with heavy, oily foods[244]. They impart a sausage-like flavour to savoury dishes. The young leaves and flowers can be eaten raw, boiled, pickled or used in sandwiches[183]. The flowers can also be sprinkled on salads to add colour and fragrance[183]. A herb tea is made from the fresh or dried leaves[183], it is said to improve the digestion[13, 21]. An essential oil obtained from the plant is used commercially to flavour ice cream, sweets, baked goods etc[61, 183].

tcanta Compost Essential Repellent Strewing TeethThe leaves make excellent tooth cleaners[14, 21], simply rub the top side of the leaf over the teeth and gums[K]. The purpleleafed form of sage has tougher leaves and is better for cleaning the teeth[K]. The leaves have antiseptic properties and can heal diseased gums[201]. An essential oil from the leaves is used in perfumery, hair shampoos (it is good for dark hair) and as a food flavouring[14, 57, 61]. It is a very effective 'fixer' in perfumes[7], and is also used to flavour toothpastes and is added to bio-activating cosmetics[238]. The plant (the flowers?) is an alternative ingredient of 'QR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The growing or dried plant is said to repel insects, it is especially useful when grown amongst cabbages and carrots[14, 18, 20, 201]. It was formerly used as a strewing herb[201] and has been burnt in rooms to fumigate them[244]. A good dense ground cover plant for sunny positions, though it needs weeding for the first year or two[197]. They are best spaced about 60cm apart each way[208]

dwatta Antidiarrhoeal Antihydrotic Antiseptic Antispasmodic Appetizer Aromatherapy Astringent Carminative Cholagogue Galactofuge Stimulant Tonic VasodilatorSage has a very long history of effective medicinal use and is an important domestic herbal remedy for disorders of the digestive system. Its antiseptic qualities make it an effective gargle for the mouth where it can heal sore throats, ulcers etc[K]. The leaves applied to an aching tooth will often relieve the pain[4. Kl. The whole herb is antihydrotic, antiseptic, antispasmodic. astringent, carminative, cholagogue, galactofuge, stimulant, tonic and vasodilator[4, 9, 13, 21, 165, 238]. Sage is also used internally in the treatment of excessive lactation, night sweats, excessive salivation (as in Parkinson's disease), profuse perspiration (as in TB), anxiety, depression, female sterility and menopausal problems[238]. Many herbalists believe that the purple-leafed forms of this species are more potent medicinally[238]. This remedy should not be prescribed to pregnant women or to people who have epileptic fits[238]. The plant is toxic in excess or when taken for extended periods[238] - though the toxic dose is very large. Externally, it is used to treat insect bites, skin, throat, mouth and gum infections and vaginal discharge[238]. The leaves are best harvested before the plant comes into flower and are dried for later use[4]. The essential oil from the plant is used in small doses to remove heavy collections of mucous from the respiratory organs and mixed in embrocations hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium deliciosum is a deciduous Shrub growing to 0.3 m (1ft). See above for USDA hardiness. It is bardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[11, 60, 177, 257]. When fully ripe it is sugary sweet with a delightful aroma and a full rich flavour[183]. Best eaten out of hand[183], the fruit can also be dried for later use[257]. The fruit is about 6mm in diameter[200].

nrakta Western N. America - Washington and Oregon. ksacta Montane regions[60].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Grows well in a moist position in a rock garden[11]. Plants spread rapidly when growing in a suitable position[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. This species is closely allied to V. caespitosum[11, 182]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.125 Ulmus procera

English Elm

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 35 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulmus procera is a deciduous Tree growing to  $35\,$  m ( $114\mathrm{ft}$ ) by  $15\,$  m ( $49\mathrm{ft}$ ) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from February to March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: TeaLeaves - raw or cooked[2, 179, K]. They can be a little bit bitter, especially if not very young, and have a mucilaginous texture[K]. They make a nice addition to a mixed salad[K]. Immature fruits, used just after they are formed - raw[2, 177]. An aromatic, unusual flavour, leaving the mouth feeling fresh and the breath smelling pleasant[132]. They contain about 34.4% protein, 28.2% fat, 17% carbohydrate, 5% ash[179]. Inner bark - cooked. A mucilaginous texture[179]. It can be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[2, 177]. A tea is made from the leaves[177].

tcanta Dye Tannin WoodA fibre from the inner bark is very tough[4]. It is used for making mats and ropes[4]. Tannin and a dyestuff are obtained from the inner bark[7]. No details of the colour are given. Wood - close-grained, free from knots, very durable under water, fairly hard, elastic,

withstands abrasion and salt water, but does not take a high polish. It is used for water pipes, wheels, mallet heads, ships keels etc[4, 7, 11] and is a good firewood[6].

dwatta Astringent Bach Demulcent Diuretic Eczema Homeopathy Mouthwash Resolvent Skin Tonic VulneraryThe dried inner bark is anti-inflammatory, astringent, demulcent, mildly diuretic, resolvent, tonic and vulnerary[4, 7, 9]. It is used both internally and externally in the treatment of diarrhoea, rheumatism, wounds, piles etc and is also used as a mouthwash in the treatment of ulcers[4, 9, 66]. The inner bark is harvested from branches 3 - 4 years old and is dried for later use[9]. The sap has been used in the treatment of baldness[7]. The leaves are astringent and have been powdered then used in the treatment of haemorrhoids[7]. A decoction is used to treat reddened and inflamed skin as well as to relieve various skin disorders[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Occasional feelings of inadequacy', 'Despondency' and 'Exhaustion from over-striving for perfection'[209]. A homeopathic remedy is made from the inner bark[4]. It is used as an astringent[4] and as a treatment for eczema[9]

nrakta Western and southern Europe, including Britain. ksacta Hedgerows, by woods and roads, less frequent in the north[17]

propta Seed - if sown in a cold frame or outdoor seedbed as soon as ripe it usually germinates in a few days. A high proportion of the seed is not viable but seed is normally freely produced and can be sown thickly to take into account the poor viability. Stored seed does not germinate so well and should be sown in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots.

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. Tolerant of atmospheric pollution[4]. The English elm is susceptible to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. Mature trees killed back by the disease will often regrow from suckers, but these too will succumb when they get larger. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan. species are resistant to the disease so the potential exists to develop new resistant hybrids with the native species[200]. The various species hybridize freely, the pollen stores well and can be kept for use with species that flower at different times[200]. A food plant for the caterpillars of many lepidoptera species[30], there are 80 species of insects associated with this tree[24]. A good tree for growing grapes

### 6.2.126 Levisticum officinale

Lovage, Garden lovage

5 tlin 9 cyuc 3 kcak 2 tcan 3 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Levisticum officinale is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from March to November, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Lovage is said to contain the alleged 'psychotroph' myristicine[218]. The volatile oil is an irritant. Contraindicated with kidney or urinary passage inflammation. Avoid during pregnancy [301].

kcakta Edible Parts: Flowers Leaves Root Seed StemEdible Uses: Condiment TeaLeaves and stems - raw or cooked[2, 4, 14, 21]. Used as a savoury flavouring in salads, soups, stews etc, imparting a yeasty/celery flavour[9,

emollient, febrifuge, hypoglycaemic, hypnotic, narcotic, parasiticide and sedative[218].

nrakta Of garden origin, probably derived from L. serriola. ksacta Not known in the wild.

propta Seed - sow a small quantity of seed in situ every 2 or 3 weeks from March (with protection in cooler areas) to June and make another sowing in August/September for a winter/spring crop. Only just cover the seed. Germination is usually rapid and good, thin the plants if necessary, these thinnings can be transplanted to produce a slightly later crop (but they will need to be well watered in dry weather). More certain winter crops can be obtained by sowing in a frame in September/October and again in January/February.

nwatta Prefers a light sandy loam[1]. Succeeds in most well-drained, humus-rich soils but dislikes acid conditions[1. 16]. Plants strongly dislike dry conditions, quickly running to seed in such a situation. Early and late sowings are best in a sunny position, but summer crops are best given a position with some shade in order to slow down the plants tendency to go to seed and to prevent the leaves becoming bitter[18, 20]. The garden lettuce is widely cultivated in many parts of the world for its edible leaves and is probably the most commonly grown salad plant. This is the cos lettuce, a taller growing plant that has longer, thinner leaves and a more erect habit. it does not form a compact heart. There are many named varieties[183] capable of providing fresh leaves throughout the year if winter protection is given in temperate areas. Lettuces are quite a problematic crop to grow. They require quite a lot of attention to protect them from pests such as slugs, aphids and birds. If the weather is hot and dry the plants tend to run very quickly to seed, developing a bitter flavour as they do so. In wet weather they are likely to develop fungal diseases. In addition, the seed needs to be sown at regular intervals of 2-3 weeks during the growing season in order to provide a regular supply of leaves. Lettuces make a good companion plant for strawberries, carrots, radishes and onions[18, 20, 201]. They also grow well with cucumbers, cabbages and beetroot[201].

#### 6.2.122 Ribes sativum

Redcurrant

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ribes sativum is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in jams, compotes, jellies, puddings, pies etc[183, 200]. An acid taste that many people find too strong to eat raw, the fruit makes an excellent jam or preserves[K]. The fruit is rich in vitamin C[183]. There are rather a lot of seeds in each fruit[K].

nrakta W. Europe, possibly including Britain. ksacta Hedges and woods, avoiding acid soils.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade, succeeding on an east or even a north-facing wall, though not fruiting so well in such a position[11]. Prefers a pH in the range 5.5 to 6[200]. Hardy

to about -20c[200]. There is some confusion in nomenclature with some botanists recognising 2 species of red currants, this species and R. spicatum (syn R. rubrum), whilst others say that R. rubrum is a distinct species[17, 200]. The red currant is sometimes cultivated for its edible fruit, there are some named varieties[183]. Most cultivars are self-fertile and set a good crop on their own[200]. The fruit is produced at the base of one-year old and older wood, plants start to fruit at 3 - 4 years from seed[200]. Red current fruits are an absolute magnet for birds and so the plants will usually need some protection to allow the crop to ripen[K]. Alternatively, you can put this attraction for the birds to good use by planting red currants specifically for the birds. Whilst they are eating these fruits they will not be eating your other fruits[K]. Plants can harbour a stage of 'white pine blister rust', so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

#### 6.2.123 Passiflora mollisima

Banana Passion Fruit

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Passiflora mollisima is an evergreen Climber growing to 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 105]. An agreeable flavour[2]. An aromatic taste, it can be eaten out of hand or used as a flavouring in ice creams, fruit salads, puddings etc[183]. A juice made from the fruit is highly prized in S. America[183]. Individual fruits are up to 15cm long and weigh 50 - 150g[196].

nrakta S. America - Venezuela and Colombia to Bolivia and Peru. ksacta Forests in the Andes to elevations of 3400 metres[196].

propta Pre-soak the seed for 12 hours in warm water and then sow late winter or early spring in a warm greenhouse. If sown in January and grown on fast it can flower and fruit in its first year[88]. The seed germinates in 1 - 12 months at 20°c. Prick out the seedlings into individual pots when they are large enough to handle. It you are intending to grow the plants outdoors, it is probably best to keep them in the greenhouse for their first winter and plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Mulch the roots well in late autumn to protect them from the cold. Cuttings of young shoots, 15cm with a heel, in spring[1]. Leaf bud cuttings in spring. Cuttings of fully mature wood in early summer. Takes 3 months. High percentage[3].

nwatta Requires a well-drained soil with plenty of moisture in the growing season, otherwise it is not fussy[1]. One report says that this plant is hardy to climatic zone 6 (tolerating frosts of -20°c)[200] but this is surely a misprint. The top growth is said to tolerate slight air frosts[88] and plants are said to be hardy on a wall in the mild areas of Britain, being commonly grown around Penzance[49, 59]. In S. America plants can tolerate occasional lows to -5°c[196]. Outdoor grown plants should have their roots restricted in order to reduce vegetative growth and encourage fruiting[1]. Plants do not generally fruit well in Britain[88]. In order to improve the chances of producing fruit it is best to hand pollinate using pollen from a flower that has been open for 12 hours to pollinate a newly opened flower before midday[88]. Cultivated for its edible fruit in S. America[46, 196]. Yields of 300 fruits per vine and 30 tonnes per hectare are recorded in S. America[196]. A climbing plant, attaching itself to other plants by means of tendrils that are produced at the leaf axils. Plants in this genus are notably resistant to honey fungus[200].

### 6.2.124 Vaccinium deliciosum

Alpine Blueberry, Cascade bilberry 5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc for treating rheumatism[4]. In larger doses, however, it can cause epileptic fits, giddiness etc[4]. The essential oil is used in aromatherapy. Its keyword is "Tonic'[210]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Salvia officinalis Sage for loss of appetite, inflammation of the mouth, excessive perspiration (see [302] for critics of commission E).

nrakta S. Europe. ksacta Dry banks and stony places[100], usually in limestone areas and often where there is very little soil[4].

propta Seed - sow March/April in a greenhouse[1]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of heeled shoots, taken off the stem in May and planted out directly into the garden grow away well[182]. Cuttings of half-ripe wood, 5 - 10cm with a heel, June to August in a frame[78]. Easy. Cuttings of mature wood, 7 - 10cm with a heel, November/December in a cold frame[78]. Layering in spring or autumn. Mound soil up into the plants, the branches will root into this soil and they can be removed and planted out 6 - 12 months later.

nwatta Landscape Uses:Border, Container, Massing, Rock garden, Seashore, Specimen. Requires a very welldrained light sandy soil in a sunny position[200]. Prefers a calcareous soil[4, 14]. Dislikes heavy or acid soils[1, 16]. Succeeds in dry soils, tolerating drought once it is established[190]. Sage can be killed by excessive winter wet[200] and winter-planted bushes often die[208]. A very ornamental plant[1], sage is commonly grown in the herb garden for culinary and medicinal purposes. There are some named varieties[182, 183]. 'Albiflora' is said to be the best culinary sage[11]. 'Purpurea' has tougher leaves than the type and makes a better tooth cleaner[K]. Plants need to be trimmed in late spring in order to keep them compact[200]. They tend to degenerate after a few years and are best replaced after about 4 years[4]. The leaves emit a unique pungent aroma when pressed[245]. A good companion for many plants, including rosemary, cabbages and carrots[14, 18, 20, 54], the growing plant is said to repel insects. It is inhibited by wormwood growing nearby and dislikes growing with basil, rue or the cucumber and squash family[14, 18, 20, 54]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Suitable for cut flowers. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. An evergreen. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2].

### 6.2.63 Peltaria alliacea

Garlic Cress

5 tlin 9 cyuc 4 kcak 3 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Peltaria alliacea is an evergreen Perennial growing to  $0.3 \,\mathrm{m}$  (1ft) by  $0.3 \,\mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[105]. A strong flavour, somewhat like a cross between garlic and mustard, the leaves make a reasonable flavouring for salads[K]. The leaves are available for most of the year, even in a severe winter they remain green and lush[K]. At this time they add an especially welcome spiciness to salads[K]. They can become rather bitter in the summer, though, especially if the plants are in a dry sunny position[K]. When flowering in early summer, the plants lose their leaves for a month or two - cutting down the flowering stems at this time will induce new fresh green growth[K]. Flowers - raw. A similar flavour to the leaves, with very little bitterness, they make a very tasty addition to summer salads[K].

tcanta The plants can be used as a ground cover, somewhat slow spreading but they are effective in excluding weeds[K].

nrakta E. Europe. ksacta Hills and woods[45].

propta Seed - sow spring or autumn in a cold frame[200]. The seed germinates rapidly, prick the seedlings out into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer[K]. Division in spring or autumn. Very easy, it can be done at almost any time of the year so long as the soil is kept moist. Divisions in the winter should be potted up in a greenhouse to allow themselves to establish, they can then be planted out in late spring.

nwatta Prefers a light fertile moist soil in sun or light shade[200], though it is not too fussy[K]. A very easily grown plant that tolerates considerable neglect, it produces its best crop of leaves from autumn to spring and is a potentially valuable winter salad plant[K]. The bruised leaves give off a powerful garlic smell which is difficult to remove from the hands[245].

# 6.2.64 Houttuynia cordata

Tsi, Chameleon, Rainbow Plant, Chameleon Plant 5 tlin 10 cyuc 4 kcak 2 tcan 3 dwat 0.6 m hkuc pcimhmim cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Houttuynia cordata is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Fruit Leaves Root ShootsEdible Uses: Teder young shoots and leaves - raw or cooked as a potherb[2, 61, 103, 183, 272]. The leaves and young shoots are harvested in the spring when about 8cm long[264]. Strongly aromatic according to one report[183] whilst others say that it is rather smelly and somewhat like rotten fish[105, 178]. Our experience is that the leaves have a delicious orangelike smell and make a marvellous flavouring in salads[K]. One report says that there are two distinct chemotypes of this species. Plants from Japan have an orange scent, whilst those from China have a smell resembling coriander leaves (Coriandrum sativum)[238]. Some people seem to really like this leaf, others are indifferent to it or strongly dislike it[K]. It also varies guite considerably according to the time of year. In the spring and summer it has a very acceptable flavour, but by autumn a distinct bitterness has crept in[K]. Root cooked[177, 183]. Same comments on the smell as for the leaves[105]. Fruit[183]. No further details[K], but the fruit is a capsule that contains many small seeds[200].

tcanta A good ground cover plant[200]. Plants do not form a weed-suppressing cover[K]. A spreading plant, it should be spaced about 45cm apart each way[208].

dwatta Antibacterial Antidote Antiinflammatory Antiphlogistic Antiviral Astringent Depurative Diuretic Dysentery Emmenagogue Febrifuge Hypoglycaemic Laxative Ophthalmic Women's complaints The whole plant is antibacterial, antiinflammatory, antimicrbial, antiphlogistic, antiviral, depurative, diuretic, emmenagogue, febrifuge, hypoglycaemic, laxative and ophthalmic[103, 116, 147, 174, 176, 218, 238, 240, 279]. A decoction is used internally in the

treatment of many ailments including cancer, coughs, dysentery, enteritis and fever[218]. Its use is said to strengthen the immune system[176]. Externally, it is used in the treatment of snake bites and skin disorders[238]. The leaves and stems are harvested during the growing season and used fresh in decoctions[238]. The leaf juice is antidote and astringent[218]. A root extract is diuretic[218, 240]. The root is also said to be used in medicinal preparations for certain diseases of women[240, 243]. The rhizomes yield a sterol. resembling sitosterol, which stimulates the secretion of antibiotic substances from a gram-positive spore-forming bacillus[240]. An active substance, effective in the treatment of stomach ulcers, has been extracted from the plant[240].

nrakta E. Asia - China, Japan, Himalayas. ksacta Shrubberies and damp places to 2400 metres in the Himalayas[51]. Often found as a weed in wet fields[187].

propta Seed - sow spring in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Division in spring[31, 56]. Very guick and easy, it can be done successfully at almost any time in the growing season[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Massing, Woodland garden. Requires a moist to wet soil or shallow water, partial shade and a sheltered position[1, 31, 56, 238]. Whilst it grows best in a bog garden, it will succeed in moist garden borders[233] and has also grown fairly well in a dry soil in Cornwall[K]. It succeeds in full shade[208]. Plants are hardy to about -15°c[187], the top growth is killed back by frost though the roots are much hardier. Even the roots, though, can be killed in severe winters[56]. A very ornamental plant, there are some named varieties[187]. 'Chameleon' has very attractively variegated leaves with the same flavour as the species[K]. The bruised leaves emit a strong citrus smell rather like orange peel[K]. Plants have a widely spreading root system and are very invasive, though they are easier to control in drier soils[200]. Creeps harmlessly between ferns[187]. Cultivated as a salad crop in Vietnam[103] and in W. China[187].. Plants seem to be immune to the predations of rabbits[233]. Plants growing in an area with a high rabbit population were not eaten by them although other plants growing nearby were attacked[K], Special Features: Attractive foliage, Fragrant foliage, Not North American native, Invasive, Naturalizing, Wetlands plant, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 6.2.65 Actinidia melanandra

5 tlin 9 cyuc 4 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia melanandra is a deciduous Climber growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant. so both male and female plants must be grown if seed is reguired), and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and

heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[126, 183]. The globose fruit is hairless when fully ripe and up to 45mm long[183, 198, 266]. It contains a number of small seeds, but these are easily eaten with the

nrakta E. Asia - W. China. ksacta Thickets around 1800 metres in W. Hupeh, Szechwan and N. Yunnan[109]. Broadleaved forests, mountain forests and moist places at elevations of 1000 - 1600 metres[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. One report says that plants are not fully hardy in the colder parts of the country[219]. Young spring growth is susceptible to frost damage[160]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. The flowers have a soft, aromatic perfume[245]. This is a climbing plant, supporting itself by twining around branches etc[200]. At least one named variety has been developed for its edible fruit[183]. Plants have been seen in fruit at Kew[11]. This species is a good pollinator for A. arguta cordifolia[183]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Another report says that both sexes are on one plant[182].

### 6.2.66 Campanula fenestrellata

Adriatic Bellflower

5 tlin 9 cyuc 4 kcak 0 tcan 0 dwat 0.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula fenestrellata is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is selffertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[K]. A pleasant sweet flavour[K]. It makes a very acceptable addition to mixed salads in the winter[K]. Flowers - raw. Produced in abundance, they have a pleasant sweet flavour and make a decorative addition to the salad bowl[K]

nrakta S. Europe - Adriatic Coast, ksacta Not known

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring[1]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or

and is sold as a manna in local markets in Iran[46]. It can be boiled down into a syrup and used for sweetening food[183].

tcanta Buttons Repellent Tannin WoodThe seed cups are used as buttons[95]. A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit the growth of young plants[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The leaves, bark and wood are used commercially as a source of tannins[223]. Wood. It is valued by wheelwrights, turners and cabinet makers[4]. Of little value[1, 11]. It does not weather well[100].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe to S.W. Asia. Naturalized in Britain[17]. ksacta Hedges, thickets and woods in acid soils[17, 100].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Grows well on chalk[98], even when the soil is shallow[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Grows well near the coast[98]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. A very ornamental tree[1], it grows very well in Britain and is the fastest growing of the oaks in cultivation in this country[1]. The seed ripens in its second year[200]. Trees transplant badly unless they are moved regularly[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200].

### 6.2.120 Fragaria moschata

Hautbois Strawberry

5 tlin 9 cyuc 3 kcak 2 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Fragaria moschata is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. Sweet and succulent. The fruit is small but has an excellent flavour and is very aromatic[61, 142, 183, K]. It is greatly superior to the cultivated strawberries, but is not very freely produced[K].

tcanta An excellent ground cover plant, spreading vigorously by means of surface stolons and forming a dense carpet of growth[K]. It grows well amongst shrubs but is likely to suffocate smaller plants[K]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

nrakta C. Europe. Perhaps occasionally naturalized in Britain, ksacta Forests and shrubberies, and amongst tall grass[74].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[200]. Tolerates semi-shade though fruit production will be reduced[38]. Another report says that this species prefers shade[74]. Succeeds in acid and alkaline soils[38]. Likes a mulch of pine or spruce leaves[18, 24]. At one time this species was widely cultivated for its edible fruit, but it is fairly low yielding and has now been almost totally superseded by cultivars of F. x. ananassa[17]. There are some named varieties[183]. The flowers are usually unisexual[200]. (This report does not say if the plants are dioecious or monoecious.) This species produces few or no stolons[200]. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 6.2.121 Lactuca sativa longifolia

Cos Lettuce

5 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 0.9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Lactuca sativa longifolia is a ANNUAL/BIENNIAL growing to 0.9 m (3ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The mature plant is mildly toxic[13].

kcakta Leaves - raw or cooked[7, 37]. A mild slightly sweet flavour with a crisp texture, lettuce is a very commonly used salad leaf and can also be cooked as a potherb or be added to soups etc[183]. A nutritional analysis is available[218]. Seed - sprouted and used in salads or sandwiches[183]. An edible oil is obtained from the seed[7]. The seed is very small, extraction of the oil on any scale would not be very feasible[K]

tcanta Parasiticide[178]. No further details are given, but it is probably the sap of flowering plants that is used. The seed is said to be used to make hair grow on scar tissue[218].

dwatta The whole plant is rich in a milky sap that flows freely from any wounds. This hardens and dries when in contact with the air[4]. The sap contains 'lactucarium', which is used in medicine for its anodyne, antispasmodic, digestive, diuretic, hypnotic, narcotic and sedative properties[9, 21, 46, 165, 192, 213, 238]. Lactucarium has the effects of a feeble opium, but without its tendency to cause digestive upsets[4], nor is it addictive[7]. It is taken internally in the treatment of insomnia, anxiety, neuroses, hyperactivity in children, dry coughs, whooping cough, rheumatic pain etc[238]. Concentrations of lactucarium are low in young plants and most concentrated when the plant comes into flower[238]. It is collected commercially by cutting the heads of the plants and scraping the juice into china vessels several times a day until the plant is exhausted[4]. The cultivated lettuce does not contain as much lactucarium as the wild species, most being produced when the plant is in flower[4]. An infusion of the fresh or dried flowering plant can also be used[9]. The plant should be used with caution, and never without the supervision of a skilled practitioner. Even normal doses can cause drowsiness whilst excess causes restlessness[238] and overdoses can cause death through cardiac paralysis[7, 9]. Some physicians believe that any effects of this medicine are caused by the mind of the patient rather than by the medicine[213]. The sap has also been applied externally in the treatment of warts[222]. The seed is anodyne and galactogogue[218]. Lettuce has acquired a folk reputation as an anaphrodisiac, anodyne, carminative, diuretic,

cone pine forests, mixed evergreens, foothill woodlands, often on serpentine soils, from sea level to 800 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame. Alternatively, the seed can be sown in spring in a cold frame. Germination usually takes place within 1 - 3 months at 15°c. Sow the seed thinly so that there is no need to prick them out and grow the seedlings on in the pot for their first year. Give an occasional liquid feed to ensure that they do not become mineral deficient. Seedlings are prone to damping off so be careful not to overwater them and keep them well ventilated. When they become dormant, pot up the small bulbs placing about 3 in each pot. Grow them on in the greenhouse for another year or two until the bulbs are about 20mm in diameter and then plant them out into their permanent positions when they are dormant in the autumn. Division of flowering size bulbs in autumn. Dig up the clumps of bulbs, replanting the larger ones direct into their permanent positions. It is best to pot up the smaller ones and grow them on in a greenhouse for a year before planting them out when they are dormant in early autumn.

nwatta Requires a rich well-drained sandy loam[1]. Likes plenty of moisture whilst in growth followed by a warm dry period in late summer and autumn[200].

#### 6.2.118 Cynara scolymus

Globe Artichoke

5 tlin 9 cyuc 3 kcak 2 tcan 5 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Cynara scolymus is a PERENNIAL growing to  $1.5\,\mathrm{m}$  (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Can cause allergic reactions (dermatitis) due to lactones. [301]. Use with caution in cases of biliary obstruction. May hinder breast feeding (lactation) [301].

kcakta Edible Parts: Flowers Leaves StemEdible Uses: Curdling agentFlower buds - raw or cooked[2, 7, 15, 16, 27, 37, 183]. Used before the flowers open[171]. The flavour is mild and pleasant[K]. Gobe artichokes are considered to be a gourmet food but they are very fiddly to eat. The buds are harvested just before the flowers open, they are then usually boiled before being eaten. Only the base of each bract is eaten, plus the 'heart' or base that the petals grow from [K]. Small, or baby artichokes, that are produced on lateral stems can be pickled or used in soups and stews[183]. Plants yield about 5 to 6 main heads per year from their second year onwards[200]. Flowering stems - peeled and eaten raw or cooked. A sweet nutty flavour 1831. Young leaf stems - a celery substitute[200]. They are normally blanched to remove the bitterness and then boiled or eaten raw[183]. We find them too bitter to be enjoyable[K]. Leaves - cooked. A bitter flavour[15, 61]. The dried flowers are a rennet substitute. used for curdling plant milks[4, 183].

tcanta DyeA dark grey dye is obtained from the leaves[7].

dwatta Anticholesterolemic Antirheumatic Appetizer Cholagogue Digestive Diuretic Hypoglycaemic Lithontripic-The globe artichoke has become important as a medicinal herb in recent years following the discovery of cynarin. This bitter-tasting compound, which is found in the leaves, improves liver and gall bladder function, stimulates the secretion of digestive juices, especially bile, and lowers blood cholesterol levels[238, 254]. The leaves are anticholesterolemic, antirheumatic, cholagogue, digestive, diuretic, hypoglycaemic and lithontripic[7, 21, 165]. They are used internally in the treatment of chronic liver and gall bladder diseases, jaundice, hepatitis, arteriosclerosis and the early stages of late-onset diabetes[238, 254]. The leaves are best harvested just before the plant flowers, and can be used fresh or dried[238]. The German Commission E Monographs, a

therapeutic guide to herbal medicine, approve Cynara scolymus (Cynara cardunculus subsp. flavescens) for liver and gallbladder complaints, loss of appetite (see [302] for critics of commission F.).

nrakta Not known in the wild, it probably arose from a form of C. cardunculus. ksacta Not known in the wild.

propta Seed - sow early spring in a greenhouse. Germination is usually quick and good, prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions during the summer. It would be prudent to give the plants some winter protection in their first year. The seed can also be sown in situ in April. Sow the seed 2cm deep, putting 2 or 3 seeds at each point that you want a plant[1]. Protect the seed from mice[1]. Division of suckers. This is best done in November and the suckers overwintered in a cold frame then planted out in April. Division can also be carried out in March/April with the divisions being planted out straight into their permanent positions, though the plants will be smaller in their first year.

nwatta Prefers a light warm soil and an open position in full sun[15, 16, 33, 37]. Requires plenty of moisture in the growing season and a good rich soil[200]. Prefers a sheltered position[200] but plants are reasonably wind resistant[K]. Plants are tolerant of saline conditions[4]. Plants succeed in cool climates though they may need protection in cold winters[200], they are unlikely to thrive in the north of Britain. Wet winters are far more likely to cause problems than cold ones[4, K]. The globe artichoke is often cultivated in the garden and sometimes commercially for its edible flower buds. there are some named varieties[183, 200]. It is best to renew the plants by division of the suckers every 3 years but they do live for a number of years[200]. The plant has recently been reclassified (1999) as not having specific status but being part of C. cardunculus. However, since it is distinct enough from the gardener's viewpoint (having a much larger seedhead) we have decided to leave it with its own entry for the time being[K]. Plants seem to be immune to the predations of rabbits[233]. The flowering plant is a magnet for bees[108]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil reguirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

# 6.2.119 Ouercus cerris

Turkey Oak, European turkey oak 5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 35 m hkuc hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Quercus cerris is a deciduous Tree growing to 35 m (114ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly aid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Manna SeedEdible Uses: CoffeeSeed - cooked. Up to 2.5cm long. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The seed contains bitter tanning, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it. would have lost most of its astringency. The roasted seed is a coffee substitute. A sweet fluid exudes from insect damage on the stems and solidifies[2, 61, 105, 177]. This is edible

autumn[200]. Very easy, the plant can be divided at almost any time of the year[221].

nwatta Prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in full sun though it also tolerates partial shade[1, 200, 208]. Plants are very drought-tolerant and can be grown on a dry stone wall[200], they also succeed in poor soils[221]. Plants are hardy to at least -15°c[200]. Closely related to C. garganica, differing in its larger leaves, longer stems and fewer flowers. The pollen is blue, whilst that of C. garganica is yellow[271]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.67 Lomatium cous

Biscuitroot, Cous biscuitroot 5 tlin 12 cyuc 4 kcak 1 tcan 0 dwat 0.1 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli fyifxre7t hjonli

drutta Lomatium cous is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Root SeedEdible Uses: Root - raw or cooked[257. It is usually peeled before being eaten[257]. The root can be dried and ground into a powder and then be mixed with cereal flours or added as a flavouring to soups etc[46, 61, 95, 105]. When dug up in the spring it has a parsnip-like flavour[161]. Seed[106]. No more details are given, though it is most likely used as an aromatic flavouring in cooked foods[K].

nrakta Western N. America. ksacta Dry often open rocky slopes and flats, often with sagebrush, especially in foothills and lowland, occasionally above the treeline[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed can be rather slow to germinate, when sown in the spring it usually takes at least 12 months to germinate. Giving it a period of cold stratification might reduce this time. The seedlings need to be pricked out into individual pots as soon as they are large enough to handle, and should be planted out into their permanent positions in the summer. Fresh seed can be sown immediately in situ. Division may be possible in spring or autumn.

nwatta We have almost no information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in much of the country. It can be assumed that plants will require a dry to moist but well-drained soil in a sunny position. Polymorphic[60]. This is a taxonomically very difficult genus, many of the species now included in it have at times been included in other genera[60]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 6.2.68 Gaultheria japonica

Creeping Snowberry 5 tlin 9 cyuc 4 kcak 3 tcan 1 dwat 0.1 m hkuc hmim cyutli tcuphja7n hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Gaultheria japonica is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit -raw or cooked. Pleasantly acid and refreshing[3, 101], with a delicate flavour of wintergreen[183]. An agreeable subacid taste, similar to G. shallon[2, 11]. They can be made into delicious preserves[183]. The fruit is about 6mm in diameter[200]. Leaves -raw or cooked[207]. The leaves are used to make a tea[2, 95, 161, 257]. A mild flavour of wintergreen[183]. Said to be superior to china tea[207].

tcanta A useful fast growing ground cover plant for shady positions.

dwatta CancerThe plant is said to remove the cancerous taint from the body[4]. An infusion of the leaves has been used as a tonic for a person who has overeaten[257].

nrakta E. Asia - central and northern Japan. ksacta Mossy grounds under conifers at elevations of 1600 - 2000 metres[275].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well. usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long. July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Layering.

nwatta Prefers a moist but not boggy humus rich soil in shade or semi-shade[11]. A peat and moisture loving species, it requires a lime-free soil[11]. A fast growing plant[200]. The plant can make a good nesting place for mice, these mice then eat the bark of the stems in winter causing dieback. Plants in this genus are notably resistant to honey fungus[200]. Gaultheria japonica bears a close resemblance to G. hispidula (L.) Bigelow of N. America and sometimes treated as a variety or subspecies of the latter. G. japonica, however, has calyx much longer than the bracteoles, ovate and acute calyx lobes, and shorter anther projections. In G. hispidula the calyx is as long as or slightly longer than the bracteoles, the calyx lobes are broadly ovate and obtuse or subacute, and the anthers have distinct projections.

### 6.2.69 Sorbus mougeotii

5 tlin 9 cyuc 4 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Sorbus mougeotii is a deciduous Tree growing to  $18\ m\ (59ft\ 1in)$  at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105]. Eaten in early September, the fruit was not quite ripe but had already developed a pleasant slightly

792

sweet flavour and a mealy texture, it made a very acceptable dessert fruit[K]. The fruit is about 10mm in diameter and is produced in fairly large clusters that make harvesting quite simple[K]. It is usually bletted if it is going to be eaten raw[K]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit[K]. The fruit is up to 8mm in diameter[200].

nrakta Europe, ksacta Found in the Alps, usually on carboniferous limestone[50].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. A tetraploid species, it is closely related to S. intermedia and S. latifolia[200]. Very similar to S. anglica[11]. The trees usually have apomictic flowers. They thus produce seed asexually, each seedling being a clone of the parent[11].

# 6.2.70 Campanula cochleariifolia

Fairies Thimbles

5 tlin 9 cvuc 4 kcak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli tcup hwicli hyishrasilut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula cochleariifolia is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked. A pleasant mild flavour[K]. Flowers - raw or cooked. Slightly sweet[K].

nrakta Europe. ksacta Cracks in rocks in mountains throughout most of temperate Europe[221].

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn. Very easy[221], larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta A very easily grown plant that succeeds in most situations so long as they are not both hot and dry[221]. In nature, the plant is found in poor soils and rock crevices and, in cultivation, when introduced to the richer conditions of the garden, is apt to spread by means of seeds and a creeping rhizome - indeed some gardeners consider it a pest even though it is beautiful and long-flowering[271]. It is probably best grown in a poor soil, indeed it grows happily in pure gravel and sand[271]. It succeeds on drystone walls where it can become invasive[200]. It does especially well on the top of walls where there are cracks for it to root into[219]. Prefers a moist but well-drained sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. Plants are hardy to at least -15°c[200]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile and often self-sow in the garden[221, 271]. There are several named varieties selected for their ornamental value[200]. 'Elizabeth Oliver' has pleasantly flavoured leaves[K]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.71 Peltaria turkmena

5 tlin 9 cyuc 4 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Peltaria turkmena is an evergreen Perennial growing to 0.5 m (1ft 8in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[K]. A strong flavour, somewhat like a cross between garlic and mustard, the leaves make a reasonable flavouring for salads[K]. The leaves are available for most of the year, even in a severe winter they remain green and lush[K]. At this time they add an especially welcome spiciness to salads[K]. They can become rather bitter in the summer, though, especially if the plants are in a dry sunny position[K]. When flowering in early summer, the plants lose their leaves for a month or two - cutting down the flowering stems at this time will induce new fresh green growth[K]. Flowers - raw. A similar flavour to the leaves, with very little bitterness, they make a very tasty addition to summer salads[K].

tcanta The plants can be used as a ground cover, somewhat slow spreading but they are effective in excluding weeds[K].

nrakta W. Asia. ksacta Not known

propta Seed - sow spring or autumn in a cold frame[200]. The seed germinates rapidly, prick the seedlings out into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer[K]. Division in spring or autumn. Very easy, it can be done at almost any time of the year so long as the soil is kept moist. Divisions in the winter should be potted up in a greenhouse to allow themselves to establish, they can then be planted out in late spring.

nwatta Prefers a light fertile moist soil in sun or light shade[200], though it is not too fussy[K]. A very easily grown plant that tolerates considerable neglect[K].

### 6.2.72 Allium porrum

Leek. Garden leek

5 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Allium porrum is a BULB growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: The leaves and long white blanched stem are eaten cooked[2. 16 37 1831 They can also be cut into thin slices and be added to salads[183]. A mild onion flavour with a delightful sweetness[183, Kl. Bulb - raw or cooked. The bulb is produced in the plants second year of growth (that is, after it is normally harvested). The bulb is somewhat larger if the plant is prevented from flowering[K]. Flowers - raw. Used as

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit. they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open. the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. The fruit is sparsely produced in Britain[11]. A tree at Kew in September 1993 was fruiting heavily[K].

# 6.2.115 Actinidia lanceolata

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia lanceolata is a deciduous Climber growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen in November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or 6.2.117 Triteleia peduncularis cooked. The ovoid fruit is very small, about 10mm x 7mm, and hairless when fully ripe[198, 200, 266]. It contains a number of small seeds, but these are easily eaten with the fruit[K]

nrakta E. Asia - S.E. China, ksacta Mountain slopes or along river banks, 200 - 600 metres in S. Chekiang, S. Kiangsi, Fukien and N. Kwangtung[198].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well

ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood. October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. Young spring growth is susceptible to frost damage[160]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. This is a climbing plant, supporting itself by twining around branches etc[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

# 6.2.116 Plantago maritima

Sea Plantain, Goose tonque, California goose tonque 5 tlin 9 cyuc 3 kcak 2 tcan 2 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli fyifxre7t hjonli

drutta Plantago maritima is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked[2, 61, 105, 183]. A delicious flavour[172]. This is one of the nicer-tasting members of the genus, the leaves are fairly low in fibres and make an acceptable addition to a mixed salad[K]. The leaves are canned for winter use in Alaska[183]. Seed - raw or cooked. The seed can be ground into a powder and used as a flour extender[172]. The seed is very small and tedious to harvest[172].

tcanta An important food plant for the caterpillars of many species of butterflies[30]. Dynamic accumulator.

dwatta LaxativePlantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238].

nrakta Western Europe, including Britain, from Scandanavia south and east to Spain, Hungary and Russia. ksacta Short turf in salt marshes near the sea and by streams in mountains, usually in saline or wet soils[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. A sowing can be made outdoors in situ in mid to late spring if you have enough seeds

nwatta Succeeds in any moderately fertile soil in a sunny position[200].

Longray Tripletlily, Long-ray brodiaea 5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Triteleia peduncularis is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[105, 161]. Rich in starch, the bulb can be used like

nrakta South-western N. America - California. ksacta Low fields, wet grasslands, vernal streams and pools, closed protection from the cold for their first winter outdoors. Cuttings  $% \left( 1\right) =\left( 1\right) \left( 1\right)$ 

nwatta Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soil[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. The trees have deep spreading roots[7] and are very drought resistant once established[74, 200]. This species requires mild winters if it is to succeed[3]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. A hardier form, from seed collected in the Caucasus, is in cultivation in Britain[11]. The fruit and the seed are sometimes sold in local markets in the Balkans[46, 183]. This plant is said to be the lotus fruit of the ancients[183]. It is mentioned in the story of Odysseus returning from Troy and the story relates that if a person should eat the fruit they will never leave that area. Coppices well[146]. A good shade tree[200]. Trees can be very long-lived, perhaps to 1000 years[200]. Plants in this genus are notably resistant to honey fungus[200].

# 6.2.112 Barbarea verna

Land Cress, Early yellowrocket 5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Barbarea verna is a BIENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: OilYoung leaves - raw, cooked or used as a seasoning[1, 2, 33, 37, 52]. A hot, spicy watercress flavour, they are delicious in salads[183, 244]. Leaves can be obtained throughout the year if autumn-sown plants are given a light protection in winter[1]. An edible oil is obtained from the seed[46, 52, 61, 183]. The seed can be sprouted and added to salads etc[183].

nrakta S.W. Europe. Naturalized in Britain[17]. ksacta Waste and cultivated ground.

propta Seed - sow spring to September in situ at 3-weekly intervals to provide a succession of leaves. Germination usually takes place within 2 - 3 weeks.

nwatta Succeeds in sun or shade in a moist well-drained soil,[200] growing well on a north facing wall[33, 52]. The summer crop is best if it is given some shade whilst the winter crop succeeds in sunny positions[1, 200]. Land cress is often cultivated as a salad plant, when it is usually treated as an annual[46]. It can supply leaves all year round from successional sowings[1]. In hot weather plants soon run to seed unless they are kept shaded and moist[183]. The leaves taste much hotter in the summer[K]. Plants usually self-sow freely when growing in a suitable position[K].

# 6.2.113 Impatiens noli

Touch-Me-Not

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Impatiens noli-tangere is a ANNUAL growing to 1

drutta Impatiens noli-tangere is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Regular ingestion of large quantities of these plants can be dangerous due to their high mineral con-

tent[172]. This report, which seems nonsensical, might refer to calcium oxalate. This mineral is found in I. capensis and so is probably also in other members of the genus. It can be harmful raw but is destroyed by thoroughly cooking or drying the plant[K]. People with a tendency to rheumatism, arthritis, gout, kidney stones and hyperacidity should take especial caution if including this plant in their diet[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Young shoots - cooked[105, 172]. See the notes above on toxicity. Seed - raw. A delicious nutty flavour but rather difficult to harvest[172], mainly because of their exploding seed capsules which scatter the ripe seed at the slightest touch[K].

dwatta Antiseptic Diuretic Emetic LaxativeThe plant is antiseptic, diuretic, strongly emetic, laxative and vulnerary[4, 9, 61]. It has been used in the treatment of stranguary and haemorrhoids[4]. The plant is occasionally used internally in the treatment of haemorrhoids and as a laxative and diuretic, but the dose must be carefully adhered to since large quantities are strongly emetic[9]. The plant is harvested at any time in the summer[9].

nrakta Europe, including Britain, from Scandanavia to France, east to Macedonia and temperate Asia. ksacta By streams, wet ground in woods in N. Wales, the Lake District, Yorkshire and Lancashire[17].

propta Seed - sow spring in a greenhouse. A period of cold stratification may help to improve germination rates. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying an outdoor sowing in situ in the spring or the autumn[4].

nwatta Succeeds in any reasonably good soil[1]. Grows well in heavy clay soils. Prefers a moist well-drained humus rich soil in a cool site[200]. Self sows in areas where the minimum temperature is no lower than -15°c[200]. This plant has seed capsules that spring open forcibly as the seed ripens to eject the seed a considerable distance. The capsules are sensitive to touch even before the seed is ripe, making seed collection difficult but fun[K].

# 6.2.114 Crataegus flava

Summer Haw, Yellowleaf hawthorn 5 tlin 9 cyuc 3 koak 3 tcan 2 dwat 8 m hkuc hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus flava is a deciduous Shrub growing to 8 m (26ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 61, 95, 161]. well-flavoured[2]. Dry and mealy[82], it is highly esteemed in N. America as a wild fruit gathered for making jellies[183]. The yellow fruit is pear-shaped[245], it is up to 16mm in diameter and is borne in small clusters[229]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwarta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to Florida, west to Mississippi. ksacta Open woods and low hills in dry sandy or gravelly soils[43, 82].

a garnish on salads, though they are rather on the dry side and less pleasant than many other members of the genus[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Anthelmintic Antiasthmatic Anticholesterolemic Antiseptic Antispasmodic Cholagogue Diaphoretic Diuretic Expectorant Febrifuge Stimulant Stings Stomachic Tonic VasodilatorThis species has the same medicinal virtues as garlic, but in a much milder and less effective form[238]. These virtues are as follows:- Garlic has a very long folk history of use in a wide range of ailments, particularly ailments such as ringworm, Candida and vaginitis where its fungicidal, antiseptic, tonic and parasiticidal properties have proved of benefit[218]. It is also said to have anticancer activity[218]. Daily use of garlic in the diet has been shown to have a very beneficial effect on the body, especially the blood system and the heart. For example, demographic studies suggest that garlic is responsible for the low incidence of arteriosclerosis in areas of Italy and Spain where consumption of the bulb is heavy[222]. The bulb is said to be anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, cholagoque, diaphoretic, diuretic, expectorant, febrifuge, stimulant, stomachic, tonic, vasodilator[4, 9, 14, 21, 46, 165]. The crushed bulb may be applied as a poultice to ease the pain of hites stings etc[4 9 14 21]

nrakta Original habitat is obscure. ksacta Not known in

propta Seed - for an early crop, or for larger plants, sow the seed in early spring in a greenhouse and plant out in May. For smaller or later plants, sow April in an outdoor seedbed and plant out as space permits in July or even August.

nwatta Prefers a sunny position in a light well-drained soil[1] but succeeds in most soils[16]. Grows well in heavy clay soils. Prefers an open situation[1, 37]. Does best in a soil that was well fed for a previous crop[1]. Tolerates a pH in the range 5.2 to 8.3. The leek is a widely cultivated vegetable, there are many named varieties[183]. Young plants are often planted quite deeply in the soil (8 - 10cm deep) in order to blanch the lower stem, it is also a common practice to earth up the growing plants in order to blanch right the way up the stems. Whilst this does make the stems more tender, it also results in a loss of minerals and vitamins. Although commonly treated as a biennial, this plant is a true perennial, perennating by means of small lateral growths and often developing a roundish bulb at the base of the main growth[1]. A relatively slow-growing plant, it can be interplanted with faster maturing species such as lettuces[201]. The bulbs should be planted fairly deeply[1]. Grows well with most plants, especially roses, carrots, celery, celariac, beet and chamomile, but it inhibits the growth of legumes [18, 20, 541. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.73 Crataegus pinnatifida major

Chinese Haw

5 tlin 9 cyuc 4 kcak 2 tcan 3 dwat m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus pinnatifida major is a deciduous Tree growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105, 177]. A pleasant flavour, it is sold in local markets in China[178]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. A good size, it is up to 25mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Anticholesterolemic Cardiotonic Hypotensive Stomachic VasodilatorThe fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]. The fruits are anticholesterolemic, cardiotonic, stomachic and vasodilator. Their use improves the blood circulation and lowers blood pressure [176]. The fruits are used in the treatment of dyspepsia, stagnation of fatty foods, abdominal fullness, retention of lochia, amenorrhoea, postpartum abdominal pain, hypertension and coronary heart disease[176]

nrakta E. Asia - China. ksacta Riverbanks, on sandy soils or stony slopes[74].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant, this sub-species is widely cultivated for its edible fruit in China[266], it is larger than the type species[46, 178, 200].

#### 6.2.74 Lomatium macrocarpum

Bigseed Biscuitroot

5 tlin 10 cyuc 4 kcak 2 tcan 2 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lomatium macrocarpum is a PERENNIAL growing to 0.5 m (1ft 8in). The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

kcakta Edible Parts: Root SeedEdible Uses: TeaRoot - raw or cooked[257]. A staple food for a number of na-

tive North American Indian tribes[257]. The root is usually peeled before being cooked or eaten[257]. It can be dried and ground into a powder and then used to make cakes etc[105, 161, 183]. Seed - raw or cooked. Very nutritious, they can also be ground into a powder[183] and then used with cereal flours when making bread, cakes etc, or be used as a flavouring in soups etc[257]. The seed is very small, but quite easy to harvest[183, K]. A tea can be made from the leaves, stems and flowers[183].

tcanta IncenseThe root has been dried then burnt as a ceremonial incense[257].

dwatta Infertility Pectoral Poultice Sedative TonicAn infusion of the roots has been used as a general strengthener for a weakened patient[257]. The infusion is also used as a treatment for colds, influenza and bronchitis[257]. The root has been chewed and the juice swallowed as a treatment for sore throats[257]. The root has been eaten by childless couples, especially older people, in order to help them conceive[257]. A poultice made from the boiled root has been used to treat swellings[257]. The leaves have been used as a padding in a child's cradle to encourage it to sleep more[257].

nrakta Western N. America - British Columbia to California. ksacta Open rocky hills and plains, not extending much into the mountains[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed can be rather slow to germinate, when sown in the spring it usually takes at least 12 months to germinate. Giving it a period of cold stratification might reduce this time. The seedlings need to be pricked out into individual pots as soon as they are large enough to handle, and should be planted out into their permanent positions in the summer. Fresh seed can be sown immediately in situ. Division may be possible in spring or autumn.

nwatta We have almost no information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in much of the country. It can be assumed that plants will require a dry to moist but well-drained soil in a sunny position. Polymorphic(60). This is a taxonomically very difficult genus, many of the species now included in it have at times been included in other genera[60]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 6.2.75 Artemisia dracunculus

Tarragon, French Tarragon

5 tlin 8 cyuc 4 kcak 3 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Artemisia dracunculus is a PERENNIAL growing to  $0.6\,\mathrm{m}$  (2ft) by  $0.3\,\mathrm{m}$  (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone  $6.1\,\mathrm{t}$  is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: Leaves ShootsEdible Uses: CondimentLeaves - raw or used as a flavouring in soups etc[2, 4, 14, 21, 37]. Tarragon is a commonly used herbal flavouring that is used in many traditional recipes[244]. It is particularly of value because of its beneficial effect upon the digestion and so is often used with oily foods[244]. The leaves can also be harvested in late summer and dried for later use[4]. The aromatic leaves have a very nice flavour that is somewhat liquorice-like[183, K]. They make an excellent flavouring in salads[K]. The young shoots can also be cooked and used as a potherb[183]. The leaves are used as a flavouring in vinegar[4]. An essential oil from the leaves is used as a flavouring[61].

tcanta Essential RepellentThe leaves contain about 0.3% essential oil, about 70% of which is methyl chivacol[240]. This is used as a food flavouring, in detergents and also medicinally[61, 238]. Both the growing and the dried plant repels insects[99]. Landscape Uses: Container, Seashore. Special Features: Edible, Fragrant foliage, Not North American native, Inconspicuous flowers or blooms. Provides shelter for beneficial invertebrates: insects and other arthropods. A specialist nectary plant [1-2].

dwatta Antiscorbutic Appetizer Diuretic Emmenagogue Febrifuge Hypnotic Odontalgic Stomachic VermifugeTarragon is a bitter warming aromatic herb that stimulates the digestive system and uterus, lowers fevers and destroys intestinal worms[238]. It is little used in modern herbalism, though it is sometimes employed as an appetizer[268]. The leaves (and an essential oil obtained from them) are antiscorbutic, diuretic, emmenagogue, hypnotic and stomachic[21, 146, 179, 238]. An infusion is used in the treatment of indigestion, flatulence, nausea, hiccups etc[244]. The plant is mildly sedative and has been taken to aid sleep[254]. It also has mild emmenagogue properties and can be used to induce a delayed period[254]. A poultice can be used to relieve rheumatism, gout, arthritis and toothache[244]. The plant is harvested in the summer and can be dried for later use[238]. This herb should not be prescribed for pregnant women[238]. The root has been used to cure toothache[4]. The essential oil is used in aromatherapy to treat digestive and menstrual problems[238].

nrakta S. Europe to W. Asia. ksacta By rivers and streams[244]. Grassland and arid steppe.

propta Seed - surface sow from late winter to early summer in a greenhouse. Fertile seed is rarely produced from this plant - most if not all seed supplied under this name is of the inferior form, Russian tarragon (A. dracunculoides). Therefore, it is best to only propagate by division. Division is very easy in spring or autumn[K]. The divisions can be planted out direct into their permanent positions, though we prefer to pot them up first and grow them on in a cold frame until they have rooted well. Basal cuttings in late spring. Harvest young shoots about 10 - 15c long and pot them up in a lightly shaded place in a greenhouse or cold frame. Plant them out into their permanent positions when well rooted. A very quick and easy method of propagation[K].

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position[1, 37, 52, 200]. Plants are not very long-lived when grown in clay soils[190]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Established plants are drought tolerant[190, 200]. Tolerates a pH in the range 6.5 to 7.8. Plants are relatively hardy in Britain, but can be killed in wet winters. It is best to grow tarragon in a dry, rather poor soil since this will produce hardier plants[4]. The dry soil will also help to reduce predation by slugs, these creatures are very fond of the young growth and have been known to completely destroy even well-established plants[K]. When well suited, the plants can spread freely at the roots[K]. The flowers do not open in cool summers and viable seed is seldom produced[238]. Often grown in the herb garden, tarragon is also sometimes grown commercially for its edible leaves which are used mainly as a flavouring [46]. There is at least one named variety, 'Epicure' is a new fragrant cultivar[183]. There is a closely related species, A. dracunculoides or Russian tarragon, which is guite inferior in flavour, though sometimes supplied under this name. A good companion for most plants, especially aubergines and sweet peppers[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhiprefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Although no records of toxicity have been seen for this species, it does belong to a family that contains many poisonous plants. Some caution should be applied, especially towards leaves or unripe fruits, though ripe fruits are almost certainly edible.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[146, 177]. Only the fully ripe fruits should be eaten[K].

tcanta Soil stabilizationPlants are very drought tolerant and have an extensive root system. They can be planted to stabilize banks and sandy soils[200, 266].

dwatta Cancer OphthalmicThe plant is used as an ointment to treat blindness in camels[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Himalayas. ksacta Higher inner Himalayas, 1800 - 3900 metres[146]. Saline deserts and sands, roadsides at elevations of 400 - 3,000 metres in western China[266].

propta Seed - sow early spring in a greenhouse. Germination is usually good and fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Pinch out the shoot tips of the young plants in order to encourage bushy growth[78]. Cuttings of half-ripe wood, 5 - 10cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, autumn to late winter in a cold frame. High percentage[78, 200]. Division of suckers in late winter. Very easy, the suckers can be planted out direct into their permanent positions. Layering.

nwatta Does not require a rich soil, flowering and fruiting better in a well-drained soil of moderate quality[11]. Succeeds in impoverished and saline soils[200, 266]. Requires a sunny position[200]. Tolerates maritime exposure[200] and drought[266].

#### 6.2.110 Berberis x carminea

5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hionli

drutta Berberis x carminea is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. The seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Üses: Fruit - raw or cooked. A pleasant though strongly acid flavour, it goes well in a muesli[K]. Most children, and a few adults, really like the fruit raw, but in general most people will prefer to cook it[K]. The fruits are about 10mm in diameter[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Antitumor DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]

nrakta A range of garden hybrids involving B. aggregata as one parent with other closely related species. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early

spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. This plant does not breed true from seed because it is a hybrid species. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Grows well on chalky soils[11]. Plants are hardy to about -15°c[184]. A very ornamental plant[1], there are several named varieties[182]. The cultivar 'Buccaneer' bears very large crops of large fruits, even on small plants[K]. A good bee plant[108], the flowers are very fragrant. Plants can be pruned back quite severely, they resprout well from the base[200].

# 6.2.111 Celtis australis

Nettle Tree, European hackberry 5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 20 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Celtis australis is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Oil OilFruit - raw[3, 7, 100]. A mealy pleasant taste[74]. Small and insipidly sweet[2, 183]. Of little value[177]. The fruit is about 10mm in diameter[200] with a single large seed[K]. Seed - raw or cooked[7, 46, 61, 105]. An oil is obtained from the seed[7, 105].

tcanta Dye Fuel Oil Oil WoodA yellow dye is obtained from the bark[100]. A fatty oil is obtained from the seed[243]. No more information is given. Wood - very tough, pliable, durable[46, 61, 158]. Widely used by turners[7]. Used for the handles of agricultural implements[272]. The flexible thin shoots are used as walking sticks[61]. An excellent fuel[146].

dwatta Astringent Dysentery Lenitive StomachicThe leaves and fruit are astringent, lenitive and stomachic[7, 254]. The leaves are gathered in early summer and dried for later use[7]. The fruit, particularly before it is fully ripe, is considered to be more effective medicinally[254]. A decoction of both leaves and fruit is used in the treatment of amenorrhoea, heavy menstrual and intermenstrual bleeding and colic[218, 240]. The decoction can also be used to astringe the mucous membranes in the treatment of diarrhoea, dysentery and peptic ulcers[254].

nrakta S. Europe. ksacta Hedges, banks and sandy places[100].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summerfKl. Give them some

772 789

nrakta Eastern N. America - Quebec to Florida and west to Minnesota and Kansas. ksacta Rich damp woods and on calcareous rocky banks[43].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at  $15^{\circ}$ c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

watta An easily grown plant, preferring a rich light moist soil and the shade of deciduous trees[1, 187]. A very cold-hardy plant, tolerating temperatures down to at least -20°c[187].

### 6.2.107 Viburnum farreri

Culver's root, Fragrant Viburnum 5 tlin 8 cyuc 3 koak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum farreri is a deciduous Shrub growing to 3 m (9ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from November to February, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[11]. A sweet flavour, but the fruit is not freely borne in Britain[K].

nrakta E. Asia - China in Gansu. ksacta Not known

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible. July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Lavering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Hedge, Massing, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in full sun or in semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Requires shelter from N. and E. winds[200]. Plants are hardy to about -20°c[184]. A very ornamental plant[1], it flowers in the winter and the flowers are said to withstand temperatures down to -12°c without damage[11. 2001. The flowers diffuse a sweet and cloving perfume of heliotrope[245]. The fruit, however, is not often produced in this country[K]. This may be due to the plant being selfincompatible and so growing 2 or more different cultivars together may improve fruit set[11, 200]. Hand pollination may also be beneficial as well as siting the plants so that they get the maximum of protection from severe winter weather [K]. A

west-facing wall or woodland edge would be ideal for this[K]. The plants flower on terminal and lateral clusters of the current years growth, any pruning is best carried out in the spring[219]. This species has long been known as V. fragrans, but this name is invalid[11]. It is closely related to V. grandiflorum[11]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

### 6.2.108 Zanthoxylum alatum

Winged Prickly Ash

5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Zanthoxylum alatum is a deciduous Shrub growing to 4 m (13ft lin). See above for USDA hardiness. It is hardy to UK zone 6. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe seed is ground into a powder and used as a condiment[183]. A pepper substitute, it is widely used in the Orient[105, 132, 158, 183]. A light roasting brings out more of the flavour[206]. The seed is an ingredient of the famous Chinese 'five spice' mixture[206]. The fruit is rather small but is produced in clusters which makes harvesting easy[K]. Each fruit contains a single seed. Young leaves are used as a condiment[105, 158, 183].

tcanta Miscellany Teeth WoodThe fruit contains 1.5% essential oil[240]. The fruit is used to purify water[146, 158]. Toothbrushes are made from the branches[146, 158]. Wood - heavy, hard, close grained. Used for walking sticks[146, 158]

dwatta Cholera Miscellany Odontalgic Stimulant Stomachic TonicThe seeds and the bark are used as an aromatic tonic in the treatment of fevers, dyspepsia and cholera[240]. The fruits, branches and thorns are considered to be carminative and stomachic[46, 61, 146, 158, 240]. They are used as a remedy for toothache[240].

nrakta E. Asia - China to the Himalayas. ksacta Forest undergrowth and hot valleys to  $1800\ metres$  in the Himalayas.

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. This species is closely related to Z. planispinum[200]. Flowers are formed on the old wood[206]. Dioecious. Male and female plants must be grown if seed is required.

# 6.2.109 Lycium ruthenicum

5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Lycium ruthenicum is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It

zomatous with underground stems sending roots and shoots along their length [1-2]. stomachic and tonic[4, 7, 9, 21, 54, 165, 176, 222, 238]. The root is also experimentally cholagogue, hypoglycaemic and a

### 6.2.76 Taraxacum officinale

Dandelion - Kukraundha, Kanphool, Common dandelion, Dandelion 5 tlin 9 cyuc 4 kcak 3 tcan 3 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Taraxacum officinale is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

picsta This plant has been mentioned in various books on poisonous plants but any possible toxins will be of very low concentration and toxicity[10]. There are reports that some people have suffered dermatitis as a result of touching the plant, this is probably caused by the latex in the leaves and stems[222].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Coffee TeaLeaves - raw or cooked[1, 2, 4, 5, 7, 9, 12, 14, 33, 154]. When used in salads, they are rather bitter, though less so in the winter. Tender young leaves are considerably less bitter than older leaves [K]. The leaves are often blanched (by excluding light from the growing plant) before use[183]. This will make them less bitter, but they will also contain less vitamins and minerals[K]. A very nutritious food, 100g of the raw leaves contain about 2.7g. protein, 9.2g. carbohydrate, 187mg Calcium, 66mg phosphorus, 3.1mg iron, 76mg sodium, 397mg potassium, 36mg magnesium, 14000iu vitamin A, 0.19mg vitamin B1, 0.26mg vitamin B2, 35mg vitamin C[173]. Root - raw or cooked[5, 9, 12, 183]. Bitter. A turnip-like flavour[159]. Flowers - raw or cooked[102, 159]. A rather bitter flavour[K], the unopened flower buds can be used in fritters[183] and they can also be preserved in vinegar and used like capers [7]. Both the leaves and the roots are used to flavour herbal beers and soft drinks such as 'Dandelion and Burdock'[238]. The roots of 2 year old plants are harvested in the autumn dried and roasted to make a very good coffee substitute[2, 4, 5, 12, 54, 159]. It is caffeinefree[213]. A pleasant tea is made from the flowers[12, 102]. They are also used to make wine - all green parts should be removed when making wine to prevent a bitter flavour[238]. The leaves and the roots can also be used to make tea.

tcanta Compost Cosmetic Dye Fruit ripening Latex MiscellanyThe flowers are an ingredient of 'OR' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. A liquid plant feed can be made from the root and leaves[54]. A low quality latex, which can be used for making rubber, can be obtained from the roots of this plant. A magenta-brown dve is obtained from the root[141]. The plant releases ethylene gas, this stunts the growth of nearby plants and causes premature ripening of fruits[14, 18]. A distilled water made from the liqules (thin appendages at the base of the leaf blades) is used cosmetically to clear the skin and is particularly effective in fading freckles[7]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Aperient Cholagogue Depurative Diuretic Eczema Hepatic Hypoglycaemic Laxative Miscellany Stomachic Tonic Urinary Vitamin C WartsThe dandelion is a commonly used herbal remedy. It is especially effective and valuable as a diuretic because it contains high levels of potasium salts and therefore can replace the potassium that is lost from the body when diuretics are used[238]. All parts of the plant, but especially the root, are slightly aperient, cholagogue, depurative, strongly diuretic, hepatic, laxative,

root is also experimentally cholagogue, hypoglycaemic and a weak antibiotic against yeast infections[222]. The dried root has a weaker action[222]. The roots can be used fresh or dried and should be harvested in the autumn when 2 years old[4]. The leaves are harvested in the spring when the plant is in flower and can be dried for later use[9]. A tea can be made from the leaves or, more commonly, from the roots[213]. The plant is used internally in the treatment of gall bladder and urinary disorders, gallstones, jaundice, cirrhosis, dyspepsia with constipation, oedema associated with high blood pressure and heart weakness, chronic joint and skin complaints, gout, eczema and acne[238]. The plant has an antibacterial action, inhibiting the growth of Staphylococcus aureus. Pneumococci, Meningococci, Bacillus dysenteriae, B. typhi, C. diphtheriae, Proteus etc[176]. The latex contained in the plant sap can be used to remove corns, warts and verrucae[7]. The latex has a specific action on inflammations of the gall bladder and is also believed to remove stones in the liver[7]. A tea made from the leaves is laxative[222]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Taraxacum officinale for dyspepsia, urnary tract infections, liver and gallbladder complaints, appetite loss (see [302] for critics of commission E).

nrakta Throughout most of the northern hemisphere, including Britain. ksacta A very common weed of grassland and cultivated ground[17].

propta Seed - sow spring in a cold frame and either surface-sow or only just cover the seed. Make sure the compost does not dry out. Germination should take place within 2 weeks, though 2 weeks cold stratification may improve germination. Prick out the seedlings into individual pots when they are large enough to handle, choosing relatively deep pots to accommodate the tap root. Plant them out in early summer. Division in early spring as the plant comes into growth.

nwatta A very easily grown plant, it succeeds in most soils[1], though it prefers a well-drained humus-rich neutral to alkaline soil in full sun or light shade[37, 238]. A very hardy plant, tolerating temperatures down to at least -29°c[238]. The dandelion is a common weed of lawns and grassy places. Though it has a bitter flavour, the plant is often cultivated as a salad crop and as a medicinal plant, especially in parts of Europe. There are some named varieties with larger, more tender and less bitter leaves[183]. Dandelions can provide edible leaves all year round, especially if they are given a small amount of protection in the winter[K]. A valuable bee plant and an important food plant for the caterpillars of many butterfly and moth species 4, 24, 30, 54], it grows well in a spring meadow[24]. A deep rooting plant, it has roots up to 1 metre long and brings up nutrients from lower levels of the soil[201]. An excellent plant to grow in lawns, if the lawn is cut no more than fortnightly then the dandelions will provide a good quantity of edible leaves[K], Grows well with alfalfa[18, 201]. Another report says that it inhibits the growth of nearby plants[54]. This is probably a reference to the fact that the plant gives off ethylene gas, this gas is a hormone that promotes the premature ripening of fruits and also induces the premature fruiting of plants, thereby stunting their growth[14, 18]. T. officinale is not a valid name for this species, but no valid name has as yet been ascribed to it[200]. This is actually an aggregate species of many hundreds of slightly differing species. Most seed production is apomictic which means that plants produce seed non-sexually and all seedlings are clones of the parent, thus small differences are maintained. Special Features: Edible, Not North American native, Invasive, Naturalizing, Suitable for dried flowers, Extended bloom season in Zones 9A and above. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones. 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also use-

788 773

ful and given here if available. The plant growth habit is a 'Bacterial'[210]. It is used especially in cases of exhaustion, clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 6.2.77 Thymus vulgaris

Common Thyme, Garden thyme, Wild Thyme 5 tlin 11 cyuc 4 kcak 5 tcan 3 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Thymus vulgaris is an evergreen Shrub growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista A comment has been made in one report on medicinal uses that the plant should be used with caution[21]. No explanation was given. It guite possibly refers to overuse of the essential oil. All essential oils, since they are so concentrated, can be harmful in large doses[K]. Avoid if inflammatory disease of the gastrointestinal tract. Internal use contraindicated especially in pregnancy. Caution if sensitive to grasses [301]. Dilute oil in carrier oil before topical use.

kcakta Edible Parts: Flowers Leaves ShootsEdible Uses: Condiment TeaLeaves and flowering tops - raw in salads, used as a garnish or added as a flavouring to cooked foods, going especially well with mushrooms and courgettes[2, 4, 21, 46, 183, 2381. It is an essential ingredient of the herb mix 'bouquet garni'[238]. It retains its flavour well in long slow cooking[200]. The leaves can be used either fresh or dried[183]. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried guickly[200]. A nutritional analysis is available[218]. An aromatic tea is made from the fresh or dried leaves[21, 183]. Pungent and spicy[183].

tcanta Deodorant Disinfectant Essential Fungicide Potpourri RepellentAn essential oil from the leaves is frequently used in perfumery, soaps, toothpastes, mouthwashes, medicinally etc[11, 21, 57, 89, 238]. It has fungicidal properties[171] and is also used to prevent mildew[218]. The leaves are dried and used in pot-pourri[238]. The plant makes an attractive ground cover for a sunny position[201]. Plants are best spaced about 30cm apart each way[208]. The dried flowers are used to repel moths from clothing[4] whilst the growing plant is said to repel cabbage root fly[18, 20].

dwatta Anthelmintic Antiseptic Antispasmodic Aromatherapy Carminative Deodorant Diaphoretic Disinfectant Expectorant Sedative TonicCommon thyme has a very long history of folk use for a wide range of ailments[218]. It is very rich in essential oils and these are the active ingredients responsible for most of the medicinal properties[218]. In particular, thyme is valued for its antiseptic and antioxidant properties, it is an excellent tonic and is used in treating respiratory diseases and a variety of other ailments[254]. The flowering tops are anthelmintic. strongly antiseptic, antispasmodic, carminative, deodorant, diaphoretic, disinfectant, expectorant, sedative and tonic[4, 7, 21, 200, 218]. The plant is used internally in the treatment of dry coughs, whooping cough, bronchitis, bronchial catarrh, asthma, laryngitis, indigestion, gastritis and diarrhoea and enuresis in children[238]. It should not be prescribed for pregnant women[238]. Externally, it is used in the treatment of tonsillitis, gum diseases, rheumatism, arthritis and fungal infections[238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238]. Thyme has an antioxidant effect, thus regular use of this herb improves the health and longevity of individual body cells and therefore prolongs the life of the body[254, K]. The essential oil is strongly antiseptic[4]. The whole herb is used in the treatment of digestive disorders, sore throats, fevers etc[4]. The essential oil is one of the most important oils used in aromatherapy[7, 210]. Its keyword is

depression, upper respiratory tract infections, skin and scalp complaints etc[238]. The oil can cause allergic reactions and irritation to the skin and mucous membranes[238].

nrakta S. Europe. ksacta Dry slopes, rocks and maguis. Always found on clay or limestone soils[89].

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can keep for three years in normal storage[4]. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel. May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Lay-

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden. Prefers a light, dry calcareous soil and a sunny position[4, 7, 11, 27, 37]. Succeeds in dry soils, poor soils and tolerates drought once it is established[190]. Plants can be grown on old walls. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils [238]. Thyme is hardy to about -15°c[200], though it is even hardier when grown on old walls are in well-drained poor light soils[4]. Thyme is commonly grown in the herb garden, there are many named varieties[182]. It is also harvested commercially for its essential oil[218]. The leaves are very aromatic[190]. It is sometimes grown as an annual from seed when used for culinary purposes[200]. The flowers are rich in nectar and are very attractive to honey bees[4, 7, 200]. Thyme is a good companion for most plants[20, 54], it is said to repel cabbage root flies when grown near brassicas[18, 20]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 6.2.78 Thymus x citriodorus

Lemon Thyme, Creeping Lemon Thyme, Lemon-Scented Thyme

5 tlin 10 cyuc 4 kcak 5 tcan 2 dwat 0.1 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Thymus x citriodorus is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers welldrained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime

3cm long and pot these up in light shade in a cold frame. They will guickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils. but it also succeeds in partial shade. Plants can grow in water up to 15cm deep[24]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant, especially when bruised, has a pungent aroma of bergamot[245]. The flowers are especially attractive to bees and butterflies[24]. A good companion for brassicas[14]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.104 Echinochloa crus

Barnyard Millet, Barnyardgrass, 5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Echinochloa crus-galli is a ANNUAL growing to 1.2 m (4ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista This grass has been reported to accumulate levels of nitrate in its tissues high enough to be toxic to farm animals[269]. This problem is most likely to occur when plants are fed with inorganic fertilizers[K].

kcakta Edible Parts: Leaves SeedEdible Uses: CoffeeSeed - cooked[35, 55, 105, 171]. Used as a millet, it can be cooked whole or be ground into a flour before use[183, 257]. It has a good flavour[85] and can be used in porridges, macaroni, dumplings etc[183]. The seed is rather small[159], though fairly easy to harvest. It has a somewhat bitter flavour[178]. Young shoots, stem tips and the heart of the culm - raw or cooked[144, 177]. A nutritional analysis is available[218]. The roasted seed is a coffee substitute[177].

tcanta Soil reclamationThe plant is sometimes used, especially in Egypt, for the reclamation of saline and alkaline areas[269].

dwatta Styptic TonicReported to be preventative and tonic, barnyard grass is a folk remedy for treating carbuncles, haemorrhages, sores, spleen trouble, cancer and wounds[269]. The shoots and/or the roots are applied as a styptic to wounds[218, 240]. The plant is a tonic, acting on the spleen[218, 240].

nrakta Native habitat is unknown but it is widespread in warmer regions occasionally introduced in Britain. ksacta Ditches roadsides and waste places in S. Europe[50]. Wet places and rich soils in India[240].

propta Seed - sow early spring in a greenhouse and only just cover the seed. When they are large enough to handle prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. A sowing in situ in late spring might also succeed but is unlikely to ripen a crop of seed if the summer is cool and wet.

nwatta An easily grown plant, it is adapted to nearly all types of wet places, and is often a common weed in paddy fields, roadsides, cultivated areas, and fallow fields[269]. It succeeds on a variety of wet sites such as ditches, low areas in fertile croplands and wet wastes, often growing in water[269]. It succeeds in cool regions, but is better adapted to areas where the average annual temperature is 14-16°C[269]. Tolerant of most soil types, including saline conditions, plants are not restricted by soil pH[269]. Prefers a rich moist soil[85] but succeeds in ordinary garden soil[1]. The sub-species E. crus-galli zelayensis (HBK)Hitchc. is often found growing wild in alkaline soils[236]. The plant is reported to tolerate an annual precipitation in the range of 31 to 250cm, an annual temperature range of 5.7 to 27.8°C

and a pH in the range of 4.8 to 8.2[269]. Barnyard millet is sometimes cultivated for its edible seed in India[171]. It has a relatively long growing season and does not always ripen its seed in Britain, though it should do better in the eastern half of the country[K]. The plant is considered to be a very serious weed of many cultivated crops[269].

# 6.2.105 Osmorhiza longistylis

Aniseroot, Longstyle sweetroot

5 tlin 9 cvuc 3 kcak 1 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Osmorhiza longistylis is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Leaves RootEdible Uses: Condiment TeaRoot - raw or cooked. Very sweet, aromatic and fleshy[222]. A spicy flavour similar to anise, the roots are chewed, made into a tea or used as a flavouring[105, 171. 183]. Leaves and young shoots - raw. An anise flavour, they are added to salads[177, 183]. The green seeds have an anise flavour and are used as a flavouring in salads, the dry seeds are added to cakes etc[183].

tcanta Scented.

dwatta Birthing aid Ophthalmic Poultice StomachicA poultice of the roots are used in the treatment of boils and wounds[207, 222]. A tea made from the roots is stomachic[222]. It has been used in the treatment of stomach complaints, kidney problems, amenorrhoea, general debility, to ease childbirth and also to bathe sore eyes[222, 257].

nrakta Eastern N. America - Nova Scotia to Ontario, Alabama, Tennessee, Kansas and Colorado. ksacta Rich, often alluvial woods and thickets[43]. Woods, often along the sides of streams in Texas[274].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise sow it in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in any deep moisture-retentive soil in sun or dappled shade[200]. Plants are hardy to about -20°c[200]. Well suited to naturalistic plantings in a woodland or wild garden[200]. A sweetly aromatic plant[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2].

### 6.2.106 Dentaria laciniata

Cut-Leaved Toothwort

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Dentaria laciniata is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April, and the seeds ripen in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland). It prefers moist soil

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[46, 61, 161]. A pleasant pungent peppery taste, somewhat like watercress[43, 105, 159, 183]. Added to salads or used as a relish. Leaves - raw or cooked. A peppery flavour[159].

### 6.2.102 Lactuca sativa crispa

Cutting Lettuce

5 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 0.9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Lactuca sativa crispa is a ANNUAL/BIENNIAL growing to 0.9 m (3ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The mature plant is mildly toxic[13].

kcakta Leaves - raw or cooked[7, 37]. A mild slightly sweet flavour with a crisp texture, lettuce is a very commonly used salad leaf and can also be cooked as a potherh or be added to soups etc[183]. This variety forms a loose rosette of leaves and can be harvested on a cut and come again basis. Seed - sprouted and used in salads or sandwiches[183]. An edible oil is obtained from the seed[7]. The seed is very small, extraction of the oil on any scale would not be very feasible[K].

tcanta Parasiticide[178]. No further details are given, but it is probably the sap of flowering plants that is used. The seed is said to be used to make hair grow on scar tissue[218].

dwatta The whole plant is rich in a milky sap that flows freely from any wounds. This hardens and dries when in contact with the air[4]. The sap contains 'lactucarium', which is used in medicine for its anodyne, antispasmodic, digestive, diuretic, hypnotic, narcotic and sedative properties[9, 21, 46, 165, 192, 213, 238]. Lactucarium has the effects of a feeble opium, but without its tendency to cause digestive upsets[4], nor is it addictive[7]. It is taken internally in the treatment of insomnia, anxiety, neuroses, hyperactivity in children, dry coughs, whooping cough, rheumatic pain etc[238]. Concentrations of lactucarium are low in young plants and most concentrated when the plant comes into flower[238]. It is collected commercially by cutting the heads of the plants and scraping the juice into china vessels several times a day until the plant is exhausted[4]. The cultivated lettuce does not contain as much lactucarium as the wild species, most being produced when the plant is in flower[4]. An infusion of the fresh or dried flowering plant can also be used[9]. The plant should be used with caution, and never without the supervision of a skilled practitioner. Even normal doses can cause drowsiness whilst excess causes restlessness[238] and overdoses can cause death through cardiac paralysis[7, 9]. Some physicians believe that any effects of this medicine are caused by the mind of the patient rather than by the medicine[213]. The sap has also been applied externally in the treatment of warts[222]. The seed is anodyne and galactogogue[218]. Lettuce has acquired a folk reputation as an anaphrodisiac, anodyne, carminative, diuretic, emollient, febrifuge, hypoglycaemic, hypnotic, narcotic, parasiticide and sedative[218].

nrakta Of garden origin, probably derived from L. serriola. ksacta Not known in the wild.

propta Seed - sow a small quantity of seed in situ every 2 or 3 weeks from March (with protection in cooler areas) to June and make another sowing in August/September for a winter/spring crop. Only just cover the seed. Germination is usually rapid and good, thin the plants if necessary, these thinnings can be transplanted to produce a slightly later crop (but they will need to be well watered in dry weather). More certain winter crops can be obtained by sowing in a frame in September/October and again in January/February.

nwatta Prefers a light sandy loam[1]. Succeeds in most well-drained, humus-rich soils but dislikes acid conditions[1, 16]. Plants strongly dislike dry conditions, quickly running to seed in such a situation. Early and late sowings are best in a sunny position, but summer crops are best given a position with some shade in order to slow down the plants tendency to go to seed and to prevent the leaves becoming bitter[18, 20]. The garden lettuce is widely cultivated in many parts of the world for its edible leaves and is probably the most commonly grown salad plant. This is the curled or leaf lettuce. It does not form a central heart but produces a loose rosette of basal leaves and can be harvested on a cut and come again basis.

There are many named varieties[183] capable of providing fresh leaves throughout the year if winter protection is given in temperate areas. Lettuces are quite a problematic crop to grow. They require quite a lot of attention to protect them from pests such as slugs, aphids and birds. If the weather is hot and dry the plants tend to run very quickly to seed, developing a bitter flavour as they do so. In wet weather they are likely to develop fungal diseases. In addition, the seed needs to be sown at regular intervals of 2 - 3 weeks during the growing season in order to provide a regular supply of leaves. Lettuces make a good companion plant for strawberries, carrots, radishes and onions[18, 20, 201]. They also grow well with cucumbers, cabbages and beetroot[201].

# 6.2.103 Mentha aquatica

Water Mint

5 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha aquatica is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A strong distinctive peppermintlike fragrance[183]. Used as a flavouring in salads or cooked foods[5]. The leaves are too pungent for most people to use as a flavouring[244]. A herb tea is made from the leaves[21, 183]

tcanta Repellent StrewingThe plant repels flies, mice and rats[14, 20, 244]. It has a pleasant, fresh scent and was formerly used as a strewing herb and has been strewn in granaries to keep mice and rats off the grain[14, 244]. The plant, harvested before flowering, yields about 0.8% essential oil[240]. The fresh or dried plant is very good when used in herbal baths and can also be used in herb pillows[244]. Water garden

dwatta Anodyne Antidiarrhoeal Antiseptic Antispasmodic Astringent Carminative Cholagogue Diaphoretic Emetic Refrigerant Stimulant Stomachic Tonic VasodilatorThe leaves are anodyne, antiseptic, antispasmodic, astringent, carminative, cholagogue, diaphoretic, emetic, refrigerant, stimulant, stomachic, tonic and vasodilator[4, 9, 21]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. It is also used as a mouth-wash and a gargle for treating sore throats, ulcers, bad breath etc[9]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Europe, including Britain, south and east to N. Africa and southwest Asia Also in S. Africa, Madeira ksacta Swamps, fen, marshes, near rivers, streams and ponds, in wet woods[9].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division [K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves raw in salads or added as a flavouring to cooked foods[105, 183]. A delicious lemon flavour[K]. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200]. An aromatic tea is made from the leaves[21]. It has a pleasant lemon-like flavour and is very refreshing[183, 238].

tcanta Deodorant Disinfectant Essential Pot-pourriThe essential oil obtained from the leaves and flowering stems is used in perfumery, as a mouth wash, medicinally etc[200]. The aromatic leaves are dried and used in pot-pourri and herbal pillows[238]. The plant makes an attractive ground cover for a sunny position[201]. They are best spaced about 30cm apart each way[208].

dwatta Antiseptic Aromatherapy Deodorant DisinfectantThe leaves, and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238]. The leaves contain an antioxidant and regular use of the raw leaves has been shown to increase average life expectancy by about 10%. The essential oil obtained from this plant is thought to be less irritant than other thyme oils and so it is used in aromatherapy to treat asthma and other respiratory complaints, especially in children[238].

nrakta A hybrid of garden origin between T. pulegioides and T. vulgaris. ksacta Not known in the wild.

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species is a hybrid and will not breed true from seed. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel. May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden. Requires a light well-drained preferably calcareous soil in a sunny position[1, 200]. Succeeds in dry soils. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to about -15°c[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200]. Often cultivated in the herb garden for its leaves, there are some named varieties. The flowers are rich in nectar and are very attractive to honey bees[200]. A good companion for most plants[54]. Special Features:Edible, Fragrant foliage, Not North American native, Suitable for dried flowers.

#### 6.2.79 Allium tricoccum

Wood Leek, Ramp 5 tlin 9 cyuc 4 kcak 3 tcan 2 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium tricoccum is a BULB growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from March to June, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[46, 61, 159]. An early Spring vegetables. Used mainly as a flavouring in salads and savoury dishes[238]. This is one of the best N. American wild species for sweetness and flavour[95]. A mild sweet flavour, resembling leeks[183]. The bulb is rather small, it is up to 12mm wide and 50mm tall[235] and is produced in clusters on a rhizome[200]. Leaves - raw or cooked[62]. The unfolding leaves in spring have a mild sweet flavour, resembling leeks[183]. Flowers - raw. Used as a garnish on salads. A hot onion flavour[Kl.

tcanta Companion RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20]. A good shade plant. Tolerates Juglone (a substance produced by a plant to stunt the growth of another plant).

dwatta EmeticThis species probably has most of the medicinal virtues of garlic (Allium sativum) but in a milder form[222, 238]. Traditionally the leaves were used in the treatment of colds and croup, and also as a spring tonic[222, 238]. The warm juice of the leaves and bulb was used externally in the treatment of earaches[222, 238]. A strong decoction of the root is emetic[222].

nrakta Eastern N. America - Quebec, south to Virginia and Iowa. ksacta Rich woods and bottoms, preferring slopes and streamsides[43]. Usually in beech and maple woods[159].

propta Seed - sow spring in a cold frame. The seed usually germinates within 12 months, but only makes a root and a small bulb in its first year of growth. Top growth is not produced until the second spring[K]. It is quite possible that if the seed can be sown when it is ripe in early summer, or in the autumn, then this will speed up germination times[K]. Sow the seed thinly in the pots so that the young seedlings can be allowed to grow on undisturbed for their first two years. Apply a liquid feed once a month during the growing season to ensure they do not suffer from mineral deficiency. When the plants are dormant at the end of their second years growth, divide them so that there are 2 - 3 small bulbs in each pot. Grow them on for a further year in the greenhouse and then plant them out when they are dormant. Division in spring. Very easy, the divisions can be planted straight out into their permanent positions if required.

nwatta Prefers a sunny position in a light well-drained soil[1]. Grows well in light moist woodland, where the plant forms large clumps and can become invasive[203, 235]. It is probably best grown in the wild garden[203]. Plants are hardy to at least -15°c[238]. The bulbs should be planted fairly deeply[1]. The leaves die down in early summer before the flowers have fully opened. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is a bulb.

#### 6.2.80 Rumex scutatus

Buckler-Leaved Sorrel, French sorrel 5 tin 9 cyuc 4 kcak 2 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rumex scutatus is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities, the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 4, 12, 14, 27, 33]. A delicious lemon-like flavour[183], most people find them overpowering if used in quantity, but they make a delightful addition to the salad bowl and can also be used as a pot-herb[K]. This species has less acid leaves and so is often preferred to sorrel (R, acetosa)[238]. The leaves should be used sparingly due to the oxalic acid content[4].

tcanta DyeThe cultivar 'Silver Shield' makes a good, if rampant, ground cover beside paths and at the front of borders[238]. Although no specific mention has been made for this species, dark green to brown and dark grey dyes can be obtained from the roots of many species in this genus, They do not need a mordant[168]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Antiscorbutic Astringent Diuretic Laxative RefrigerantThe leaves are antiscorbutic, astringent, diuretic, laxative and refrigerant[4, 238]. They are rarely used as a specifically medicinal plant.

nrakta Europe. Occasionally naturalized in Britain[17]. ksacta Old walls and mountain pastures[17, 244].

propta Seed - sow spring in a cold frame. Germination is rapid, the seedlings can be pricked out into individual pots when they are large enough to handle and are planted out in early summer[K]. It should also be possible to sow the seed in situ in mid spring[K]. Division in spring. Division is easy at any time in the growing season, though the plants establish better in the spring[K]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta A very easily grown plant, succeeding in most soils but preferring a moist moderately fertile well-drained soil in a sunny position[200]. Prefers a rather dry soil[4, 27]. Established plants are drought tolerant[200]. Plants often self-sow freely in the garden[K]. Buckler-leafed sorrel is occasionally cultivated for its edible leaves 61, 1051. There are some named varieties that have been selected for their ornamental value[238]. A food plant for the caterpillars of many species of butterfly[30]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

# 6.2.81 Thymus serpyllum

Wild Thyme

5 tlin 9 cyuc 4 kcak 5 tcan 3 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thymus serpyllum is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves - raw in salads or added as a flavouring to cooked foods[2, 11, 46, 61]. Thyme retains its flavour well in long slow cooking. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200]. An aromatic tea is made from the leaves[21].

tcanta Deodorant Disinfectant Disinfectant Essential Fungicide RepellentAn essential oil from the leaves and flowering tops is used in perfumery, soaps, medicinally etc. It has fungicidal and disinfectant properties[4, 7]. About 150 grams of oil are obtained from 100 kilos of plant material[4]. The dried flowers are used to repel moths from clothing[4]. The growing plant is said to repel cabbage root fly[18, 20]. A good ground cover for a sunny position[197]. It needs weeding for the first year or so[197]. Plants are best spaced about 45cm apart each way[208]. Plants are only satisfactory when young or growing luxuriantly - they are apt to become bare in patches otherwise[208], Summer flowers bring bees, Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, theses are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level groundcovers provide little fuel.

dwatta Anthelmintic Antirheumatic Antiseptic Antispasmodic Carminative Deodorant Diaphoretic Disinfectant Disinfectant Expectorant Sedative TonicWild thyme is a commonly used domestic remedy, being employed especially for its antiseptic properties and its beneficial effect on the digestive system. The whole plant is anthelmintic, strongly antiseptic, antispasmodic, carminative, deodorant, diaphoretic, disinfectant, expectorant, sedative and tonic[4, 165, 200, 238, 254]. It is taken internally in the treatment of bronchitis, catarrh, laryngitis, flatulent indigestion, painful menstruation, colic and hangovers[238]. It is said to be effective in treating alcoholism[238]. It should not be prescribed for pregnant women[238]. Externally, it is applied to minor injuries, mastitis, mouth, throat and gum infections etc[238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238]. The seeds are used as a vermifuge[240]. Wild thyme contains all the medicinal properties of the more commonly used garden thyme (T. vulgaris), though in a lesser degree[4]. An essential oil distilled from the leaves is used in the treatment of stress-related conditions, though it can cause allergic reactions[238].

nrakta Europe, including Britain, from Sweden south and east to France, Hungary and Roumania. ksacta Dry stony ground, open sandy heaths and grassland in East Anglia[7, 13, 17].

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[201]. Layering.

nwatta Landscape Uses:Container, Ground cover, Rock garden, Seashore. Requires a light well-drained preferably calcareous soil in a sunny position[1, 200]. Succeeds in dry soils[4]. Grows well between stepping stones on paths, tolerating light treading[183, 200]. Succeeds on walls. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to about -15°c[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200]. This species is harvested commercially for its essential oil, known as 'wild thyme'[218]. Closely related to T. praecox arcticus, but this species is not so common in Britain[11]. It is a very polymorphic plant. A good companion for most other plants[54], it makes a very qood carpeting on for most other plants[54], it makes a very qood carpeting

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta Industrial Crop: Medicinal Management: Standard Minor Global CropA very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Most trees have very few thorns, some forms are thorn-free[202]. A very ornamental plant[1, 11]. The sub-species C, pinnatifida major has larger fruit than the type species, it is cultivated for this fruit in China[46, 178, 200] Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a nonsuckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 6.2.100 Corylus sieboldiana mandschurica

Hairy hazel, Japanese hazelnut, 5 tlin 9 cyuc 3 kcak 1 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyif hjonli

drutta Corylus sieboldiana mandschurica is a deciduous Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[63, 74, 105]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed[105].

nrakta E. Asia - N. China to Manchuria. ksacta An understorey in deciduous, mixed and coniferous woods[74].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame [164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3- 4 months cold stratification [164]. Germinates in 1- 6 months at  $20^{\circ}$  (164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months [78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[1, 11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. This species is closely allied to C. cornuta, and often bears good crops of seeds in Britain[11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

# 6.2.101 Vitis monticola

Sweet Mountain Grape

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis monticola is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or dried for winter use[1, 2, 105]. Large, thin-skinned with a tender juicy sweet pulp[183]. Small and sweet according to another report[182]. The fruit is about 12mm in diameter[200] and is borne in bunches. Leaves - cooked[55]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked[55, 85].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern N. America - S.W. Texas. ksacta Rich damp woodland soils[200]. Stream bottoms and limestone areas[274].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. They grow especially well up elm trees[18]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta South-western N. America - California, Nevada, Oregon. ksacta Dry flats, screes and slopes in sagebrush scrub, 1200 - 3000 metres[71, 90].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained soil[1]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.98 Mahonia japonica

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 2 m hkuc pcimhmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Mahonia japonica is an evergreen Shrub growing to 2 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to April, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked. An acid flavour, but it is rather nice raw especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The ovoid fruit is about 9mm long[200], it ripens in spring and crops can be quite good if the plant is in a sheltered position[K]. The fruit is produced in large clusters and so is easy to harvest[K].

dwatta Antibacterial Antirheumatic Antitumor Antitussive Cancer Depurative Dysentery Expectorant Febrifuge TonicThe leaf is febrifuge and is used as a tonic in cases of cancer[218]. The seed is febrifuge and tonic[218]. The roots and stems are antirheumatic, antitussive, depurative, expectorant and febrifuge[147, 218]. A decoction is used in the treatment of bone-breaking fevers, dizziness and tinnitus, backache, weak knees, dysentery and enteritis[147]. The root and root bark are best harvested in the autumn[213]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China, Taiwan. ksacta Damp woodlands in upland areas[147, 200]. Not found in a truly wild situation, this species is possibly only a cultigen.

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant

them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown shrub, it thrives in any good garden soil[11] including heavy clays. Prefers a semi-shaded woodland position in a damp, slightly acid to neutral humusrich soil[200]. Survives under very heavy tree shade[184]. Succeeds in poor soils when the leaves will often become bright red, especially if the plant is in full sun. The fully dormant plant is hardy to about -20°c[184], though the young growth in spring can be damaged by late frosts. Plants are very tolerant of pruning and can be cut right back into old wood if they have outgrown their welcome[182]. This species is closely related to M. bealei[11, 200]. It hybridizes freely with other members of the genus. The flowers have a delicious perfume[245]. The form 'Hiemalis' bears larger flower spikes which are almost as strongly scented as Lily of the Valley (Convallaria majalis)[245].

# 6.2.99 Crataegus pinnatifida

Chinese Haw

5 tlin 9 cyuc 3 kcak 2 tcan 3 dwat 7 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crategus pinnatifida is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A pleasant flavour[178]. The orange fruit has a mealy texture with an acid taste and a slight bitterness but is fairly nice raw[K]. It ripens fairly late, specimens seen at the end of October 1998 were not quite fully ripe[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 15mm in diameter[200], though in some forms it can be 25mm in diameter[266]. A nutritional analysis is available[218]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Alterative Antibacterial Anticholesterolemic Antidote Antiscorbutic Cardiotonic Deobstruent Hypotensive Laxative Stimulant Stomachic VasodilatorThe fruit is antibacterial, anticholesterolemic, cardiotonic, hypotensive, stomachic, vasodilator. It contains several medically active constituents including flavonoids and organic acids[279]. It has been shown to lower blood cholesterol levels and to improve blood circulation[176, 238, 279]. It is used in Korea in the treatment of abdominal distension, pain, diarrhoea and to induce menstruation[279]. The dried fruit is alterative, antiscorbutic, deobstruent, laxative, stimulant and stomachic[218]. The fruits and flowers of hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]. The seed is recommended in the treatment of difficult labour, hernia and swollen genitals[218]. The leaves and twigs are used as an antidote to varnish poisoning (from certain Rhus spp)[218]. The root is used in the treatment of nausea and vomiting[218].

nrakta E. Asia - N. China, Korea. ksacta Riverbanks, on sandy soils or stony slopes[74]. Among shrubs, on slopes at elevations of 100 - 2000 metres[266].

plant for the rockery or between paving stones[1] and can also be grown in a short lawn[54]. The flowers are rich in nectar and are very attractive to honey bees[200], the plant also attracts butterflies[4, 7, 24]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Suitable for dried flowers. Heat Zone 9-1.

#### 6.2.82 Vaccinium erythrocarpum

Southern Mountain Cranberry
5 tiin 9 cyuc 3 kcak 0 tcan 0 dwat 1.5 m hkuc
hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat
hpa7tmwatli xre7t hionli

drutta Vaccinium erythrocarpum is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked and used in jellies etc[183]. The transparent scarlet berries have an excellent flavour[183]. Somewhat sour according to one report[200] whilst another says that they can be insipid or sweetish[161].

nrakta South-eastern N. America - Virginia, N. Carolina, Tennessee. ksacta Thickets, rocky woods, slopes and summite[43]

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. This plant has been recommended for improvement by cultivation for its edible fruit[183]. Plants in this genus are notably resistant to honey funcus[2001.

#### 6.2.83 Berberis lycium

5 tlin 9 cyuc 3 kcak 1 tcan 3 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis lycium is an evergreen Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit-raw or cooked and made into preserves[2, 11, 105, 177, 183]. Fairly juicy with a nice slightly acid flavour[K]. The fruits are about 8mm long[200]. Leaves and young shoots - cooked[2, 177, 183]. Leaves are a tea substitute[177, 183].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Aperient Cancer Carminative Dysentery Febrifuge OphthalmicThe roots are aperient, carminative, febrifuge and ophthalmic[11, 46, 61, 158, 240]. They are used in the treatment of eye complaints, menorrhagia, chronic diarrhoea and piles[240]. The leaves have been used in the treatment of jaundice[240]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas ksacta Shrubberies and open hillsides[51, 67], usually on hot dry slopes[146], to 3000 metres. in Kashmir[57].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. A fairly hardy plant but it suffers some damage in severe winters[1]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

# 6.2.84 Amelanchier weigandii

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Amelanchier weigandii is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit, raw or cooked. The fruit is rich in iron and copper[226].

nrakta Eastern N. America - Canada, ksacta Not known propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if re-

nwatta We have very little information on this species, though it is growing well at Kew Botanical Gardens, where 8 year old plants are about 3 metres tall with multiple stems and lots of side branches[K]. They were flowering well at the

end of April 1995[K]. The following notes are based on the general needs of the genus. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Hybridizes freely with other members of this genus [200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

#### 6.2.85 Lactuca sativa

Lettuce, Garden lettuce

5 tlin 9 cyuc 3 kcak 1 tcan 3 dwat 0.9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Lactuca sativa is a ANNUAL/BIENNIAL growing to 0.9 m (3ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The mature plant is mildly toxic[13].

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Oil-Leaves - raw or cooked[7, 37]. A mild slightly sweet flavour with a crisp texture, lettuce is a very commonly used salad leaf and can also be cooked as a potherb or be added to soups etc[183]. A nutritional analysis is available[218]. Seed - sprouted and used in salads or sandwiches[183]. An edible oil is obtained from the seed[7]. The seed is very small, extraction of the oil on any scale would not be very feasible[K].

tcanta Hair Oil Parasiticide ParasiticideParasiticide[178]. No further details are given, but it is probably the sap of flowering plants that is used. The seed is said to be used to make hair grow on scar tissue[218].

dwatta Anaphrodisiac Anodyne Antispasmodic Carminative Diuretic Emollient Expectorant Febrifuge Galactogogue Hypnotic Hypoglycaemic Narcotic Parasiticide Parasiticide SedativeThe whole plant is rich in a milky sap that flows freely from any wounds. This hardens and dries when in contact with the air[4]. The sap contains 'lactucarium', which is used in medicine for its anodyne, antispasmodic, digestive, diuretic, hypnotic, narcotic and sedative properties[9, 21, 46, 165, 192, 213, 238]. Lactucarium has the effects of a feeble opium, but without its tendency to cause digestive upsets[4], nor is it addictive[7]. It is taken internally in the treatment of insomnia, anxiety, neuroses, hyperactivity in children, dry coughs, whooping cough, rheumatic pain etc[238]. Concentrations of lactucarium are low in young plants and most concentrated when the plant comes into flower[238]. It is collected commercially by cutting the heads of the plants and scraping the juice into china vessels several times a day until the plant is exhausted[4]. The cultivated lettuce does not contain as much lactucarium as the wild species, most being produced when the plant is in flower[4]. An infusion of the fresh or dried flowering plant can also be used[9]. The plant should be used with caution, and never without the supervision of a skilled practitioner. Even normal doses can cause drowsiness whilst excess causes restlessness[238] and overdoses can cause death through cardiac paralysis[7, 9]. Some physicians believe that any effects of this medicine are caused by the mind of the patient rather than by the medicine[213]. The sap has also been applied externally in the treatment of warts[222]. The seed is anodyne and galactogogue[218]. Lettuce has acquired a folk reputation as an anaphrodisiac, anodyne, carminative, diuretic, emollient, febrifuge, hypoglycaemic, hypnotic, narcotic, parasiticide and sedative[218].

nrakta Of garden origin, probably derived from L. serriola, ksacta Not known in the wild.

propta Seed - sow a small quantity of seed in situ every 2 or 3 weeks from March (with protection in cooler areas)

to June and make another sowing in August/September for a winter/spring crop. Only just cover the seed. Germination is usually rapid and good, thin the plants if necessary, these thinnings can be transplanted to produce a slightly later crop (but they will need to be well watered in dry weather). More certain winter crops can be obtained by sowing in a frame in September/October and again in January/February.

nwatta Prefers a light sandy loam[1]. Succeeds in most well-drained, humus-rich soils but dislikes acid conditions[1. 16]. Plants strongly dislike dry conditions, quickly running to seed in such a situation. Early and late sowings are best in a sunny position, but summer crops are best given a position with some shade in order to slow down the plants tendency to go to seed and to prevent the leaves becoming bitter[18, 20]. The garden lettuce is widely cultivated in many parts of the world for its edible leaves and is probably the most commonly grown salad plant. There are many named varieties[183] capable of providing fresh leaves throughout the year if winter protection is given in temperate areas. Over the centuries a number of more or less distinct forms have arisen in cultivation. These forms have been classified as follows. They are treated separately in more detail:- L. sativa angustana. L.H.Bailey. is the Celtuce. The leaves of this form are not of such good quality as the other lettuces and the plant is grown more for its thick central stem which is used in the same ways as celery[1]. L. sativa capitata. L. is the heading lettuce, it forms a heart in a similar way to cabbages. Examples of this include the Iceberg and Butterhead lettuces. L. sativa crispa. L. is the curled or leaf lettuce. This does not form a central heart but produces a loose rosette of basal leaves. It can be harvested on a cut and come again basis. L. sativa longifolia Lam, is the cos lettuce. This has longer, thinner leaves and a more erect habit, it does not form a compact heart. Lettuces are guite a problematic crop to grow. They require guite a lot of attention to protect them from pests such as slugs, aphids and birds. If the weather is hot and dry the plants tend to run very quickly to seed, developing a bitter flavour as they do so. In wet weather they are likely to develop fungal diseases. In addition, the seed needs to be sown at regular intervals of 2-3 weeks during the growing season in order to provide a regular supply of leaves. Lettuces make a good companion plant for strawberries, carrots, radishes and onions[18, 20, 201]. They also grow well with cucumbers, cabbages and beetroot[201].

#### 6.2.86 Asarum splendens

Chinese Wild Ginger

5 tlin 9 cyuc 3 kcak 3 tcan 0 dwat 0.2 m hkuc

pcimhmim cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli hionli

drutta Asarum splendens is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.6 m (2ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista Leaves toxic [1-2].

kcakta Edible Parts: RootEdible Uses: A ginger-like rhizome with a strong potent flavour [1-2]. They are commonly referred to as wild gingers (not a culinary gingers) as their rhizomes have a similar spicy scent.

tcanta Groundcover - an excellent groundcover for shade and semi-shade. Known to tolerate Juglone (a poisonous product produced by black walnuts Juglans nigra)[1-2]. Attractive leaves - Containers, Ornamental. Food Forest.

dwatta None Known

nrakta Asia ksacta Forest floors full to part shade.

propta Propagate by seed in containers in a cold frame as soon as ripe. Can also be propagated by division in early spring.

nwatta A semi-evergreen perennial with thick heart-shaped, dark green leaves. Asarum splendens is a showy vigorous groundcover for shade with a vigorous rhizomatic root that forms a thick mat of foliage. It will remain semi-evergreen through mild winters. Semi shade to full shade. It prefers moist, slightly acidic organic soil in a well-drained site and is ideal for a shady border or a woodland garden. In China it grows on mountain slopes between 800-1,300 above sea level. Flower Color: Purple. Bloomtime: Early

is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista There have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of this species. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw or cooked[5, 177]. Rather stringy, they are used as a garlic substitute[2, 12, K]. The leaves are available from late autumn until the following summer, when used sparingly they make a nice addition to the salad bowl[8, 183, K]. Bulb - used as a flavouring[105, 161, 177]. Rather small, with a very strong flavour and odour[183]. The bulbs are 10 - 20mm in diameter[200]. Bulbils - raw or cooked. Rather small and fiddly, they have a strong garlic-like flavour[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20]. The juice of the plant can be rubbed on exposed parts of the body to repel biting insects, scorpions etc[257].

dwatta Antiasthmatic Blood purifier Carminative Cathartic Diuretic Expectorant Stimulant VasodilatorThe whole plant is antiasthmatic, blood purifier, carminative, cathartic, diuretic, expectorant, hypotensive, stimulant and vasodilator[20, 257]. A tincture is used to prevent worms and colic in children, and also as a remedy for croup[257]. The raw root can be eaten to reduce blood pressure and also to ease shortness of breath[257]. Although no other specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Much of Europe, including Britain, to N. Africa and Lebanon. ksacta Fields and roadsides to elevations of 450 metres in Britain, often a serious weed of pastures [17].

propta Plants do not need any encouragement, they are more than capable of propagating themselves. Bulbils are produced in abundance in the summer and are the main means by which the plant spreads.

nwatta Prefers a sunny position in a light well-drained soil[1]. The bulbs should be planted fairly deeply[1]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. This species is a pernicious weed of grassland in Britain[1], spreading freely by means of its bulbils[203]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.96 Mahonia nervosa

Oregon Grape, Cascade barberry 5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 0.6 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia nervosa is an evergreen Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[2, 3, 101]. An acid flavour but it is rather nice raw, especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. Too acid for most tastes but they are very good in jams, jellies, pies etc[183]. They can also be used to enhance the flavour of bland fruits or made into a refreshing lemon-flavoured drink[183]. The fruit is about 8mm in diameter[200]. Young tender leaves - cooked. Simmered in a small amount of water and eaten as a snack[183].

tcanta DyeA yellow dye is obtained from the inner bark of the stem and roots[98, 101, 257]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. Plants can be grown as a ground cover, spaced about 30cm apart each way[208]. They are very slow to spread[208] and so will need weeding for their first few years after planting[K].

dwatta Antiarthritic Antibacterial Antitumor Blood tonic Dysentery Laxative TonicThe root is alterative and tonic[4]. It improves the digestion and absorption and is recommended in the treatment of psoriasis, syphilis and impure blood conditions[4, 257]. A decoction of the peeled and chopped root bark has been used as a wash in treating arthritis and as an eyewash for red itchy eyes[257]. The fruit is an excellent safe and gentle laxative[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine [218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta North-western N. America. ksacta Light dry woods and rocky ledges[60, 67].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autum.

nwatta An easily grown plant, it thrives in any good garden soil[11, 200] but also succeeds in poor dry ones. Another report says that it is best on a lime-free soil[182]. Grows well in heavy clay soils. Prefers a sunny position[3] but succeeds in heavy woodland shade[K]. Hybridizes freely with other members of this genus. Plants are growing and fruiting well at Wakehurst Place in Sussex, but they do not generally do well in Britain[11]. Resistant to honey fungus[88].

#### 6.2.97 Allium platycaule

Broadstemmed Onion

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.1 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium platycaule is a BULB growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible 761.

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Bulb - raw or cooked[177, 257]. The bulbs are formed in clusters on a rhizome and are about 20 - 35mm in diameter[200]. Leaves - raw or cooked. Used as an onion-flavoured relish[257]. Flowers - raw. Used as a garnish on salads. The seed heads can be placed in hot ashes for a few minutes, then the seeds extracted and eaten[257].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in

#### 6.2.93 Tanacetum balsamita

Alecost, Costmary

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.9 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Tanacetum balsamita is a PERENNIAL growing to 0.9 m (3ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or used as a flavouring in soups, beer etc[2, 4, 14, 27, 52, 177, 183]. They can be chopped and added sparingly to salads[183]. They have a very pleasant aroma, but can be overpowering in the food if you are not careful[K]. The leaves were at one time widely used in brewing beer, before being superseded by hops (Humulus lupulus)[238]. The whole leaves can be laid in cake trays to flavour the cake whilst it is baking[183]. The flower petals are used for conserves[183]. A delicious tea is made from the dried leaves[14, 21, 183].

tcanta Insecticide Pot-pourri StrewingThe plant was traditionally used for its insecticidal properties[200]. The dried leaves retain their fragrance well and so are used in potpourri[4, 238], they are also used as a strewing herb[200].

dwatta Antiseptic Astringent Digestive Dysentery LaxativeAlecost is seldom used in herbal medicine, though it does have a beneficial effect upon the digestive system[268]. The leaves are antiseptic, astringent, digestive and laxative[4, 14, 238]. They have been used internally as an aperient in the treatment of dysentery, and as a remedy for liver and gall bladder complaints[238]. Externally, they have been used as a salve to treat burns and insect stings[238, 268]. They are considered to be virtually obsolete in modern herbalism[4, 238]

nrakta Europe to W. Asia. ksacta An introduced weed of roadsides in eastern N. America[43].

propta The seed is seldom produced in Britain[4]. If seed is obtained it would probably be best sown in a cold frame in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[4]. Very easy, it can be done successfully at almost any time of the year. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in late spring[K]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, it prefers a sunny warm position[52] in a dry soil[14, 37] but thrives under most conditions[4]. Tolerates a pH in the range 5.0 to 7.6. The leaves emit a soft balsamic odour[4]. The sub-species T. balsamita tomentosum is called the camphor plant because of its camphor-scented foliage[238]. Plants produces lot of leaves but no flowers when grown in the shade[4], though this is an advantage when the plant is being grown for its useful leaves[200]. Alecost used to be commonly grown in the herb garden but it has fallen out of favour in recent times[4].

#### 6.2.94 Linum perenne

Perennial Flax, Blue flax, Alpine flax 5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Linum perenne is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July, and the seeds ripen in August.

The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The raw seed contains cyanide and should not be eaten raw[183]. The cooked seed is perfectly safe[183].

kcakta Edible Parts: Oil SeedEdible Úses: OilSeed cooked[46, 61, 183]. A pleasant nutty taste and very nutri-tious[94]. The seed has a high oil content and can be eaten on its own or used as a flavouring[161, 183]. It should not be eaten raw because it contains cyanide but this is destroyed in the cooking process[183].

tcanta Cosmetic Fibre Hair Oil PaperA drying oil is obtained from the seed. Used mainly for lighting[178], though it could also be used in all the ways that linseed oil (from Linum usitatissimum) is used - in paints, varnishes etc[115]. An infusion of the whole plant is used as a hair and skin wash[257]. It is said to be very beneficial to the skin and also to help prevent hair loss[257]. A good fibre is obtained from the stems, it is inferior to flax (Linum usitatissimum)[115] but is used for making (oth, nets, string, baskets, mats etc and in paper making[4, 46, 61, 74, 94, 115]. When used for paper making, the stems are harvested in late summer or autumn when they are two thirds yellow and are then retted[189]. The fibre is then stripped from the stem, cooked for two hours or more with lye and then beaten in a Hollander beater[189].

dwatta Antirheumatic Carminative Emollient Ophthalmic Poultice StomachicThe plant is antirheumatic, carminative and stomachic[94, 257]. The oil in the seed has soothing and lubricating properties, and is used in medicines to soothe tonsillitis, sore throats, coughs, colds, constipation, gravel and stones[244]. When mixed with an equal quantity of lime water it is used to treat burns and scalds[244]. A poultice of the fresh crushed leaves has been used to treat eve problems[94, 213]. A tincture of the entire plant is used in the treatment of diarrhoea[4]. The fresh herb is boiled and taken internally for the treatment of rheumatic pains, heartburn, colds, coughs and dropsy[4, 257]. A poultice of the plant is applied to bruises to reduce the swelling[257]. The seeds are emollient[240]. An eye medicine is made from them[257]. An infusion of the roots is used as an evewash[257].

nrakta Europe. Western N. America. ksacta Calcareous grassland[244]. Prairies to alpine ridges, usually on dry well-drained soils in Western N. America[60].

propta Seed - sow spring in greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Basal cuttings in spring. Harvest the shoots when they are about 8 - 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Alpine garden, Border, Container, Foundation, Massing, Rock garden. Prefers a light dry well-drained moderately fertile humus-rich soil in a sunny sheltered position[200]. Prefers an alkaline soil. Established plants are drought tolerant[190]. A very ornamental plant[1], it is not generally very long-lived though it normally self-sows freely[190]. The sub-species lewisii (which is seen as a separate species by some botanists or as no more than a synonym of this species by others) is more desirable for its fibre and has been cultivated by the N. American Indians for this purpose[155]. Special Features: Naturalizing.

#### 6.2.95 Allium vineale

Crow Garlic, Wild garlic, Compact onion, False Garlic, Wild, Onion

5 tlin 8 cvuc 3 kcak 2 tcan 2 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Allium vineale is a BULB growing to 0.6 m (2ft) by 0.1 m (0ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is n leaf from October to August, in flower from June to July, and the seeds ripen from August to September. The species

Spring Foliage Color: Variegated. Resistant: Deer Resistant, Rabbit Resistant.. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. Known to tolerate Juglone (a poisonous product produced by black walnuts Juglans nigra) [1-2].

#### 6.2.87 Carya laciniosa

Shellbark Hickory

5 tlin 9 cyuc 3 kcak 3 tcan 1 dwat 30 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carya laciniosa is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Sap SeedEdible Uses: SweetenerSeed - raw or cooked in pies, cakes etc[183]. Sweet, with a very fine flavour[183], it has the largest seeds of the hickories[227], up to 5cm long[229]. Probably the finest flavoured hickory[117]. The shell is hard and thick[101, 117] and the cracking quality is poor compared to C. ovata[183]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. Sap - a sweet flavour[62]. Tapped in spring, it can be boiled down to a syrup or sugar and be used in similar ways to maple syrup[101, 183].

tcanta Fuel WoodWood - close-grained, tough, hard, heavy, elastic, very flexible. It weighs 50 lb. per cubic foot. An excellent wood, it is used for tool handles, baskets, fuel etc[46, 61, 63, 82, 226, 227]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Astringent DetergentThe inner bark is astringent and detergent[257]. It has been used as a dressing for cuts and has been chewed to treat sore mouths[257].

nrakta Eastern N. America - New York and Pennsylvania to Indiana, Iowa and Kansas. ksacta Deep rich soils of floodplains and bottomlands[43, 62]. It grows best on neutral or slightly alkaline soils and tolerates shallow flooding in early spring[229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Management: Standard Regional Crop Staple Crop: OilLandscape Uses:Pest tolerant, Aggressive surface roots possible. Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. A very ornamental but slow growing tree[1], it is sometimes cultivated for its edible seed, and is also sold in local markets in N. America[82]. There are some named varieties[183] though some of these are likely to be hybrids. 'Fayette' is a thin shelled form[200]. 'Henry' has a very large nut[200]. Trees have been planted

on an experimental scale in Germany for their wood[50]. Hybridizes in the wild with C. ovata[227]. Trees take up to 15 years from seed to bear fruit[117]. Plants are strongly taprooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have guite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Special Features: North American native, Wetlands plant. Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 4. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

# 6.2.88 Allium stellatum

Prairie Onion, Autumn onion
5 tin 9 cyuc 3 koak 0 tcan 2 dwat 0.8 m hkuc
htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis
hpa7tmwatli xre7t hjonli

drutta Allium stellatum is a BULB growing to 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2]. The bulbs are eaten by the N. American Indians[183]. They are rather small, about 4cm tall and 15mm wide[235]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta A sweetened decoction of the root has been taken, mainly by children, as a remedy for colds[257]. Although no other specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta N. America - Illinois and Minnesota to Missouri, Nebraska and Kansas. ksacta Rocky prairies, slopes, shores and ridges[43]. Usually found on limestone soils[274].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then

put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta Landscape Uses:Border, Container, Massing, Rock garden. An easily grown plant, it prefers a sunny position in a rich moist but well-drained soil[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. There is at least one named variety - 'Album' has white flowers[200]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion or alfalfa, each species negatively affecting the other[201]. Closely allied to A. cernuum and to A. textile[1]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: North American native, Suitable for cut flowers.

#### 6.2.89 Gaultheria ovatifolia

Mountain Checkerberry, Western teaberry 5 tlin 9 cyuc 3 kcak 3 tcan 0 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Gaultheria ovatifolia is an evergreen Shrub growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 62, 183]. Spicy and delicious[11]. The fruit is up to 6mm in diameter[200].

tcanta A useful ground cover for shady places.

nrakta Western N. America - British Columbia to California. ksacta Various habitats from fairly dry yellow pine forests to sub-alpine bogs[60].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood, 7cm with a heel, July/August in a shady frame. Rather slow, it usually takes 12 months for the roots to form[78]. Division in early spring. Larger clumps can be replanted direct into their permanent positions, though it is best to not up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Layering in September/October. Takes 12 months

nwatta Prefers a moist but not boggy humus rich soil in shade or semi-shade[11, 182]. This species prefers considerable shade[1]. A peat and moisture loving species, it requires a lime-free soil[11, 182]. Closely related to G. humifusa[182]. Reputed to be rather difficult in cultivation[11], it does not grow well in S. England[1]. The plant can make a good nesting place for mice, these mice then eat the bark of the stems in winter causing die-back. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.90 Crocus sativus

Saffron 5 tlin 9 cyuc 3 kcak 2 tcan 3 dwat 0.1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crocus sativus is a CORM growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness, It is hardy to UK zone 6 and is not frost tender. It is in leaf from October to May, in flower in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, butterflies. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The plant is poisonous[21]. The plant is perfectly safe in normal usage but 5 - 10 grams of saffron has been known to cause death[65].

kcakta Edible Parts: RootEdible Uses: Colouring Condiment TeaThe flower styles are commonly used as a flavouring and yellow colouring for various foods such as bread, soups, sauces, rice and puddings[2, 4, 7, 14, 21, 27, 34, 183]. They are an essential ingredient of many traditional dishes such as paella, bouillabaisse, risotto milanese and various other Italian dishes[244]. The styles are extremely rich in riboflavin[137]. Water soluble[171]. Yields per plant are extremely low, about 4000 stigmas yield 25g of saffron[89]. Saffron is the world's most expensive spice, it takes 150,000 flowers and 400 hours work to produce 1 kilo of dried saffron[238]. About 25 kilos of styles can be harvested from a hectare of the plant[4]. Fortunately, only very small quantities of the herb are required to impart their colour and flavour to dishes[244]. Because of the cost, saffron is frequently adulterated with cheaper substitutes such as marigold flowers and safflower[244]. The flower styles are used as a tea substitute[183]. Root - cooked[183]. The corms are toxic to young animals[218] so this report of edibility should be treated with some caution[K].

tcanta DyeThe yellow dye obtained from the stigmas has been used for many centuries to colour cloth[4, 7, 14, 21]. It is the favoured colouring for the cloth of Indian swamis who have renounced the material world. A blue or green dye is obtained from the petals[168].

dwatta Abortifacient Anodyne Antispasmodic Aphrodisiac Appetizer Carminative Diaphoretic Emmenagogue Expectorant Narcotic Sedative StimulantSaffron is a famous medicinal herb with a long history of effective use, though it is little used at present because cheaper and more effective herbs are available[4, 7, 254]. The flower styles and stigmas are the parts used, but since these are very small and fiddly to harvest they are very expensive and consequently often adulterated by lesser products[7]. The styles and stigmas are anodyne, antispasmodic, aphrodisiac, appetizer, carminative, diaphoretic, emmenagogue, expectorant, sedative and stimulant[4, 7, 21, 174, 176, 218]. They are used as a diaphoretic for children, to treat chronic haemorrhages in the uterus of adults, to induce menstruation, treat period pains and calm indigestion and colic[4, 254]. A dental analgesic is obtained from the stigmas[7]. The styles are harvested in the autumn when the plant is in flower and are dried for later use[4], they do not store well and should be used within 12 months[238]. This remedy should be used with caution[21], large doses can be narcotic[240] and quantities of 10g or more can cause an abortion[218].

nrakta S. Europe - Greece to W. Asia. ksacta Not known in a truly wild location[90].

propta Seed - according to some reports this species is a sterile triploid and so does not produce fertile seed[90, 238]. However, if seed is obtained then it is best sown as soon as it is ripe in a cold frame[1]. Stored seed can be sown in the spring in a cold frame[1]. Germination can take 1 - 6 months at 18°c[164]. Unless the seed has been sown too thickly, do not transplant the seedlings in their first year of growth, but give them regular liquid feeds to make sure they do not become deficient. Divide the small bulbs once the plants have died down, planting 2 - 3 bulbs per 8cm pot. Grow them on for another 2 years in a greenhouse or frame and plant them out into their permanent positions when dormant in late summer[K]. It takes 3 years for plants to flower from seed[244]. Division of the clumps in late summer after the plant has died down[1, 4, 14]. The bulbs can be planted out direct into their permanent positions.

nwatta Prefers a well-drained sandy or loamy soil that is free from clay[137]. Prefers a sunny position[238]. Grows

well on calcareous soils[27] and on hot sheltered stony banks[42]. Plants are very frost hardy[137]. They also thrive in areas with poor summers, though they usually fail to flower in such conditions[238]. Plants produce less saffron when grown on rich soils[137]. They do not flower very freely in Britain[90]. Saffron has been cultivated for over 4,000 years for the edible dye obtained from the flower stigmas[1]. It was at one time commercially grown in Britain and the town Saffron Walden obtained its name because of this. There is at least one named form, 'Cashmirianus' comes from Kashmir and has large high quality corms. It yields about 27 kilos of rich orange stigmas per hectare[183]. When inhaled near to. the flowers have a delicate perfume[245]. Unlike most members of this genus, the flowers do not close of a night time or in dull weather[245]. The flowers are only produced after hot, dry summers[245]. Plants tend to move considerably from their original planting place because of their means of vegetative reproduction, it is therefore wise not to grow different species in close proximity[1]. Any planting out is best done in late spring or early summer[245]. Plants take 4 - 5 years to come into flowering from seed. The plant is heat tolerant in zones 8 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is a corm swelling at the stem base [1-2].

# 6.2.91 Carva cathavensis

Chinese Hickory

5 tlin 9 cyuc 3 kcak 3 tcan 0 dwat 18 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvif hionli

drutta Carya cathayensis is a deciduous Tree growing to 18 m (59ft 1in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[46, 61, 105, 109]. Rich in oil[266]. it has a sweet flavour and is highly esteemed by the Chinese[137]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. An edible oil from the seed is used in cooking[109]. Carbon Farming - Staple Crop: oil.

tcanta Fuel Fuel Oil Wood WoodWood - hard, tough, elastic. Used for tool handles etc[46, 61, 109]. A very good fuel, burning well and giving off a lot of heat.

nrakta E. Asia - E. China. ksacta Narrow moist valleys and the foot of mountains[109]. Forests on mountain slopes, valleys, and riverbanks at elevations of 400 - 1500 metres[266].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, Kl. Seed can also be sown in situ so long as protection

is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Management: Standard Regional Crop Staple Crop: OilPrefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. Dislikes wind exposure[109]. Plants are intolerant of much frost[109]. Another report says that plants succeeds in climatic zone 6, which suggests that they should tolerate temperatures down to about -15 and -20°c[200]. Cultivated for fod in China[266], the edible seed is often sold in local markets in China[137]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. Carbon Farming - Cultivation: regional crop only. Management: standard.

# 6.2.92 Chaerophyllum bulbosum

Turnip-Rooted Chervil

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Chaerophyllum bulbosum is a BIENNIAL growing to 1.2 m (4th). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista One report suggests that the leaves and roots are poisonous[1]. The same report says that this plant is cultivated for its edible root! The root is unlikely to be poisonous[K]

kcakta Edible Parts: Root StemEdible Uses: Root - raw or cooked[2, 33, 34, 37, K]. The raw root is rather tough, but has a nice, aromatic, starchy flavour[K]. When cooked it becomes floury and sweet[27] with a peculiar flavour that is excellent and unlike any other vegetable[183]. Peeling the roots ruins the flavour[183]. The root is about the size of a small carrot[2]. It can be harvested when the foliage dies down, usually in July/August from an autumn sowing, and stored like potatoes for later use[1]. It is best harvested as required[164]. The roots contain about 20% starch and 4% protein[74]. Young stems - raw or cooked[74]. Some caution is advised, see notes at the top of the sheet.

nrakta Europe to W. Asia. ksacta Fallow fields and water meadows from 1000 - 2100 metres in Turkey[93].

propta Seed - best sown in the autumn in situ[33]. The seed has a very short viability[1] or, according to another report, the seed becomes dormant if allowed to dry out and will not germinate for a year[164]. If stored for a spring sowing it should be kept in damp sand in a cold but frost-free place and then sown in situ in March[1]. Another alternative is to sow the seed, in the autumn in a seed tray in a cold frame and then to sow the seed, soil and all, in early April in situ[164].

nwatta An easily grown plant, succeeding in almost any soil[1], though it prefers a moist soil[27]. Tolerates a pH in the range 4.6 to 7. The turnip-rooted chervil is occasionally cultivated for its edible root[46, 61], there is at least one named variety[183]. The sub-species C. bulbosum prescottii (synonym C. prescottii) is used in Russia[74]. The root of this sub-species contains about 17% starch[74].

nwatta Landscape Uses: Specimen. Thrives in a welldrained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants are hardy to about -20°c[184]. A very ornamental plant[11], but it is slow growing[1]. A tree in a very windy position in Cornwall was 2 metres tall in spring 1994 when 4 years old and was flowering heavily[K]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, All or parts of this plant are poisonous, Blooms are

# 6.2.228 Quercus lyrata

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 30 m hkuc

hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus lyrata is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked. The seed is about 25mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed is fairly sweet and does not contain many bitter tannins[159]. It does not require much leaching but any bitterness can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - close-grained, hard, tough, strong, heavy, very durable in contact with the ground[82]. It weighs 51lb per cubic foot. Used for construction, tools, furniture etc[46, 82, 227].

dwatta Astringent DysenteryThe leaves and bark are astringent[46, 61]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Central and South-eastern N. America - New Jersev to Florida, west to Mississippi and Texas. ksacta Bottomlands and wet woods[43], usually on rich soils[82]. Wet, poorly-drained heavy clay soils[227, 229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam

840

which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees are not well suited to the British climate and usually grow poorly here. They fail to properly ripen their wood which results in frost damage overwinter[200]. A slowgrowing but long-lived tree[227], it takes 25 - 30 years before it starts to produce seeds[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Large crops are produced every 3 - 4 years with low production in the intervening years[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

#### 6.2.229 Crataegus aprica

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Crataegus aprica is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A good dessert fruit, it is sweet and rather juicy[82]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 12mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-eastern N. America - Virginia to Tennessee and Georgia. ksacta Dry woods in the foothills of the Appalachians, 450 - 1000 metres[82].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

and female plants must be grown if seed is required. Selfsown seedlings have occasionally been observed growing in bare soil under the parent plant[K]. A good forest garden plant. Some reports suggest it can grow in deep shade. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 6.2.138 Prunus canescens

Greyleaf Cherry

5 tlin 9 cyuc 3 kcak 2 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prunus canescens is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[183]. A pleasant cherry-like flavour[11]. The fruit is about 10mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter see the notes above on toxicity.

tcanta Dye RootstockUsed as a rootstock for cherries. It is compatible with most sweet cherry cultivars and produces small trees with an open growth habit. Suitable for planting at 300 - 500 trees per hectare. The fruit yield tends to be very good[183]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - W. China. ksacta Cliffs[109].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.139 Satureja hortensis

Summer Savory

5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Satureja hortensis is a ANNUAL growing to 0.3 m (1ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked[1, 2, 20, 27, 34, 37, 52]. An aromatic, slightly peppery flavour, they are used mainly as a flavouring for cooked foods, especially the more difficult to digest foods such as beans where they compliment the flavour and reduce flatulence[183, 244]. They are also used as a garnish for salads etc[183]. The leaves can be used fresh or dried[183]. A herb tea is made from the leaves[14]. The leaves are harvested just before the plant comes into flower[183]. A tangy, marjoram-like flavour[183]. The flowering shoots contain about 0.5% essential oil[7], this is used as a food flavouring[46, 61, 105].

tcanta Essential RepellentThe essential oil from the flowering shoots is used extensively in perfumery, giving a particular quality to the fragrance[7]. When grown near beans it repels insect pests[201]. Dynamic accumulator.

dwatta Antirheumatic Antiseptic Aromatic Carminative Digestive Expectorant Stings StomachicSummer savory is most often used as a culinary herb, but it also has marked medicinal benefits, especially upon the whole digestive system[254]. The plant has a milder action than the closely related winter savory, S. montana[254]. The whole herb, and especially the flowering shoots, is antiseptic, aromatic, carminative, digestive, expectorant and stomachic[4, 7, 14] 21]. Taken internally, it is said to be a sovereign remedy for colic and a cure for flatulence[4], whilst it is also used to treat nausea, diarrhoea, bronchial congestion, sore throat and menstrual disorders[238]. It should not be prescribed for pregnant women[238]. A sprig of the plant, rubbed onto bee or wasp stings, brings instant relief[4]. The plant is harvested in the summer when in flower and can be used fresh or dried[238]. The essential oil forms an ingredient in lotions for the scalp in cases of incipient baldness[7]. An ointment made from the plant is used externally to relieve arthritic

nrakta S.E. Europe to W. Asia. ksacta Dry gravelly and stony slopes to 1500 metres[74].

propta Seed - sow April in situ and only just cover[1]. Germinates in about 2 weeks. The plant strongly resents root disturbance so do not transplant it. In areas with mild winters an autumn sowing will provide an earlier supply of leaves[200].

nwatta A very easily grown plant when given suitable conditions, it prefers a rich light soil with plenty of moisture[1, 4, 14, 27] and succeeds in a hot dry sunny position[200]. It prefers growing in an alkaline soil[200] but is not too fussy. It is very intolerant of soils that remain damp and dislikes shade[200]. Summer savory is often grown as a culinary herb. It is a good companion plant in the garden, where it helps to repel insect pests and grows especially well with onions and beans[14, 18, 20]. A fast-growing plant, it can be harvested within 2 months of sowing the seed[244]. If cut back as the flower buds appear, it will produce a fresh flush of leaves[1]. Summer savory seeds can prevent the germination of nearby seeds[201]. The leaves have an aromatic fragrance[245]. The flowers are very attractive to bees[7, 14]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.140 Prunus munsoniana

5 tlin 9 cyuc 3 kcak 2 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis 6.2.141 Vaccinium hirsutum hpa7tmwatli xre7t hjonli

drutta Prunus munsoniana is a deciduous Tree growing to 8 m (26ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[1, 46, 82]. Thin skinned with a juicy aromatic flesh that is often of good dessert quality[183]. It can be eaten out of hand, used in pies, preserves etc or be dried for later use[183]. We do not know how large the fruit is but it contains a seed the shell of which is 15mm x 20mm[200]. Seed raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - hard, heavy. Of little commercial value because of its small size[229].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Central N. America. ksacta Rich soils along the banks of streams, floodplains, pastures, roadsides and edges of woodlands, often forming thickets[229].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel. July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Closely related to Prunus rivularis, and possibly no more than a form of that species[274]. A fast-growing but short-lived species, it can reach flowering and fruiting age within 3 years from seed[229]. It is cultivated for its edible fruit in N. America, where there are some named varieties[1, 46, 61]. It has also been hybridized with other species to produce new fruiting cultivars[82]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. This species suckers freely in the wild, forming quite large thickets[82]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

Hairy Huckleberry

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli dyatxre7t hjonli

drutta Vaccinium hirsutum is a deciduous Shrub. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. A sweet and pleasant taste according to some reports[3, 182], though others say that it is gritty and insipid[200]. The fruit is about 6mm in diameter[200].

nrakta South-eastern N. America - S. Tennessee, N. Carolina and N. Georgia.. ksacta Open woods[72].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Plants are self-sterile, at least two plants from different sources must be grown if seed is required. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. A freely suckering shrub when well-grown in a moist soil[182]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.142 Tilia tuan

moist soil.

5 tlin 9 cvuc 3 kcak 0 tcan 1 dwat 16 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Tilia tuan is a deciduous Tree growing to 16 m (52ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw. The dried flowers make a refreshing herb tea. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta Fibre WoodA fibre is obtained from the inner bark and is used in making sandals and cordage[46, 61, 189]. Wood[46]. No more details.

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and seda-

nrakta E. Asia - China, Japan. ksacta Thickets and woods, 1300 - 2600 metres in W. Hupeh[109].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has dency to cause digestive upsets[4], nor is it addictive[7]. It is taken internally in the treatment of insomnia, anxiety, neuroses, hyperactivity in children, dry coughs, whooping cough, rheumatic pain etc[238]. Concentrations of lactucarium are low in young plants and most concentrated when the plant comes into flower[238]. It is collected commercially by cutting the heads of the plants and scraping the juice into china vessels several times a day until the plant is exhausted[4]. The cultivated lettuce does not contain as much lactucarium as the wild species, most being produced when the plant is in flower[4]. An infusion of the fresh or dried flowering plant can also be used[9]. The plant should be used with caution, and never without the supervision of a skilled practitioner. Even normal doses can cause drowsiness whilst excess causes restlessness[238] and overdoses can cause death through cardiac paralysis[7, 9]. Some physicians believe that any effects of this medicine are caused by the mind of the patient rather than by the medicine[213]. The sap has also been applied externally in the treatment of warts[222]. The seed is anodyne and galactogogue[218]. Lettuce has acguired a folk reputation as an anaphrodisiac, anodyne, carminative, diuretic, emollient, febrifuge, hypoglycaemic, hypnotic, narcotic, parasiticide and sedative[218].

nrakta Of garden origin, it is probably derived from L. serriola. ksacta Not known in the wild.

propta Seed - sow March to June in situ[206]. Seedlings can be transplanted[206]. Seed becomes dormant at temperatures above 27°c[206].

nwatta Prefers a light sandy loam[1]. Succeeds in most well-drained, humus-rich soils but dislikes acid conditions[1, 16]. Prefers some shade in the summer to slow down the plants tendency to go to seed and to prevent the leaves becoming bitter[18, 20]. Plants can resist some frost, they can also tolerate temperatures in excess of 27°c[206]. They are fairly resistant to bolting, though they can run to seed prematurely in very hot conditions[206]. The celtuce is a form of lettuce with a longer and thicker central stem, it is sometimes cultivated for its edible leaves and stems[206]. There are some named varieties [183]. It takes 3-4 months from sowing before the stems are ready to harvest [206]. A surface-rooting plant, the roots can be damaged by hoeing[206]. A good companion for strawberries, carrots, radishes and onions[18,

#### 6.2.226 Arctostaphylos patula

Greenleaf Manzanita

5 tlin 9 cyuc 3 kcak 1 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli fyifxre7t hjonli

drutta Arctostaphylos patula is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from March to May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is selffertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[3, 94, 105, 161]. The fully ripe fruit is pleasantly acid with a flavour resembling green apples[183]. It can be dried, ground into a powder then used in making cakes etc[257]. The fruit can also be used for making jelly and cider[183]. The fruit is about 8 - 10mm in diameter[200]. Seed - ground into a powder and added to soups etc[92]. The seed is very small and would be difficult to separate from the fruit. It would be easier to dry the whole fruit, grind this into a powder and use it in soups etc[K].

tcanta DyeA yellowish-brown dye is obtained from the leaves, it does not require a mordant[168].

dwatta Astringent Poultice VDThe leaves are astringent[94]. They have been used in the treatment of VD[257]. They are also used as a poultice on burns, cuts etc[257].

nrakta South-western N. America. ksacta Open coniferous forests[3, 11].

propta Seed - best sown in a greenhouse as soon as it is ripe. Pre-soak dried seed in boiling water for 10 - 20 seconds or burn some straw on top of them and then stratify at 2 - 5°c for 2 months[11, 200]. The seed usually germinates

in 2 - 3 months at 15°c[134]. When large enough to handle. prick the seedlings out into individual pots and grow them on in a cold frame or greenhouse for at least their first winter. Plant out in late spring or early summer. Cuttings of side shoots of the current season's growth, 5 - 8cm with a heel, August to December in a frame. The cuttings are very slow and can take a year to root[1, 78]. This species is very difficult from cuttings[166]. Division in early spring. Take care because the plant resents root disturbance. Pot the divisions up and keep them in a lightly shaded position in a cold frame or greenhouse until they are growing away actively. Layering in spring[200].

nwatta Requires a deep moist well-drained light or medium lime-free loam in sun or semi-shade[3, 11, 166, 200] but plants produce less fruit when they are grown in the shade[200]. Prefers a soil that is dry in the summer[184]. Plants are not very wind-firm[11]. Plants are hardy to about -10°c[184]. This species was growing well at Chelsea Physic garden after the harsh winter of 1985/86, showing no signs of damage[11]. Highly fire resistant[155], it can regenerate after a forest fire from a mallee-like base[166, 184]. Plants selflayer in nature[155]. A very ornamental plant[1], it grows well in Britain[3]. Plants resent root disturbance and should be placed in their final positions as soon as possible[11, 134].

# 6.2.227 Prunus incisa

Fuji Cherry

5 tlin 7 cyuc 3 kcak 2 tcan 1 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prunus incisa is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[2, 105, 177, 183]. A fairly small fruit, about 8mm in diameter with one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on

tcanta Dve Hedge HedgeA green dve can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Plants can be grown as a hedge[200].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - Japan. ksacta Woods in the mountains of C. Japan[58].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

in the treatment of coughs, stomach ulcers, dysentery, diarrhoea, rheumatism and consumption[257]. The shredded bark has been used to treat blood spitting[257]. A poultice of the chewed bark has been applied to wounds[257]. An infusion of the bark is used as an eyewash[257]. a decoction of the bark is used as a wash on cuts, eczema and other skin problems[257]. An infusion of the bark, combined with wild cherry bark (Prunus sp.) has been used as a cure-all tonic[257]. The juice scraped from the peeled trunk has been used as an eye medicine[257]. The soaked leaves have been chewed in the treatment of lung problems[257].

nrakta Western N. America - Alaska to California. ksacta Moist woods, stream banks, swamps and bogs in deep rich soils[60, 82], usually occurring in dense pure thickets[229].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. A very ornamental plant[1], it is slow-growing in the wild[229]. Hybridizes freely with other members of this genus[200]. The fruit is a good wildlife food source, especially for birds[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.224 Stellaria pubera

Star chickweed

5 tlin 8 cvuc 3 kcak 3 tcan 1 dwat 0.2 m hkuc

pcimhmim cyutli tcup hwicli ilutnyik hpa7tli flatprik hpa7tmwatli hionli

drutta Stellaria pubera is a PERENNIAL growing to 0.2 m (Oft 8in) by 0.2 m (Oft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees, Insects. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The leaves contain saponins[7, 65]. Although toxic, these substances are very poorly absorbed by the body and so tend to pass through without causing harm. They are also broken down by thorough cooking. Saponins are found in many plants, including several that are often used for food. such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. Report of paralysis attributed to excessive intake. Should not be used during pregnancy or during breastfeeding [301].

kcakta Leaves. Lettuce like greens - good [2-1]. Fresh greens - salad, potherb, dried and added to soups. Seeds sprouted and eaten [318-1]. Probably similar qualities to Stellaria media

tcanta A good medium to high density grouncover [1-2]. Soap - Contains saponins [318-1]. Insectory: The flowers of Star Chickweed attract cuckoo bees (Nomada spp.), mason bees (Osmia spp.), Halictid bees (Augochlorella spp., Lasioglossum spp.), Andrenid bees (Andrena spp.), the Giant Bee Fly (Bombylius major), Syrphid flies, and other miscellaneous flies. Butterflies and skippers are rare visitors of the flowers. These insects are attracted primarily to the nectar of the flowers, although some of the bees collect pollen for their larvae and some of the flies feed on pollen as adults. Insects that feed on Stellaria spp., including possibly this chickweed, are the aphid Abstrusomyzus phloxae, the Pale Tortoise Beetle (Cassida flaveola), and caterpillars of a moth, Lobocleta ossularia (Drab Brown Wave) [318-1]. Domestic animal forage: Used to feed chickens [318-1].

dwatta Although no information could be found for this species it is likely to have similar properties to Stellaria media. Stellaria media (Chickweed) has a very long history of herbal use, being particularly beneficial in the external treatment of any kind of itching skin condition[238]. It has been known to soothe severe itchiness even where all other remedies have failed[254]. In excess doses chickweed can cause diarrhoea and vomiting[254]. It should not be used medicinally by pregnant women[254]. The whole plant is astringent, carminative, demulcent, diuretic, expectorant, laxative, refrigerant, vulnerary[4, 7, 9, 21, 54, 165, 222]. Taken internally it is useful in the treatment of chest complaints and in small quantities it also aids digestion[254]. It can be applied as a poultice and will relieve any kind of roseola and is effective wherever there are fragile superficial veins[7]. An infusion of the fresh or dried herb can be added to the bath water and its emollient property will help to reduce inflammation - in rheumatic joints for example - and encourage tissue repair[254]. Chickweed is best harvested between May and July, it can be used fresh or be dried and stored for later use[4, 238]. A decoction of the whole plant is taken internally as a post-partum depurative, emmenagogue, galactogogue and circulatory tonic[218]. It is also believed to relieve constipation and be beneficial in the treatment of kidney complaints[244]. The decoction is also used externally to treat rheumatic pains, wounds and ulcers[4, 218, 222]. The expressed juice of the plant has been used as an eyewash[244].

nrakta Native to the eastern United States. Native distribution is from Illinois east to New York, south to Florida. west to Louisiana, and northeast to Kentucky; also in Nebraska and Minnesota. ksacta High quality woodlands, especially where sandstone is close to the ground surface. Edges of rocky meadows, rocky wooded slopes, wooded bluffs, and the upper slopes of sandstone ravines or rich mesic wood-

nwatta A perennial herbaceous wildflower for Partial or Dappled Shade. Water Preferences: Mesic (environment or habitat containing a moderate amount of moisture). Soil pH preferences: Slightly acid (6.1 - 6.5). Flowers: White/Showy. Bloom Time: Mar to May. Resistances: Humidity tolerant.

# 6.2.225 Lactuca sativa angustana

5 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Lactuca sativa angustana is a AN-NUAL/BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is selffertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The mature plant is mildly toxic[13].

kcakta Edible Parts: Leaves StemEdible Uses: Leaves raw or cooked[33, 183]. A mild, slightly sweet flavour, they are rather more coarse than ordinary lettuce[206], though they make an acceptable ingredient in mixed salads. Old leaves become coarser and bitter[206]. Stem - raw or cooked. Thick, tender, crisp and juicy, its flavour is variously described as being like lettuce, celery, artichoke, squash, asparagus or chard[33, 183]. It is usually peeled before being used[183, 206]. The stems can be harvested just before the plants flower without them turning bitter, though they might become hollow at this stage[206].

tcanta ParasiticideParasiticide[178]. No further details are given, but it is probably the sap of flowering plants that is used. The seed is said to be used to make hair grow on scar tissue[218].

dwatta Anodyne Antispasmodic Emollient Expectorant Parasiticide SedativeThe whole plant is rich in a milky sap that flows freely from any wounds. This hardens and dries when in contact with the air[4]. The sap contains 'lactucarium', which is used in medicine for its anodyne, antispasmodic, digestive, diuretic, hypnotic, narcotic and sedative properties[9, 21, 46, 165, 192, 213, 238]. Lactucarium has the effects of a feeble opium, but without its tennot as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immedi-

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. A good bee plant[125]. Unlike most other members of this genus, this species does not usually become infested with aphis[125]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

# 6.2.143 Crataegus hupehensis

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli hqattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus hupehensis is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 105, 177, 200]. Esteemed in China, the fruit is large but insipid[61]. The fruit is up to 2.5cm in diameter[200, 266]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta E. Asia - W. China. ksacta Thickets on slopes at elevations of 500 - 2000 metres in Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, Sichuan and Zhejiang Provinces[266].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Cultivated for its edible fruit in China[46, 61,

# 6.2.144 Tilia japonica

Japanese Lime

5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 20 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Tilia japonica is a deciduous Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: TeaYoung leaves - raw or cooked[105, 177]. Flowers - parboiled to remove the bitterness and used as greens or added to soups[183]. A tea is made from the flowers[177, 183]. Fruit[105, 183]. No further details are given. This report possibly refers to the fact that the seed and flowers of some species can be made into a chocolate substitute. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta Fibre WoodA fibre is obtained from the inner bark and used for sandals, cordage etc[46, 61, 189]. Wood - light, soft. Used for boxes, barrels etc[46, 61].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226]

nrakta E. Asia - China, Japan. ksacta Mountains all over

Japan[58].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months

at high temperatures ( $10^{\circ}c$  at night, up to  $30^{\circ}c$  by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1-3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. The leaves appear early in the spring and are not troubled by frosts. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Cultivated for its wood in Japan[125]. A very good bee plant[125]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.145 Vaccinium arctostaphylos

Caucasian Whortleberry

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium arctostaphylos is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is poliniated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[177]. The fruit is juicy with a slightly acid flavour, it makes an acceptable fruit to nibble on, though it is nothing special[K]. The fruit is usually produced abundantly when the plant is well sited[K]. The pear-shaped fruit is small, about 8 - 10mm in size[183]. The leaves are a tea substitute[183].

nrakta Europe - E. Mediterranean to W. Asia. ksacta Mountain slopes, fir/spruce or fir/beech woods, rhododendron thickets, occasionally in oak forests and near the timber line in stands of birch and occasionally of pine[74].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present[11, 200]. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. A plant growing in fairly heavy woodland shade at Westonbirt Arboretum in Gloucester was fruiting very heavily in September 1996, and we have seen several other plants fruiting well in dappled shade[K]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until

being planted out in their permanent positions[200]. Closely related to V. padifolium[182], differing mainly in that species usually being evergreen[11]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.146 Smyrnium olusatrum

Alexanders

5 tlin 9 cyuc 3 kcak 2 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Smyrnium olusatrum is a BIENNIAL growing to 1.2 m (4ft) by 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves Root StemEdible Uses: CondimentLeaves and young shoots - raw in salads or cooked in soups, stews etc[2, 5, 8, 12, 27, 37, 115, 183]. The plant comes into growth in the autumn and the leaves are often available throughout the winter[5, 52]. They have a rather strong celery-like flavour and are often blanched (by excluding light from the growing plant) before use[183]. Leafy seedlings can be used as a parsley substitute[183]. Stem - raw or cooked[2, 5, 8, 12, 27, 37, 53, 115]. It tastes somewhat like celery, but is more pungent[17, 244]. The stem is often blanched (by excluding light from the growing plant) before use[183]. Flower buds - raw[12, 52]. Added to salads, they have a celery-like flavour [K]. The spicy seeds are used as a pepper substitute[52, 183]. Root - cooked. Boiled and used in soups, its flavour is somewhat like celery. The root is said to be more tender if it has been kept in a cool place all winter[183].

tcanta A good wildlife plant. Scented. A good plant for food forests/forest gardens.

dwatta Bitter DigestiveThe whole plant is bitter and digestive. It has been used in the past in the treatment of asthma, menstrual problems and wounds, but is generally considered to be obsolete as a medicinal plant[238].

nrakta Europe to Asia. Naturalized in Britain[17]. ks-acta Hedges and waste places, often near the sea[17].

propta Seed - best sown in an outdoor seedbed in autumn and planted into its permanent position in late spring[1, 200]. Germination can be slow[200]. The seed can also be sown in situ in spring.

nwatta Succeeds in most soils but prefers an open sunny position in a well-drained moisture retentive soil[200]. Hardy to about -15°c[200]. At one time this plant was extensively grown for its edible leaves and stems but it has now fallen into virtual disuse, having been replaced by celery[1, 2, 27, 37, 61, 183]. The seeds are highly aromatic with a myrrhlike scent[245]. A good bee plant. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

#### 6.2.147 Carya pallida

Sand Hickory

5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 30 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carya pallida is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium

refreshing taste of spearmint, leaving the mouth and digestive system feeling clean[K]. An essential oil from the leaves and flowers is used as a flavouring in sweets, ice cream, drinks etcl[238].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Febrifuge StomachicRed raripila mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Northern and Central Europe. ksacta Not known propta Seed - this hybrid is usually sterile, and even if seed is produced it will not breed true[200]. If you do obtain seed, then it can be sown in spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade[4]. Prefers partial shade and a slightly acid soil[4, 16]. This species is a hybrid involving M. aquatica x M. arvensis x M. spicata[200]. It has sweetly mint-scented leaves with similar culinary uses to M. spicata. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The flowers are very attractive to bees and butterflies [24]. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests[14, 20]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.222 Actinidia coriacea

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia coriacea is an evergreen Climber growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 183]. Small but very juicy and full of seeds[182]. The fruit is up to 2cm long[198]. It contains a number of small seeds, but these are easily eaten with the fruit[K].

nrakta E. Asia - W. China in Sichuan and Baoxing provinces. ksacta Hedges and woods[126]. Thickets, 200 - 1000 metres from Kweichow and Szechuan to N.W. Yunnan[198]

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. A fairly hardy plant, succeeding in many parts of the country[1], but young spring growth is susceptible to frost damage[160]. Plants are semi-evergreen in mild winters[219]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. The flowers are softly scented[245]. This is a climbing plant, supporting itself by twining around branches etc[200]. Plants are often erroneously labelled A. henryi in British nurseries[219]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if fruit and seed is required.

# 6.2.223 Malus fusca

Oregon Crab, Oregon crab apple 5 tin 9 cyuc 3 kcak 0 tcan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus fusca is a deciduous Tree growing to 12 m (3Pt 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for atracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Pectin Pectin-Fruit - raw or cooked[11, 101]. Up to 2cm in diameter[229]. An agreeable sub-acid taste, it can be eaten out of hand or made into jellies, preserves etc[183]. The fruit can be left on the tree until there have been some autumn frosts, this will soften the fruit and make it somewhat less acid[K]. The fruit is rich in pectin so it can be added to pectin-low fruits when making jams or jellies[183, 257]. Pectin is also said to protect the body against radiation[201].

tcanta Pectin Pectin WoodThe fruit is a source of pectin[183]. Wood - hard, close grained, durable. Used for mallets, tool handles and bearings[11, 82, 99, 101, 226].

dwatta Antirheumatic Astringent Diuretic Dysentery Eczema Laxative Ophthalmic Pectoral Skin Stomachic TB TonicOregon crab was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. In particular, it gained a reputation with some tribes as a heal-all, especially useful for treating any of the internal organs[257]. It is little, if at all, used in modern herbalism. The trunk, bark and inner bark are antirheumatic, astringent, blood purifier, cardiac, diuretic, laxative and tonic[257]. A decoction has been used

and seasoned, pickled and used in winter soups or preserved in miso[183]. They can be boiled, dipped in cold water then peeled and baked - they have a pleasant fragrant taste[206]. Flower buds cooked or used as a flavouring[1, 22, 46, 61, 105]. A slightly bitter yet agreeable flavour[116, 206], they are much prized in Japan[183]. They can be eaten whilst still green with miso or boiled down in soy sauce[183]. The young flowering stems can be eaten cooked[206].

tcanta MiscellanyThe leaves of the sub-species P. japonicus giganteus are used as umbrellas by Japanese children[187]. The leaf stalks can be used as walking sticks[206]. Plants can be grown as ground cover in damp shady places[206]. They are too invasive for most gardens and should only be used where they have plenty of room[208].

dwatfa Antiasthmatic Antispasmodic Expectorant Miscellany PoulticeThe plant (though the exact part of the plant used is not specified) is antiasthmatic, antispasmodic, expectorant and poultice[147]. A decoction is used in the treatment of chronic coughing and pulmonary 'deficiency', laboured or difficult breathing and asthma, constant sputum formation and pulmonary tuberculosis[147].

nrakta E. Asia - China, Japan, Korea. Naturalized in Britain, ksacta Moist woods and thickets[58].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Container, Ground cover, Massing, Woodland garden. Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Requires a moist shady position[187]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Its roots are very difficult to eradicate[200]. The sub-species P. japonicus giganteus has huge leaves up to 1.5 metres across on stems 2 metres tall[187]. It has a poorer flavour than the species type[206]. Sometimes cultivated in E. Asia as a food plant[1, 58]. Dioecious, male and female plants must be grown if seed is required. Special Features: Attractive foliage. Not North American native, Invasive, Wetlands plant, Flower characteristics are unknown. Petasites japonicus giganteus (Petasites japonicus subsp. giganteus F.Schmidt ex Kitam) is a larger version of Petasites japonicus commonly know as giant fuki. It can grow in similar hardiness zones to fuki but can grow in wetter conditions and tolerate more sun. It can grow to 5 ft (1.5m). The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

# 6.2.220 Pleioblastus simonii

Medake, Simon bamboo 5 tlin 9 cyuc 3 kcak 4 tcan 0 dwat 4.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pleioblastus simonii is an evergreen Bamboo growing to 4.5 m (14ft 9in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all

year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Seed Shoots StemEdible Uses: Young shoots - cooked[25, 61, 105]. They have a very bitter flavour, this bitterness is considerably reduced by changing the water at least once during the cooking process - though this will also remove quite a few of the nutrients[K]. The new shoots are about 20mm in diameter[K]. Seed cooked. As a grass seed the paper husk must be removed before eating.

tcanta Hedge Hedge Plant support WoodCanes are thin walled but extremely strong, they can be used as plant supports, also for fencing etc[25, 61, 74, 195]. Often used in China for making fan handles, poles and in various handicrafts[195]. Tolerant of maritime exposure and very hardy and vigorous, this plant makes a good screen or hedge[25, 166, 195].

nrakta E. Asia - China, Japan. Locally naturalized in Britain[50]. ksacta Not known

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°c. Stored seed should be sown as soon as it is received. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 -6 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse or cold frame until they are large enough to plant out, which could be a number of years. The plants only flower at intervals of several years and so seed is rarely available. Division in spring as new growth commences. Very easy, single canes can be used. Pot them up in light shade in a greenhouse. Make sure the foliage is not allowed to dry out - misting 2 - 3 times a day for the first couple of weeks following divsion can be very helpful. Plant out in the summer once they are growing away strongly.

nwatta A very easily grown bamboo, it succeeds in most soils but prefers a good loamy soil in sun or semi-shade[1]. Dislikes drought[1]. Tolerates maritime exposure[166]. A very hardy plant, it can tolerate temperatures down to between -20 and -25°c. The rootstock is running and very inxaive[11, 25, 166]. Another report says that it is a vigorous grower but not invasive[195]. New shoots are produced from May[25]. The canes are harvested commercially for their many uses in Japan[195]. It is the third most commonly cultivated species in Japan[195]. This species is notably resistant to honey fungus[200]. Unlike many bamboos, this plant quite often flowers and sets viable seed, the plants do not usually die as a result of this[122]. However, if they are fed with artificial NPK fertilizers at this time they are far less likely to survive[122]

#### 6.2.221 Mentha x smithiana

Red Raripila Mint

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha x smithiana is a PERENNIAL growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil. can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods. The sweetly scented leaves can be used in the same ways as spearmint[238]. A good culinary mint, the leaves have an attractive red tinge[244]. A herb tea is made from the fresh or dired leaves[238]. It has a very pleasant and

(loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105, 177]. Rather thin-shelled, the seed is small and sweet[82, 235]. The seed is up to 3cm long[229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel WoodWood - heavy, hard, tough. Used for tool handles etc[82]. A good fuel, burning well and giving off a good heat[229].

dwatta Astringent DetergentThe inner bark is astringent and detergent[257]. It has been used as a dressing for cuts and has been chewed to treat sore mouths[257].

nrakta Eastern N. America - Oklahoma to Texas. ksacta Dry sandy or gravelly soils in woods[82, 137, 229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have guite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

# 6.2.148 Galium odoratum

Sweet Woodruff, Sweetscented bedstraw, Bedstraw 5 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 0.2 m hkuc pcimhmim cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Galium odoratum is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers LeavesEdible Uses: Condiment Drink TeaLeaves - raw or cooked[62]. The leaves are coumarin-scented (like freshly mown hay), they are used as a flavouring in cooling drinks[2, 9, 27] and are also added to fruit salads etc[183, 200]. The leaves are soaked in white wine to make 'Maitrank', an aromatic tonic drink that is made in Alsace[238]. A fragrant and delicious tea is made from the green-dried leaves and flowers[2, 183, 268]. Slightly wilted leaves are used, the tea has a fresh, grassy flavour[200]. The sweet-scented flowers are eaten or used as a garnish[183].

tcanta Dye Pot-pourri Repellent StrewingA red dye is obtained from the root[168]. Soft-tan and grey-green dyes are obtained from the stems and leaves[168]. A good ground-cover plant for growing on woodland edges or in the cool shade of shrubs[24, 200]. It spreads rapidly at the roots[28, 197, 208]. It is an ideal carpeting plant for bulbs to grow through[K]. Although the fresh plant has very little aroma, as it dries it becomes very aromatic with the scent of newly-mown grass and then retains this aroma for years[2, 200]. It is used in the linen cupboard to protect from moths etc.[4, 14] It was also formerly used as a strewing herb and is an ingredient of pot-pourri[238]. It was also hung up in bunches in the home in order to keep the rooms cool and fragrant during the summertime[245].

dwatta Antispasmodic Cardiac Diaphoretic Diuretic Homeopathy SedativeSweet woodruff was widely used in herbal medicine during the Middle Ages, gaining a reputation as an external application to wounds and cuts and also taken internally in the treatment of digestive and liver problems[4]. In current day herbalism it is valued mainly for its tonic, diuretic and anti-inflammatory affect[254]. The leaves are antispasmodic, cardiac, diaphoretic, diuretic, sedative[9, 13, 21, 200]. An infusion is used in the treatment of insomnia and nervous tension, varicose veins, biliary obstruction, hepatitis and jaundice[9, 238]. The plant is harvested just before or as it comes into flower and can be dried for later use[9]. One report says that it should be used with caution[21] whilst another says that it is entirely safe[9]. Excessive doses can produce dizziness and symptoms of poisoning[268]. The dried plant contains coumarins and these act to prevent the clotting of blood - though in excessive doses it can cause internal bleeding[254]. The plant is grown commercially as a source of coumarin, used to make an anticoagulant drug[268]. Do not use this remedy if you are taking conventional medicine for circulatory problems or if you are pregnant[254]. Both Asperuloside (a terpenoid) and Coumarin (a benzopyrone) occur in some species of Galium. Asperuloside can be converted into prostaglandins (hormone-like compounds that stimulate the uterus and affect blood vessels), making the genus of great interest to the pharmaceutical industry[238]. A homeopathic remedy made from the plant is used in the treatment of inflammation of the uterus[238].

nrakta Northern and central Europe, including Britain, south and east to N. Africa and Siberia. ksacta Woodland and shady areas[4, 14] on damp calcareous and base rich soils[17]. Often found in beech woods[268].

propta Seed - best sown in situ as soon as it is ripe in late summer[200]. The seed can also be sown in spring though it may be very slow to germinate[200]. A period of cold stratification helps reduce the germination time. Lots of leafmold in the soil and the shade of trees also improves germination rates. Division in spring. The plant can also be successfully divided throughout the growing season if the divisions are kept moist until they are established[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings of soft wood, after flowering, in a frame.

nwatta Landscape Uses:Ground cover, Massing, Rock garden, Woodland garden. Prefers a loose moist leafy soil in some shade[200]. Tolerates dry soils but the leaves quickly become scorched when growing in full sun[200]. This species does not thrive in a hot climate[200]. Prefers a moist calcareous soil[9, 13, 14]. Dislikes very acid soils[187]. Tolerates a pH in the range 4.3 to 8.3. This species is very tolerant of atmospheric pollution and grows well in towns[208]. A very cold-hardy plant, tolerating temperatures down to about -25°c[187]. Sweet woodruff is occasionally cultivated in the herb garden for its medicinal and other uses. The dried foliage has the sweet scent of newly mown hay[245]. A very ornamental plant[1] but it spreads rapidly[28] and can be invasive[200]. However, this is rarely to the detriment of other plants since these are normally able to grow through it[200]. It does no harm to any plants more than 60cm tall[208]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Suitable for dried flowers, Fragrant flowers. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant

Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

# 6.2.149 Gaultheria pyroloides

5tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Gaultheria pyroloides is an evergreen Shrub growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 11, 183]. A sweet flavour. The fruit is about 10mm in diameter[200].

nrakta E. Asia - Japan. ksacta Coniferous woods and subalpine thickets[58].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division can be carried out at almost any time of the year, but works best in the spring just before new growth begins[K]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

in shade or semi-shade[11, 182]. A peat and moisture loving species, it requires a lime-free soil[11, 182]. An easily grown plant, it succeeds in most situations[182]. This species is often confused with G. pyroloides[11] and G. pyroliides[182]. It was mistakenly originally included in G. pyroloides though it is in fact quite distinct and is closely related to G. cuneata[11, 182]. Further evidence has shown that the original description of Gaultheria pyroloides refers to the Japanese species, whilst Gaultheria pyroliifolia is a distinct Himalayan species[266]. Gaultheria miqueliana is thus a synonym of G. pyroloides[266]. A very ornamental plant[11]. The flowers are scented[245]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.150 Barbarea vulgaris

Yellow Rocket, Garden yellowrocket 5 tlin 9 cyuc 3 koak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli drutta Barbarea vulgaris is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a report that ingestion of the leaves can lead to kidney malfunction[222].

kcakta Édible Parts: Flowers LeavesEdible Uses: Young leaves - raw or cooked like spinach[2, 9, 27, 46, 52, 95]. A hot cress-like flavour[183]. Young leaves are chopped up finely and added to salads, older leaves can be used as a potherb but they are rather strong and are best cooked in one or two changes of water[183]. The leaves are available all year round, even in the winter, especially if the weather is mild[95, 115]. To increase the productivity of the plants, remove the flowering stems as they appear (they can be eaten like the leaves[K]) and pick the outer leaves as the plant regrows[244]. Some caution is advised, see the notes above on toxicity. Young flowering stems - harvested before the flowers open and cooked like broccoli[183].

dwatta Antiscorbutic Appetizer Diuretic VulneraryThe leaves are vulnerary and have been used as a poultice for treating wounds[207, 240]. A tea made from the leaves is appetizer, antiscorbutic and diuretic[222].

nrakta Most of Europe, including Britain, south and east to N. Africa and Asia. ksacta Moist places, roadsides, stream banks and hedges[9].

propta Seed - sow spring or autumn in situ. Germination usually takes place within 2 - 3 weeks. Division in spring. his plant is a short-lived perennial, and also usually self-sows freely, so we have not found division to be worthwhile.

nwatta Succeeds in sun or shade in a moist well-drained soil[1, 111]. Tolerates a pH in the range 4.8 to 7.5. The plant can continue to grow all winter, especially if the weather is mild[183]. A short-lived perennial[1], though plants usually self-sow freely when in a suitable position[K]. There is at least one named form, developed for its ornamental value. 'Variegata' has variegated leaves and grows less strongly than the type[183]. A good bee plant[108].

#### 6.2.151 Staphylea pinnata

Bladder Nut

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 4.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Staphylea pinnata is a deciduous Shrub growing to  $4.5 \,\mathrm{m}$  ( $14\mathrm{ft}$ ) by  $4.5 \,\mathrm{m}$  ( $14\mathrm{ft}$ ). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is polinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw[2, 105, 177]. Said to taste like pistachios, the seeds are eaten by children in Germany[183].

nrakta Europe. Naturalized in Britain[17]. ksacta Hedgerows and copses[11, 17].

propta Seed - this can be very slow to germinate, sometimes taking 18 months or more. It is best sown as soon as it is ripe in a cold frame[200], and some of it at least should then germinate in the spring. Stored seed should be sown as early in the year as possible and given cold stratification - it might not germinate until spring of the following year. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first winter. Plant them out early the following summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Fair to good percentage[78]. Layering in July/August. Takes 15 months. Good percentage[78]. Plants sometimes produce suckers, these can be removed in the dormant season and planted out.

and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded frame[113].

nwatta Industrial Crop: Medicinal Management: Coppice Regional CropLandscape Uses:Espalier, Firewood, Hedge, Screen, Standard, Superior hedge, Specimen. A very easy plant to grow, it is extremely tolerant of cold and heat, sunny and shady positions, wet and dry soils, exposure and any pH[200]. Thrives in almost any soil, acid or alkaline, as long as it is well-drained[1, 11, 200]. Grows well in heavy clay soils. Sensitive to soil compaction by roads etc[186, 200]. Very shade tolerant[17, 81]. Tolerates urban pollution[200]. In general they are very tolerant of exposure, though plants are damaged by severe maritime exposure[K]. A very cold hardy plant when dormant, tolerating temperatures down to about -25°c[200]. The fresh young shoots in spring, however, can be damaged by frosts[186, K]. Plants are dioecious, though they sometimes change sex and monoecious trees are sometimes found[81, 186]. Male and female trees must be grown if fruit and seed is required[K]. The fruit is produced mainly on the undersides of one-year old branches[200]. A very long lived tree[1, 7, 11, 185], one report suggests that a tree in Perthshire is 1500 years old, making it the oldest plant in Britain. Another report says that trees can be up to 4000 years old[11]. It is, however, slow growing and usually takes about 20 years to reach a height of 4.5 metres[186]. Young plants occasionally grow 30cm in a year but this soon tails off and virtually no height increase is made after 100 years[185]. A very ornamental tree, there are many named varieties[200]. Very resistant to honey fungus[8, 88, 200], but susceptible to phytopthera root rot[81, 88]. The bark is very soft and branches or even the whole tree can be killed if the bark is removed by constant friction such as by children climbing the tree[186]. Plants produce very little fibrous root and should be planted in their final positions when still small[200]. The fruit is greatly relished by thrushes[186]. Special Features: Not North American native, All or parts of this plant are poisonous, Inconspicuous flowers or blooms.

#### 6.2.217 Ribes altissimum

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes altissimum is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Small with a thick skin and a pleasant acid daste[74]. The fruit is abundantly produced in the wild[74]. The purplish-black fruit is about 7mm in diameter[266].

nrakta E. Asia - N. China, Mongolia, Siberia. ksacta Taluses composed of large stones in the forest zone, often into the bald mountain zone[74]. Coniferous or mixed forests and forest margins on mountain slopes below 2000 metres in N. China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 0 - 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 2001.

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Does well in shade though does not fruit so well in such a position[11]. Hardy to about -20°c[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. This plant is possibuted useful as part of a breeding programme for red currants[74].

#### 6.2.218 Claytonia caroliniana

Broad-Leaved Spring Beauty, Carolina springbeauty 5 tlin 9 cyuc 3 kcak 1 tcan 0 dwat 0.1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flat hpa7tmwatli xre7t

drutta Claytonia caroliniana is a PERENNIAL growing to 0.1 m (0ft 4m). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in March, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root-raw or cooked like potatoes[2, 22, 46, 62, 85, 183, 257]. Rich in starch, it has a pleasant nutty flavour[105, K]. Leaves and stems-raw or cooked[62]. A very mild flavour, they are best mixed with stronger tasting leaves[183].

nrakta Eastern N. America - Nova Scotia to Saskatchewan, south to North Carolina, Ohio and Missouri. ksacta Rich open woods, alluvial thickets and upland slopes[43]. Wetlands and riparian hardwood forests from sea level to 1400 metres[270].

propta Seed - surface sow on a peat based compost in spring in a cold frame. Germination usually takes place within  $2 \cdot 4$  weeks at  $10^{\circ} c[164]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out in late spring or early summer after the last expected frosts. Division of offsets in spring or autumn.

nwatta Prefers a damp peaty soil and a position in full sun[1, 164]. Requires a lime-free soil[164]. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Ephemeral emerging in spring and dying back by summer every year [1-2]. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is a corm swelling at the stem base [1-2].

#### 6.2.219 Petasites japonicus

Sweet Coltsfoot, Japanese sweet coltsfoot, Butterbur 5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 0.6 m hkuc pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Petasites japonicus is a PERENNIAL growing to 0.6 m (2ft) by 1.5 m (5ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in February, and the seeds ripen in March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) on o shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers StemEdible Uses: Leaf stalks - cooked and used like rhubarb[1, 2, 46, 116]. The stems can be up to 1.2 metres long[104]. They can be boiled

of the year and are dried for later use[238].

nrakta South-western N. America - Arizna, California, Nevada, Oregon and Utah. ksacta Dry, rocky slopes and hills, rarely in sandy flat areas, at elevtions of 700 - 1900 metres[270].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[200]. It can also be sown in spring in a greenhouse in a sandy compost[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse. Plant out in the spring or early summer after the last expected frosts and give some protection in their first winter[K]. Division in spring or autumn[238]. Layering.

nwatta Requires a well-drained loamy soil and a sunny position[1, 11]. Established plants are drought resistant and are also lime tolerant[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 6.2.215 Rubus kuntzeanus

5 tlin 9 cyuc 3 kcak 1 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rubus kuntzeanus is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. A good flavour[11, 177]. The orange-red fruit is about 20mm in diameter[200].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]

nrakta E. Asia - W. and C. China. ksacta Slopes, roadsides and thickets at elevations of 800 - 2000 metres[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Division in early spring or just before leaf-fall in the autumn[200]

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Closely related to R. innominatus[11, 105]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. The stems have very few prickles[200]. Plants in this genus are notably susceptible to honey funmis[200].

#### 6.2.216 Taxus baccata

Yew, English yew, Common Yew 5 tlin 7 cyuc 3 kcak 4 tcan 4 dwat 15 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hrasilutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Taxus baccata is an evergreen Tree growing to 15 m (49ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from March to April, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry

if a tea is made[K]. The stems can be harvested at any time or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous, having a paralyzing affect on the heart[1, 4, 7, 10, 19, 65]. Poisoning symptoms are dry mouth, vomiting, vertigo, abdominal pain, dyspnoea, arrhythmias, hypotension and unconsciousness.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw[1. 2, 65, 81, 1581. Very sweet and gelatinous, most people find it delicious though some find it sickly[K]. A number of people who like the flavour do not like the texture which is often described as being 'snotty'[K]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm (UPDATE: this is probably not true: unfortunately, the digestive system of most mammals, including humans, is robust enough to break down the seeds. This will release the toxic taxanes. Birds are able to eat the whole "berry" because they cannot digest the seeds). If it is bitten into, however, you will notice a very bitter flavour and the seed should immediately be spat out or it could cause some problems. The fruit is a fleshy berry about 10mm in diameter and containing a single seed[200]. Some reports suggest using the bark as a tea substitute[158, 183], this would probably be very unwise.

tcanta Fuel Hedge Hedge Incense Insecticide WoodVery tolerant of trimming, this plant makes an excellent hedge[1]. 11, 29]. The plants are often used in topiary and even when fairly old, the trees can be cut back into old wood and will resprout[200]. One report says that trees up to 1000 years old respond well to trimming[200]. A decoction of the leaves is used as an insecticide[46, 61]. Some cultivars can be grown as a ground cover when planted about 1 metre or more apart each way[208]. 'Repandens' has been recommended[208]. Wood - heavy, hard, durable, elastic, takes a good polish but requires long seasoning. Highly esteemed by cabinet makers, it is also used for bows, tool handles etc[4, 7, 11, 46, 61, 66, 146]. It makes a good firewood[6]. The wood is burnt as an incense[146].

dwatta Anticonvulsant Antispasmodic Cancer Cardiotonic Diaphoretic Emmenagogue Epilepsy Expectorant Homeopathy Narcotic Purgative The vew tree is a highly toxic plant that has occasionally been used medicinally, mainly in the treatment of chest complaints. Modern research has shown that the plants contain the substance 'taxol' in their shoots. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[238]. Unfortunately, the concentrations of taxol in this species are too low to be of much value commercially, though it is being used for research purposes[238]. This remedy should be used with great caution and only under the supervision of a qualified practitioner[21]. See also the notes above on toxicity. All parts of the plant, except the fleshy fruit, are antispasmodic, cardiotonic, diaphoretic, emmenagogue, expectorant, narcotic and purgative[7, 21]. The leaves have been used internally in the treatment of asthma, bronchitis, hiccup, indigestion, rheumatism and epilepsy[240, 257]. Externally, the leaves have been used in a steam bath as a treatment for rheumatism[257]. A homeopathic remedy is made from the young shoots and the berries[4]. It is used in the treatment of many diseases including cystitis, eruptions, headaches, heart and kidney problems, rheumatism etc[4]. Ingestion of 50-100g of needles can cause death.

nrakta Europe, incl Britain, from Scandanavia south and east to N. Africa, the Caucasus, Iran, Himalayas. ksacta Woods and scrub, usually on limestone. It sometimes forms pure stands in sheltered sites on chalk in the south-east and on limestone in the north-west[17].

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing

nwatta Tolerant of a wide range of soils so long as they are not too dry[11, 182, 200], it prefers a rich loamy soil in full sun or semi-shade[200]. Prefers a neutral to acid soil but tolerates some alkalinity[202]. A very ornamental plant[1], it is hardy to about -20°c[184]. The plants flower best in years that follow hot summers[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.152 Vaccinium formosum

Swamp Highbush Blueberry, Southern blueberry 5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Vaccinium formosum is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 142]. Well-flavoured[200]. A reasonable size, 7 - 12mm in diameter[200].

nrakta Eastern N. America - New Jersey to Florida and Alabama. ksacta Not known

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame [78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Often cultivated for its edible fruit[142], there are many named varieties[1]. Spreading by means of suckers, plants often form small colonies[200] Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

# 6.2.153 Hydrangea serrata thunbergii

Tea of heaven, Ama-tsja, 5 tlin 9 cyuc 3 kcak 2 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hydrangea serrata thunbergii is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: SweetenerThe young leaves, after fermentation[174], become very sweet and are used to make a sweet tea called 'tea of heaven', it is used in Buddhist ceremonies[11, 46, 61]]. The leaves contain phellodulcin (its chemical formula is C16 H14 O), a very sweet substance that can be used as a sugar substitute[116. 183]. The older leaves can be dried, powdered and used as a flavouring on foods[105, 177]. The young leaves and shoots are also eaten cooked[105, 177].

tcanta Hedge HedgeCan be grown as a low hedge[29], it is quite wind tolerant.

nrakta E. Asia - Japan. ksacta Montane woodlands and by mountain streams all over Japan[11, 174].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Tolerates most soil[200], thriving in a welldrained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Plants are hardy to about -25°c when dormant but the young growth in spring can be killed by late frosts. This species is notably susceptible to honey fungus[200].

### 6.2.154 Claytonia virginica

Spring Beauty, Virginia springbeauty, Hammond's claytonia Yellow Virginia springbeauty

5 tlin 7 cyuc 3 kcak 0 tcan 1 dwat 0.2 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flat hpa7tmwatli xre7t hjonli

drutta Claytonia virginica is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to April, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[2, 55, 62, 85, 257]. Rich in starch, it has a pleasant nutty flavour[105, 183]. A radish-like flavour when raw[159], it tastes like a cross between a potato and a chestnut when cooked[183]. The root is rich in vitamins A and C[159]. The globose tuber is up to 20cm in diameter[270]. Leaves and flowering stems - raw or cooked[62]. Added to salads or used as greens[183]. The leaves are often available in the winter.

dwatta Antispasmodic ContraceptiveA cold infusion or decoction of the powdered roots has been given to children with convulsions [257]. It has been said that eating the raw plants can permanently prevent conception[257].

nrakta Eastern N. America - Quebec to Texas. A garden escape, locally naturalized in Britain[17], ksacta Rich woods. thickets and clearings[43]. Wetlands, seeps, moist woods, riparian hardwood forests, copses, bluffs, ravines and prairies from sea level to 1000 metres[270].

propta Seed - surface sow on a peat based compost in spring in a cold frame. Germination usually takes place within 2 - 4 weeks at 10°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out in late spring or early summer after the last expected frosts. Division of offsets in spring or autumn.

nwatta Landscape Uses: Rock garden, Woodland garden. Prefers a damp peaty soil and a position in full sun[1, 164]. Another report says that it requires some shade[188]. Reguires a lime-free soil[164]. Special Features: North American native, Naturalizing, Wetlands plant. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. Ephemeral emerging in spring and dying back by summer every year [1-2]. The root pattern is a corm swelling at the stem base [1-2].

# 6.2.155 Mentha x gracilis

Ginger Mint.

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

wis hpa7tmwatli xre7t hionli

drutta Mentha x gracilis is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. They are used as a flavouring in salads or cooked foods[61, 105]. A refreshing odour and taste[183], they are said to go particularly well with melon. tomatoes and fruit salads[238]. The slight ginger scent make them an interesting addition to fresh salads[244]. A herb tea is made from the leaves. An essential oil from the leaves is used as a spearmint flavouring, it is especially used in N. America in chewing gums[183, 238].

tcanta Essential Repellent StrewingThe essential oil obtained from the leaves has a spearmint flavour and is used commercially in N. America[238]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative FebrifugeGinger mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta A hybrid, M. arvensis x M. spicata, ksacta Not known in a truly wild situation.

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K] Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. This species is somewhat less easy in cultivation than most other mints. It can be lost

over winter if the weather is very cold or wet so ensure that it is grown in a warm, well-drained sunny position[K]. A sterile hybrid, the result of a cross between M. arvensis and M. spicata, though it can back-cross with its parents. There are some named varieties[183], most of which have variegated leaves. A polymorphic species [200]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. The whole plant has a strong minty aroma with a hint of ginger[245]. The flowers are very attractive to bees and butterflies. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.156 Osmorhiza claytonii

Woolly Sweet-Cicely, Clayton's sweetroot 5 tlin 9 cyuc 3 kcak 1 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Osmorhiza claytonii is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentRoot - cooked and eaten as a vegetable[46, 105, 1831. Used for putting on weight[61, 161]. Leaf stalks cooked and used as a vegetable [183]. The aromatic roots and unripe seeds are used as anise-like flavourings[183]. Pleasant to chew[207].

tcanta Scented

dwatta Ophthalmic PoulticeThe root has been chewed or gargled as a treatment for sore throats[222, 257]. A poultice of the moistened pulverized roots has been applied to boils, cuts, sores etc whilst a tea made from the roots has been used to bathe sore eyes[222, 257].

nrakta Eastern N. America - Nova Scotia to South Dakota, North Carolina, Illinois, Nebraska and Kansas. ksacta Woods and wooded slopes[43].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise sow it in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in any deep moisture-retentive soil in sun or dappled shade[200]. Plants are hardy to about -20°c[200]. Well suited to naturalistic plantings in a woodland or wild garden[200]. A sweetly aromatic plant[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is fleshy. Thick or swollen - fibrous or tap root [1-2].

#### 6.2.157 Rhus puniabensis sinica

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 12 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus punjabensis sinica is a deciduous Tree growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Cultivated in China for its edible fruit, it is sold in the local markets[46, 61]. This report might be a mistake, probably applying instead to C. pinnatifida[K] Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 6.2.213 Rheum australe

Himalayan Rhubarb

5 tlin 9 cyuc 3 kcak 2 tcan 3 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum australe is a PERENNIAL growing to 3 m (9ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: StemEdible Uses: RutinLeaf stem - raw or cooked[22, 105, 183]. An excellent flavour that is something like apples[2, 183] (this is likely to be a cooking apple!). The crop is sometimes blanched by excluding light from the growing stems, this produces an almost white stem that is free of fibre, crisp and less acid[2]. This species makes an excellent late crop[2]. The stems can also be made into a preserve or be dried and stored for later use[183]. One report says that the plant contains 0.32% rutin[240]. It does not specify which part of the plant, though it is likely to be the leaves[K]

tcanta Dye LiningThe leaves can be up to 1 metre in diameter, they are used as a lining material and also to cover and protect fruit in baskets[2, 37]. A bright yellow dye is obtained from the root[272].

dwatta Digestive Purgative TonicRhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. The main species used is R. palmatum. Though the chemistry varies slightly, this species is used interchangeably[238]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 37, 57, 61, 171, 238, 240]. Small doses act as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta E. Asia - Himalayas. ksacta Open slopes on rocky ground at elvations of 3200 - 4200 metres[51, 272]. Grassy slopes at elevations of 3400 - 4300 metres in Tibet[266].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semishade[200]. Grows well in heavy clay soils. Plants can be grown in guite coarse grass, which can be cut annually in the autumn[233]. Hardy to about -20°c[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200]. The root is sold for medicinal purposes in local markets in the Himalayas[46, 61]. Overgathering of this plant from the wild, both for food and for medicine, is becoming a cause of conservation concern[272]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

# 6.2.214 Ephedra nevadensis

Mormon Tea, Nevada jointfir

5 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 1.2 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ephedra nevadensis is an evergreen Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Fruit SeedEdible Uses: TeaFruit - raw. A sweet but very mild flavour[K]. Seed - cooked[22. 46, 105, 161, 257]. A bitter taste[92]. It can be roasted and ground into a powder and used to make a bread or mush[183]. A delicious tea is made by steeping the green or dried twigs in boiling water until they turn an amber or pink colour[21, 92, 95, 105, 161, 183].

dwatta Blood purifier Diuretic Febrifuge Poultice Tonic VDThe stems are blood purifier, diuretic, febrifuge and tonic[22, 46, 61, 257]. They are beneficial in the treatment of urogenital complaints[22, 46, 61]. An infusion has been used in the treatment of kidney problems, gonorrhoea and the first stages of syphilis [257]. A poultice of the powdered stems has been applied to sores[257]. The stems of most members of this genus contain the alkaloid ephedrine and are valuable in the treatment of asthma and many other complaints of the respiratory system[K]. The whole plant can be used at much lower concentrations than the isolated constituents - unlike using the isolated ephedrine, using the whole plant rarely gives rise to side-effects[254]. Ephedra does not cure asthma but in many cases it is very effective in treating the symptoms and thus making life somewhat easier for the sufferer. The stems can be used fresh or dried and are usually made into a tea, though they can also be eaten raw[K]. The young stems are best if eating them raw, though older stems can be used

nrakta S. Europe. ksacta Stony or waste places and in dry grassland, usually on clay[50].

propta Seed - sow early spring in a greenhouse. Germination is usually quick and good, prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions during the summer. It would be prudent to give the plants some winter protection in their first year. The seed can also be sown in situ in April. Sow the seed 2cm deep, putting 2 or 3 seeds at each point that you want a plant[1]. Protect the seed from mice[1]. Division of suckers. This is best done in November and the suckers overwintered in a cold frame then planted out in April. Division can also be carried out in March/April with the divisions being planted out straight into their permanent positions, though the plants will be smaller in their first year.

nwatta Industrial Crop: Biomass Management: Hay Management: Standard Staple Crop: OilPrefers a light warm soil and an open position in full sun[37, 200]. For best results, this plant requires plenty of moisture in the growing season and a good rich soil[16, 27, 33, 37], though another report says that it is drought tolerant once established[190]. Plants grew very well with us in the hot and very dry summer of 1995, though they were looking very tatty by September[K]. Tolerates most soils including heavy clays of both acid and alkaline nature, especially when grown in heavier or more spartan soils[200]. Plants are reasonably wind resistant[200, K]. This species is hardy to about -10°c[187]. Plants are more likely to require protection from winter cold when they are grown in a heavy soil[190]. Wet winters can do more harm than cold ones[K]. At one time the cardoon was often grown for its edible stems but it has now fallen into virtual disuse[132]. There are some named varieties[183]. It is a very ornamental foliage plant and makes a very attractive feature in the garden. The leaves are long lasting in water and are often used in flower arrangements[233]. Recent taxonomic revisions (1999) have seen the globe artichoke being merged into this species. However, since from the gardener's point of view it is quite a distinctive plant, we have decided to leave it with its own entry in the database under Cynara scolymus[K]. Plants seem to be immune to the predations of rabbits[233]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

# 6.2.211 Corylus sieboldiana

Japanese Hazel, Manchurian hazel 5 tlin 9 cyuc 3 kcak 1 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Corylus sieboldiana is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[183]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed[183].

nrakta E. Asia - Japan. ksacta Not known

propta Seed - Dest sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very

easy, they can be planted out straight into their permanent positions.

nwatta Management: Coppice Management: Standard Regional Crop Staple Crop: Protein-oilAn easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

# 6.2.212 Crataegus pentagyna

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Crataegus pentagyna is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 46, 105]. It can also be made into preserves[61] and can be dried for later use. The fruit is about 1 cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta S.E. Europe to the Caucasus. ksacta Woodland margins[45, 50].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and

and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There are some suggestions that the sap of this species can cause a skin rash in susceptible people, but this has not been substantiated. See also notes in 'Cultivation Details'.

kcakta Edible Parts: Fruit OilEdible Uses: Drink Oil-Fruit - raw or cooked[2, 105, 145]. The fruit is small with very little flesh, but it is produced in fairly large panicles and so is easily harvested. When soaked for  $10 \cdot 30$  minutes in hot or cold water it makes a very refreshing lemonade-like drink (without any fizz of course)[K]. The mixture should not be boiled since this will release tannic acids and make the drink astringent.

tcanta Dye Mordant Oil TanninAn oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The leaves are rich in tannin[145]. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169].

dwatta Antiseptic Astringent HaemostaticAn excrescence produced on the leaf by an insect Melaphis chinensis or M. paitan is antiseptic, astringent and haemostatic[176]. It is used in the treatment of persistent cough with blood, chronic diarrhoea, spontaneous sweating, night sweats, bloody stool, urorrhoea and bloody sputum. It is used applied externally to burns, bleeding due to traumatic injuries, haemorrhoids and ulcers in the mouth[176].

nrakta E. Asia - Himalayas. ksacta Moist situations in valleys and ravines[146]. Thickets and forests at elevations of 460 - 3000 metres in Tibet and western China[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. This soak water can be drunk and has a delicious lemonflavour. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 2001. Suckers in late autumn to winter[200].

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. The young growth in spring can be damaged by late frosts. This species is closely allied to R. potaninii[11]. This is the form of R. punjabensis that is most commonly grown in Britain[200]. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

# 6.2.158 Sambucus racemosa var racemosa

Red Coast Elder

5 tlin 9 cyuc 3 kcak 2 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sambucus racemosa var. racemosa is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy

clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Fruit - raw or cooked[61, 105, 257]. The fruit can be made into jams and preserves[257]. It can also be dried for winter use[118]. The fruit is about 5mm in diameter and is borne in large clusters[200]. Some caution is advised, see notes above on toxicity. Flowers - raw or cooked.

dwatta The leaves are abortifacient, analgesic, oxytocic and poultice [257]. A decoction of the leaves has been used to terminate a pregnancy and can also be taken during labour to ease the birth [257]. An infusion of the leaves has been used as an antiseptic wash on areas affected by blood poisoning [257]. A poultice of the pounded leaves has been applied to abscess and boils and also to sore joints to help reduce the swelling [257]. A poultice of the cooked shoots has been used to alleviate pain [257]. The bark is cathartic [257]. An infusion of the bark has been used in the treatment of coughs and colds [257]. A poultice of the bark has been applied to sore joints to help reduce the swelling [257]. The fruit has been cooked and eaten as a treatment for stomach problems [257].

nrakta Western N. America - Alaska to California. ksacta River banks in low moist soils from sea-level to 2400 metres[82]

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.159 Berberis angulosa

5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis angulosa is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 177]. The relatively large berries are freely borne and are more palatable than most barberries[1, 3, 11]. The fruit is about 12mm in diameter[200].

tcanta DveA vellow dve is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not

nullifies the effects of the berberine [218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas (Nepal) ksacta Alpine regions, open places in forests and amongst rocks in river beds to 4500 metres[51, 67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[200]. Plants can be pruned back quite severely and will resprout well from the base[200]. Hybridizes freely with other members of this genus[1]. This species is closely related to B. ludlowii, B. cappilaris and B. parisepala[200].

#### **6.2.160** Aesculus chinensis

Chinese Horse Chestnut

5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus chinensis is a deciduous Tree growing to 25 m (82ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. It can be dried and ground into a powder and used as a gruel. The seed is quite large, it can be 3cm in diameter, and is easily harvested. Unfortunately it is also rich in saponins, these must be removed before it can be used as a food and this process also removes many of the minerals and vitamins, leaving behind mainly starch. See also the notes above on toxicity. The following notes apply to A. californica, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213].

tcanta Soap WoodSaponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]

dwatta Antirheumatic EmeticThe seed is antirheumatic and emetic[178, 218]. The sweet tasting seed is said to be

be used with Glycyrrhiza species (Liquorice) because this used in the treatment of contracted limbs that are due to palsy or rheumatism[178, 218]. It is also used in the treatment of stomach aches[218].

nrakta E. Asia - N. China. ksacta Mountains of Szech-

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer

nwatta Prefers a deep loamy well-drained soil but is not too fussy[11]. Plants grow best in eastern and southeastern areas of England, probably needing a continental climate in order to thrive[11, 200]. Although the trees are very hardy when dormant, the new growth can be damaged by late spring frosts[11]. Most members of this genus transplant easily, even when fairly large[11].

#### 6.2.161 Impatiens glandulifera

Iewelweed, Ornamental iewelweed

5 tlin 9 cvuc 3 kcak 0 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Impatiens glandulifera is a ANNUAL growing to 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers maist sail

pcista Regular ingestion of large quantities of these plants can be dangerous due to their high mineral content[172]. This report, which seems nonsensical, might refer to calcium oxalate. This mineral is found in I. capensis and so is probably also in other members of the genus. It can be harmful raw but is destroyed by thoroughly cooking or drying the plant[K]. People with a tendency to rheumatism, arthritis, gout, kidney stones and hyperacidity should take especial caution if including this plant in their diet[238].

kcakta Edible Parts: Leaves Oil Oil SeedEdible Uses: Oil OilYoung leaves and shoots - cooked[172, 183]. They should not be used on a regular basis, see warning at top of record[172]. Seed - raw[105, 177]. A delicious nutty flavour[183], but difficult to harvest in quantity mainly because of their exploding seed capsules which scatter the ripe seed at the slightest touch[K] An edible oil is obtained from the seed[17 177 183]

tcanta Oil OilAn oil from the seed is used for lighting[17,

dwatta BachThe plant is used in Bach flower remedies the keywords for prescribing it are 'Impatience', 'Irritability' and 'Extreme mental tension'[209]. It is also one of the five ingredients in the 'Rescue remedy' [209].

nrakta E. Asia - W. Himalayas - Pakistan to Uttar Pradesh. Naturalized in Britain. ksacta Shrubberies and bushy places, often on grazing ground, frequently gregarious, 1800 - 4000 metres in the Himalayas[51]. Grows on river banks and waste places in Britain[17].

propta Seed - sow spring in a greenhouse. A period of cold stratification may help to improve germination rates. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying an outdoor sowing in situ in the spring.

nwatta Succeeds in any reasonably good soil[1]. Grows well in heavy clay soils. Prefers a moist well-drained humus rich soil in a cool site[200]. Self sows in areas where the minimum temperature is no lower than -15°c[200]. This plant has seed capsules that spring open forcibly as the seed ripens to eject the seed a considerable distance. The capsules are sensitive to touch even before the seed is ripe, making seed collection difficult but fun[K].

and mountains to 2000 metres in W. China[109]. Secondary forest[266]

propta Seed - germinates freely if sown as soon as it is ripe in a cold frame[200]. Stored seed should be scarified and sown in early spring[113], it may not germinate for a year. Prick out the seedlings into individual pots when large enough to handle and grow on for at least their first winter in a greenhouse. Plant out in late spring after the last expected frosts and give some winter protection for their first couple of years outdoors. Cuttings of half-ripe wood, July/August in a frame[200]. Cuttings of mature wood, late autumn in a frame[200].

nwatta Grows well in a fertile sandy loam in a sunny position[200]. Although the dormant plant is hardy to at least -15°c in Britain, it really prefers a continental climate to fully ripen its wood, it is then hardy to about -25°c[200]. The shoot tips are sometimes damaged by winter frosts in Britain[1] and the young growth in spring can also be damaged by late frosts[K]. The Japanese raisin tree is said to grow well in Cornwall[59], though our experience of this plant so far (1995) is that it is very difficult to establish. Perhaps older plants are as hardy as the reports above suggest, but younger plants are guite tender and often die in their first few winters outdoors[K]. The Japanese raisin tree is cultivated for its edible fruit in Japan. The small white flowers are scented and are produced in terminal cymes[245]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 6.2.209 Castanea seguinii

Chinese Chinquapin

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 10 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Castanea seguinii is a deciduous Tree growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105, 177]. Small, but a good flavour[61, 183]. Eaten raw, there is a distinct astringency, especially if the fleshy inner skin beneath the outer shell of the seed is not removed[K]. When cooked, however, and especially when baked, the seed becomes much sweeter and has a floury texture[K]. It then makes an excellent food and can be used as a staple food in much the same way as potatoes or cereals[K].

tcanta TanninThe bark, leaves, wood and seed husks all contain tannin. Wood - hard, strong, light. Used for fence posts etc.

nrakta E. Asia - E. and C. China. ksacta Mixed mesophytic forests and thickets at elevations of 400 - 2000 metres[266].

propta Seed - where possible sow the seed as soon as it is rine in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late

nrakta E. Asia - China to the Himalayas. ksacta Plains winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K].

> nwatta Prefers a good well-drained slightly acid loam but succeeds in dry soils[1, 11, 200]. Once established, it is very drought tolerant[1, 11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. This species can vary in size from a shrub 4 metres tall to, rarely, a tree 12 metres tall[266]. It is allied to the dwarf N. American species C. pumila[11], but unlike that species it has 3 seeds per bur[183]. Valued in breeding programmes because of its dwarf stature and heavy bearing at an early age[183]. Sometimes cultivated for its edible seed in China[266]. Although it is winter-hardy in most of Britain, this species only really thrives in areas with hot summers[200]. An excellent soil-enriching understorey in pine forests[200]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.210 Cynara cardunculus

831

5 tlin 9 cyuc 3 kcak 1 tcan 5 dwat 2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Cynara cardunculus is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Flowers Leaves Root StemEdible Uses: Curdling agentFlower buds - raw or cooked[33, 105]. A globe artichoke substitute[183]. The flower buds are a bit smaller than the globe artichoke and so are even more fiddly to use[K]. The buds are harvested just before the flowers open, they are then usually boiled before being eaten. Only the base of each bract is eaten, plus the 'heart' or base that the petals grow from [K]. The flavour is mild and pleasant and is felt by some people to be more delicate than the globe artichoke[K]. Stems - cooked and used as a celery substitute[2, 27, 33, 46, 61]. It is best to earth up the stems as they grow in order to blanch them and reduce their bitterness[4], these blanched stems can then be eaten cooked or in salads[105, 132, 183]. In Italy raw strips of the stems are dipped into olive oil[183]. We find these stems to be too bitter when eaten raw[K]. Young leaves - raw or cooked. Eaten as a salad by the ancient Romans[183]. Rather bitter[K]. Root cooked like parsnips[27, 105, 183]. Tender, thick and fleshy. with an agreeable flavour[183]. The dried flowers are a rennet substitute, used for curdling plant milks[105, 183].

tcanta DyeThe plant is said to yield a good yellow dye[4] though the report does not say which part of the plant is used.

dwatta Anticholesterolemic Cholagogue Digestive DiureticThe cardoon has become important as a medicinal herb in recent years following the discovery of cynarin. This bitter-tasting compound, which is found in the leaves, improves liver and gall bladder function, stimulates the secretion of digestive juices, especially bile, and lowers blood cholesterol levels[238, 254]. The leaves are anticholesterolemic, antirheumatic, cholagogue, digestive, digretic, hypoglycaemic and lithontripic[7, 21, 165]. They are used internally in the treatment of chronic liver and gall bladder diseases, jaundice, hepatitis, arteriosclerosis and the early stages of late-onset diabetes[238, 254]. The leaves are best harvested just before the plant flowers, and can be used fresh or dried[238].

tcanta Makes a good carpet in open woodland and on woodland edges[24, 31]. Plants are best spaced about 35cm apart each way[208]. Attractive flowers.

dwatta Anodyne Antispasmodic Astringent Emetic Sedative VermifugePrimroses have a very long history of medicinal use and has been particularly employed in treating conditions involving spasms, cramps, paralysis and rheumatic pains[238]. They are, however, considered to be less effective than the related P. veris[238]. The plant contains saponins, which have an expectorant effect, and salicylates which are the main ingredient of aspirin and have anodyne. anti-inflammatory and febrifuge effects[238]. This remedy should not be prescribed for pregnant women, patients who are sensitive to aspirin, or those taking anti-coagulant drugs such as warfarin[238]. The roots and the flowering herb are anodyne, antispasmodic, astringent, emetic, sedative and vermifuge[4]. An infusion of the roots is a good remedy against nervous headaches[4]. The roots are harvested in the autumn when two or three years old and dried for later use[4]. An ointment has been made from the plant and used for treating skin wounds[244].

nrakta Western Europe, including Britain, from Norway south and east to N. Africa and W. Asia. ksacta Woods and hedgerows on acid and calcareous soils[4, 17]. Also found in the open on north-facing slopes in south-western England[31].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above  $20^{\circ}c[200]$ . When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in autumn. This is best done every other year[200].

nwatta Landscape Uses:Container, Ground cover, Rock garden, Woodland garden. Prefers a medium to heavy moisture retentive humus rich loam in a cool position with light to medium shade[200]. Grows well in heavy clay soils. Plants are hardy to about -25°c[187]. A very ornamental plant, there are many named varieties[187]. The blooms have a characteristic fragrance of a mossy bank or a deciduous woodland[245]. This species hybridizes readily with P. elatior[17]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Suitable for dried flowers, Fragrant flowers.

#### 6.2.207 Rheum palmatum tanguticum

Da Huang

5 tlin 9 cyuc 3 kcak 0 tcan 5 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum palmatum tanguticum is a PERENNIAL growing to 2 m (6ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (lioth woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238]. See Rheum palmatum for possible related information.

kcakta Leaf stem - raw or cooked[2, 7, 105, 183]. The stem is superior in flavour to the common rhubarb and quite tender[2]. An acid flavour, it is sometimes used as a cooked fruit substitute[K].

dwatta Anticholesterolemic Antiseptic Antispasmodic Antitumor Astringent Cholagogue Diuretic Haemostatic PurgativeRhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely

used herbs in Chinese medicine[238]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagoque, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 7, 9, 21, 91, 171, 176, 238]. The roots contain anthraquinones, which have a purgative effect, and also tannins and bitters, which have an opposite astringent effect[244]. When taken in small doses, it acts as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232, 244]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta E. Asia - N.W. China. ksacta Valleys at elevations of 1600 - 3000 metres in Gansu, Qinghai and Xizang Provinces[266]

propta Seed - best sown in autumn in a shaded cold frame [200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1,111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semishade [200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. This is a more robust form of the species [200], it is hardy to at least -15°c[238]. This sub-species is favoured for its medicinal properties over the species [244] and is cultivated as a medicinal plant in China[187]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

#### 6.2.208 Hovenia dulcis

Japanese Raisin Tree

5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 10 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hovenia dulcis is a deciduous Tree growing to 10 m (32ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: SweetenerFruitraw or cooked[2, 11, 158]. They can be dried when they have
the sweet flavour and texture of raisins and can be used similarly[183]. The fruit is sweet and fragrant[105, 147] with a
pear-like flavour[218]. Dry and sub-acid[61]. It is not a true
fruit but a swollen receptacle[200]. The fruit is up to 3cm
long[2], it contains 11.4% glucose, 4.7% fructose and 12.6%
sucrose[218]. A sweet extract of the seed, boughs and young
leaves is used as a substitute for honey[183]. The seed contains 15% protein and 7.8% fat[218].

tcanta WoodThe wood is hard and fine grained. It is good for making furniture[266].

dwatta Antispasmodic Febrifuge LaxativeAntispasmodic, febrifuge, laxative[147, 178]. The fruit is antispasmodic, febrifuge, laxative and diuretic[218]. The seeds are diuretic and are used in the treatment of alcohol overdose[218]. The seeds are used to relieve intoxication due to wine[240]. The stem bark is used in the treatment of rectal diseases[218].

#### 6.2.162 Arundinaria gigantea

Canebrake bamboo, Cane Reed, Giant cane 5 tlin 9 cyuc 3 kcak 4 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arundinaria gigantea is an evergreen Bamboo growing to 9 m (29th 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Seed Shoots StemEdible Uses: Young shoots - cooked[11, 22, 46, 105, 183]. Used as a pot-herb[236]. Seed - cooked[46, 61, 161]. It can be used as a wheat substitute[2, 105], for which it is not much inferior[213], but it is rather small and difficult to collect in quantity[159]. The plants only flower at irregular intervals of several years.

tcanta Basketry Fodder Hedge Musical Soil stabilization WeavingAgroforestry Uses: With its extensive running root system, the plant is ideal for helping to control soil erosion, especially along the sides of rivers[352]. The extensive growth of the plant provides streambank stabilization, sediment retention, and bioaccumulation of nutrients and toxins[1050]. So long as it can be restrained, the plant makes an excellent, dense hedge or screen[352]. The canes are used as pipe-stems, are woven into baskets and mats plus a variety of other purposes[169, 236]. The hollow stems can be made into flutes[257]. Carbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses, Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Fodder: hank

dwatta CatharticThe root is cathartic. A decoction has been used to stimulate the kidneys and 'renew strength' [257].

nrakta Southeastern N. America - Ohio, Indiana, Illinois and Oklahoma to North Carolina, Florida and Texas. ksacta Forms dense thickets along riverbanks, in swamps and low woods[43, 235]. Found on all types of soil from sea level to 600 metres[195].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. When large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded place in the greenhouse until large enough to plant out. Bamboos only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Rhizome cuttings. Basal cane cut-

nwatta Fodder: Bank Management: Managed Multistem Wild CropPrefers an open loam of fair quality and a position sheltered from cold drying winds[1, 11, 25]. Succeeds on peaty soils. Requires abundant moisture and plenty of organic matter in the soil. Plants are intolerant of drought[1]. Succeeds in full sun or dappled shade in warm, humid, damp conditions[200]. Some reports say that this plant is only hardy in S.W. England[1, 11, 25] though another report says that the roots are hardy to about -30°c if they are heavily mulched[169]. This plant used to form very extensive stands in much of south-eastern N. America, but it provides a nutritious forage and is very easily destroyed by the continuous grazing of cattle or the rooting of pigs and so has been greatly reduced in the wild[236]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though

they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rootstock is running, forming new shoots from late May[25]. Carbon Farming Solutions - Managed bamboo forest sequester more carbon than wild bamboo and the same as fast-growing tropical trees like eucalyptus. Cultivation: minor global crop. Management: managed multistem (Describes the non-destructive management systems that are used in cultivation) [1-1]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

#### 6.2.163 Crataegus cuneata

Sanzashi, Chinese hawthorn

5 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 15 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli

flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus cuneata is a deciduous Shrub growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked and used in pies, preserves etc[147, 183]. I can also be dried for later use[177, 183]. A pleasant flavour, it is sold in local markets in China and Japan[178]. The fruit contains about 0.44% protein, 1% fat, 22.1% carbohydrate, 0.8% ash, it is rich in vitamin C, fruit acids and pectin[179]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Anodyne Anticholesterolemic Astringent Blood tonic Cardiotonic Dysentery Haemostatic Hypotensive Stomachic Vitamin CThe fruits and flowers of hawthorns are wellknown in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]. The fruit is anodyne, anticholesterolemic, antidiarrhetic, antidysenteric, astringent, blood tonic, cardiotonic, haemostatic and stomachic[61, 147, 176, 218]. It is used in the treatment of dyspepsia, stagnation of fatty food, abdominal fullness, retention of lochia, amenorrhoea, postpartum abdominal pain, hypertension and coronary heart disease[176].

nrakta E. Asia - China, Japan. ksacta Sunny places in upland wilds[147]. Valleys, thickets and hills at elevations of 200 - 2000 metres[266].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c1641. It may still take

another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Although perfectly cold-hardy in most of Britain when dormant, the young growth of this species might be susceptible to spring frosts[11]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 6.2.164 Viburnum foetens

5 tlin 9 cyuc 3 kcak 3 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum foetens is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from January to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 145, 146]. A sweetish flavour[2], but the fruit is not freely borne in Britain[K].

tcanta WoodWood - hard, close grained[146].

nrakta E. Asia - Himalayas. ksacta An undershrub of coniferous forests, it is also found in oak forests from 1500 - 3300 metres[51, 146].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 2001. Best if given shade from the early morning sun in spring[200]. Requires shelter from northerly and easterly winds[200]. Plants are hardy to about -20°c[184]. A very ornamental plant[1], it flowers in the winter and the flowers are said to withstand temperatures down to -12°c without damage[11, 200]. However fruit is not often produced in this country[K]. This may be due to the plant being selfincompatible and so growing 2 or more different cultivars together may improve fruit set[11, 200]. Hand pollination may also be beneficial as well as siting the plants so that they get the maximum of protection from severe winter weather[K]. A west-facing wall or woodland edge would be ideal for this[K]. Closely allied to V. grandiflorum and included in that species by many botanists[11]. This species has a more westerly range, shorter stems and white flowers[200]. The crushed leaves have a foetid aroma[182].

# 6.2.165 Prunus hortulana

Hog Plum, Hortulan plum
5 tlin 9 cyuc 3 kcak 2 tcan 1 dwat 9 m hkuc
hmimbtut cyutli tcun bwieli brasilutnyik hpa7tli flatoriklwi

5 tiln 9 cyuc 3 kcak 2 tcan 1 dwat 9 m nkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Prunus hortulana is a deciduous Tree growing

drutta Prunus nortulana is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Flowers Fruit SeedEdible Uses: Fruit - raw or cooked. Thin-skinned[227] with an agreeable flavour, it can be eaten out of hand or be made into pies, preserves etc[183]. Another report says that it is small and not very palatable, and is only used in preserves[171]. The fruit is about 12mm in diameter and contains one large seed[200]. The fruit is up to 25mm long according to other reports[227, 229]. Flower buds[46]. No more details are given. Seed raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - heavy, hard, strong. Used for turnery[46].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Southern and Central N. America - Indiana to Iowa, Missouri, Kansas and Texas. ksacta Bottomlands, thickets and woodland edges[43], in rich moist soils[82].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113].

tcanta WoodWood - heavy, hard, attractive, very close grained. It weighs 46lb per cubic foot and is sometimes used for panelling, tool handles, bearings etc[82, 229, 235].

dwatta Cardiac Diuretic Refrigerant TonicThe leaves are cardiac, diuretic, refrigerant and tonic[61, 82]. A tea made from the leaves has been used in the treatment of asthma, diarrhoea, indigestion and to check excessive menstrual bleeding[222, 257]. It is diuretic and is a folk remedy for treating fevers, kidney and bladder ailments[82, 222]. The bark has been chewed in the treatment of mouth ulcers[222, 257].

nrakta South-eastern N. America - Pennsylvania to Florida, west to Louisiana and Ohio. ksacta Well-drained gravelly soils on ridges rising above the banks of streams[82].

propta Surface sow the seed[113] in a shady place in a greenhouse either as soon as it is ripe in the autumn[200] or in late winter[78]. Germination is variable[78]. Put outside in a shady position as soon as it germinates and overwinter in a frame[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are susceptible to damping off and so should be kept well-ventilated and should not be over-watered. Cuttings of half-ripe wood, July/August in a frame[200]. Layering.

nwatta Landscape Uses:Pest tolerant, Specimen. Requires a moist well-drained lime-free soil[200]. Prefers a pH in the range of 4 to 6[200]. Succeds in light dappled shade or in full sun[200], it appreciates the protection of other tall shrubs and trees[1, 200]. A very ornamental plant[1], it is rather slow growing, especially when growing at the limits of its hardiness[200]. Plants can flower in 4 - 5 years from seed. The flowers are sweetly scented[245]. Transplant with care plants may take some time to re-establish themselves[200]. The flowers are very attractive to bees[49, 229]. Special Features:North American native, Attracts butterflies, Blooms are very show.

#### 6.2.205 Lactuca sativa capitata

Cabbage Lettuce

5 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Lactuca satīva capitata is a ANNUAL/BIENNIAL growing to 0.9 m (3ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The mature plant is mildly toxic[13].

kcakta Leaves - raw or cooked[7, 37]. A mild slightly sweet flavour with a crisp texture, lettuce is a very commonly used salad leaf and can also be cooked as a potherb or be added to soups etc[183]. The plant forms a head of leaves in a similar way to cabbages. The whole head is usually harvested at one time. Seed - sprouted and used in salads or sandwiches[183]. An edible oil is obtained from the seed[7]. The seed is very small, extraction of the oil on any scale would not be very feasible[K].

tcanta Parasiticide [178]. No further details are given, but it is probably the sap of flowering plants that is used. The seed is said to be used to make hair grow on scar tissue [218].

dwatta The whole plant is rich in a milky sap that flows reely from any wounds. This hardens and dries when in contact with the air[4]. The sap contains 'lactucarium', which is used in medicine for its anodyne, antispasmodic, digestive, diuretic, hypnotic, narcotic and sedative properties[9, 21, 46, 165, 192, 213, 238]. Lactucarium has the effects of a feeble opium, but without its tendency to cause digestive upsets[4], nor is it addictive[7]. It is taken internally in the treatment of insomnia, anxiety, neuroses, hyperactivity in children, dry coughs, whooping cough, rheumatic pain tet[238]. Concentrations of lactucarium are low in young plants and most concentrated when the plant comes into flower[238]. It is collected commercially by cutting the heads of the plants and scraning the fuice into china vessels several

times a day until the plant is exhausted[4]. The cultivated lettuce does not contain as much lactucarium as the wild species, most being produced when the plant is in flower[4]. An infusion of the fresh or dried flowering plant can also be used[9]. The plant should be used with caution, and never without the supervision of a skilled practitioner. Even normal doses can cause drowsiness whilst excess causes restlessness[238] and overdoses can cause death through cardiac paralysis[7, 9]. Some physicians believe that any effects of this medicine are caused by the mind of the patient rather than by the medicine[213]. The sap has also been applied externally in the treatment of warts[222]. The seed is anodyne and galactogogue[218]. Lettuce has acquired a folk reputation as an anaphrodisiac, anodyne, carminative, diuretic, emollient, febrifuge, hypoglycaemic, hypnotic, narcotic, parasiticide and sedative[218].

nrakta Of garden origin, probably derived from L. serriola. ksacta Not known in the wild.

propta Seed - sow a small quantity of seed in situ every 2 or 3 weeks from March (with protection in cooler areas) to June and make another sowing in August/September for a winter/spring crop. Only just cover the seed. Germination is usually rapid and good, thin the plants if necessary, these thinnings can be transplanted to produce a slightly later crop (but they will need to be well watered in dry weather). More certain winter crops can be obtained by sowing in a frame in September/October and again in January/February.

nwatta Prefers a light sandy loam[1]. Succeeds in most well-drained, humus-rich soils but dislikes acid conditions[1. 16]. Plants strongly dislike dry conditions, quickly running to seed in such a situation. Early and late sowings are best in a sunny position, but summer crops are best given a position with some shade in order to slow down the plants tendency to go to seed and to prevent the leaves becoming bitter[18, 20]. The garden lettuce is widely cultivated in many parts of the world for its edible leaves and is probably the most commonly grown salad plant. This is the heading form of lettuce, including the Iceberg and Butterhead varieties. There are many named varieties[183] capable of providing fresh leaves throughout the year if winter protection is given in temperate areas. Lettuces are quite a problematic crop to grow. They require quite a lot of attention to protect them from pests such as slugs, aphids and birds. If the weather is hot and dry the plants tend to run very quickly to seed, developing a bitter flavour as they do so. In wet weather they are likely to develop fungal diseases. In addition, the seed needs to be sown at regular intervals of 2-3 weeks during the growing season in order to provide a regular supply of leaves. Lettuces make a good companion plant for strawberries, carrots, radishes and onions[18, 20, 201]. They also grow well with cucumbers, cabbages and beetroot[201].

#### 6.2.206 Primula vulgaris

Primrose, Common Primrose, English Primrose 5 tlin 10 cyuc 3 kcak 3 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Primula vulgaris is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from December to May, and the seeds ripen from April to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: midly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves - raw or cooked as a potherb, added to soups etc[2, 177, 183]. A mild flavour, though the texture is a bit tough[K]. The leaves are often available all through the winter[K]. Flowers - raw or cooked. They make an attractive garnish to salads[4, 183, 238, K], and can also be used as a cooked vegetable or in conserves etc[4, 183]. Picked when first opened, the flowers are fermented with water and sugar to make a very pleasant and intoxicating wine[2]. Both the flowers and the leaves can be made into a syrup or a tea[183].

they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about  $5\cdot 10\text{cm}$  tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Industrial Crop: Hydrocarbon Management: Standard Regional TimberSucceeds in most soils[129], but prefers a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. A very ornamental plant[120]. It is often short-lived in Britain but is moderately fast growing with some trees reaching a height of 15 metres in 29 years[185]. A long-lived tree in the wild, specimens 500 years old are known[229]. It commences bearing seeds when about 10 - 15 years old, though good production does not commence until twice that age[229]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Closely related to P. ponderosa[1], and hybridizes with it in the wild[71]. Some of the earlier plantings under this name in Britain have turned out to be P. ponderosa[185]. The cones are 12 - 35cm long, they open and shed their seed whilst still attached to the tree[82, 226]. The resin from broken shoots has a very strong lemon scent[185]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. An evergreen. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 6.2.202 Osmorhiza occidentalis

Western Sweet-Cicely, Western sweetroot 5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Osmorhiza occidentalis is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Root SeedEdible Uses: Condiment-The root has a sweet liquorice or anise flavour and can be dried, ground into a powder and used as a flavouring for biscuits etc[85, 183, 257]. The taste is probably too strong for the whole root to be used as a vegetable[85]. The dried seeds are used as a flavouring[85, 183, 257]. The unripe seed, when still fleshy, can be nibbled raw[85, 183].

tcanta Deodorant Incense InsecticideThe roots have been used by women as a feminine deodorant[257]. They have also been placed in the clothes cupboard to impart a nice smell to clothes and have been used to rinse babies nappies[257]. A decoction of the root has been used as a dip to kill lice in chickens[257].

dwatta Antiseptic Carminative Deodorant Febrifuge Ophthalmic Oxytoxic Pectoral Poultice Skin StomachicWestern sweet-cicely was widely employed medicinally by several native North American Indian tribes who used it particularly to treat digestive disorders and as an antiseptic wash for a range of problems[257]. It is little, if at all, used in modern herbalism. An infusion of the plant is used in the treatment of coughs and colds[61, 257]. The roots are antiseptic, carminative, febrifuge, oxytocic, pectoral and stomachic[257]. An infusion has been used to induce labour in a pregnant woman and to treat fevers, indigestion, flatulence, stomach aches etc[257]. An infusion of the roots has been applied externally as a treatment for swollen breasts, sores, sore eyes etc[257]. A decoction of the root has been used as a wash on venereal sores and skin rashes[257]. A poultice of the pulped roots has been used in the treatment of cuts, sores, swellings and bruises[257]. The root has been applied to teeth to relive the pain of toothache[257]. A hot decoction of the root has been used to kill head lice[257].

nrakta Western N. America. ksacta Shady or partly shady areas, often on slopes and in valleys[60, 85].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise sow it in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in any deep moisture-retentive soil in sun or dappled shade[200]. Plants are hardy to about - 20°c[200]. Well suited to naturalistic plantings in a woodland or wild garden[200]. A sweetly aromatic plant[200].

# 6.2.203 Osmorhiza chilensis

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Osmorhiza chilensis is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked. It is considered to be a delicacy[69].

nrakta N. America, S. America. ksacta Deciduous Nothofagus forests and moist shaded cliffs to 200 metres in S. Chile north to latitude 31°s[69].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise sow it in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in any deep moisture-retentive soil in sun or dappled shade[200]. Plants are hardy to about - 20°c[200]. Well suited to naturalistic plantings in a woodland or wild garden[200]. A sweetly aromatic plant[200].

#### 6.2.204 Oxydendrum arboreum

Sorrel Tree, Sourwood

5 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Oxydendrum arboreum is a deciduous Tree growing to  $10\ m$  (32ft) by  $6\ m$  (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw[11, 105, 161]. A pleasant acid flavour[82]. They allay thirst[61].

Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Sometimes cultivated for its edible fruit in Southern N. America, there are some named varieties[43, 183]. This tree is of very little value for its fruit in Britain, requiring hotter summers than are usually experienced here if it is to fruit well[1]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface

# 6.2.166 Taxus brevifolia

Pacific Yew

5 tlin 9 cyuc 3 kcak 3 tcan 4 dwat 15 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Taxus brevifolia is an evergreen Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from March to May, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista All parts of the plant, except the flesh of the fruit, are highly poisonous[1, 4, 7, 10, 19, 65]. Another report says that the toxic alkaloid found in other yews, known as taxine, is not found in this species and that the toxicity of this species has not been conclusively proven[270]. Poisoning symptoms are dry mouth, vomiting, vertigo, abdominal pain, dyspnoea, arrhythmias, hypotension and unconsciousness.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 161, 257]. Very sweet and gelatinous, most people find it delicious though some find it sickly[K]. The fruit is a fleshy berry about 8mm in diameter and containing a single seed[200]. Trees usually produce good crops every year[229]. All other parts of this plant, including the seed, are highly poisonous. When eating the fruit you should spit out the large seed found in the fruit's centre. Should you swallow the whole seed it will just pass straight through you without harm, if the seed has been bitten into, however, it could cause some problems.

tcanta Paint WoodA red paint was made by mixing the woodchips with oil[226]. The roots have been used as the weft in twined basketry[257]. The root is very strong and is particularly good for hopper mortar baskets[257]. Wood-fine-grained, strong, hard, heavy, durable and resilient, taking a very fine polish. Though hard, the wood is easy to carve[226]. It is also used for making paddles, fence posts and various other small articles[46, 61, 82, 226, 229, 257].

dwatta Cancer Diaphoretic Pectoral PoulticeThe Pacific yew is a highly toxic plant but it was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. Modern research has shown that it contains the substance 'taxol' in its shoots and bark. Taxol has shown exciting potential as an anti-cancer drug, particularly in the treatment of ovarian cancers[238]. Unfortunately, the concentrations of taxol are rather low and

the bark of 6 trees is required to provide enough taxol to treat one patient[238]. This remedy is very toxic and, even when used externally, should only be used under the supervision of a qualified practitioner[238]. See also the notes above on toxicity. All parts of the plant, except the fleshy fruit, are diaphoretic and pectoral[257]. A decoction of the branches and leaves has been used in the treatment of lung problems[257]. An infusion of the crushed leaves has been used externally as a wash to cause perspiration and effect a general improvement in the health[257]. A poultice of the crushed leaves has been applied to wounds[257]. A decoction of small woody pieces has been used in the treatment of internal complaints including stomach pains and blood in the urine[257]. The leaves are harvested in early autumn or spring, the bark from autumn to spring, for commercial extraction of taxol[238]. Ingestion of 50-100g of needles can cause death.

nrakta Western N. America - Alaska to California. ksacta Growing singly or in small clumps on the banks of mountain streams, in deep gorges and ravines, open or dense forests, especially under large coniferous trees from sea level to 2200 metres[82, 270].

propta Seed - can be very slow to germinate, often taking 2 or more years[78, 80]. It is best sown as soon as it is ripe in the autumn when it should germinate 18 months later. Stored seed may take 2 years or more to germinate. 4 months warm followed by 4 months cold stratification may help reduce the germination time[113]. Harvesting the seed 'green' (when fully developed but before it has dried on the plant) and then sowing it immediately has not been found to reduce the germination time because the inhibiting factors develop too early[80]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in pots in a cold frame. The seedlings are very slow-growing and will probably require at least 2 years of pot cultivation before being large enough to plant out. Any planting out is best done in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe terminal shoots, 5 - 8cm long, July/August in a shaded frame. Should root by late September but leave them in the frame over winter and plant out in late spring[78]. High percentage[11]. Cuttings of ripe terminal shoots, taken in winter after a hard frost, in a shaded frame[113].

nwatta Management: Coppice Regional CropThrives in almost any soil, acid or alkaline, as long as it is well-drained[1, 200]. Succeeds in dry soils. Plants are very shade tolerant[81]. Dormant plants are very cold-hardy, though the young growth in spring can be damaged by late frosts. A slow-growing but apparently long-lived tree[229]. Plants produce very little fibrous root and should be planted in their final positions when still small[200]. Because of its useful wood, large trees are unscrupulously poached from the wild and, in some areas, the species has been nearly extirpated. Exploitation of the species for medicinal purposes is further threatening it in the wild[270]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 6.2.167 Crataegomespilus dardarii

Bronvaux Medlar

5 tlin 9 cvuc 3 kcak 0 tcan 0 dwat 5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Crataegomespilus dardarii is a deciduous Tree growing to 5 m (16ft) by 3.5 m (11ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. There are three distinct sizes of fruit on this tree, though they all have the same flavour[K]. The first is quite large, up to 35mm in diameter, and is just like the medlar, Mespilus germanica. The second is slightly smaller, perhaps 25mm in diameter, and once more like a medlar. The third is rather smaller, perhaps 10mm in diameter, and is intermediate between the medlar and the hawthorn, Crataegus spp. The fruit does not ripen until very late in the autumn, or even

early winter. It will probably need to be harvested before it is fully ripe and stored in a cool but frost-free place where it can continue the ripening process. It is ready to eat when the flesh has turned brown and is very soft. It will then have a delicious, sweet flavour that reminds you of a lush tropical fruit. Care must be taken that the fruit is eaten no later than this stage because it is almost at the point of rotting and will can then cause gastric upsets[K].

nrakta A graft hybrid of garden origin. ksacta Not known in the wild

propta Seed - this species is a bi-generic graft hybrid and is very unlikely to breed true from seed. Should you want to give it a try, then the seed is best sown as soon as it is ripe in the autumn in a cold frame. Some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be stratified for 3 months at 15°c and then for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years. Grafting onto a rootstock of hawthorn, Crataegus species.

nwatta Prefers a well-drained, moisture-retentive soil enriched with organic matter, in sun or part shade[200]. Plants are hardy to about -15°c[200]. This tree is a bi-generic graft chimera resulting from a medlar, Mespilus germanica, being grafted on a hawthorn, Crataegus sp.[11]. Three branches that grew from just beneath the graft were different from each other and also from either of the two species used in the graft. They showed characteristics intermediate between the hawthorn and the medlar[11]. These three forms have been propagated and, in growth, each form tends to produce some branches of the other forms[11]. The first branch that was propagated has received specific status as C. dardarii. This is closer to the medlar than the hawthorn. but produces its flowers in clusters like the hawthorn - the fruits are medlar-like but a bit smaller. This tree also produces some branches that are pure medlar[11]. The second branch has cultivar status as 'Jules d'Asnieres'. This is more hawthorn-like, and produces some hawthorn-like spines. It produces fruit that is more hawthorn in size[11]. The third branch, which does not seem to have been named, started off like a pure hawthorn, but towards its extremity changed into the cultivar 'Jules d'Asnieres'[11].

# **6.2.168** Amelanchier interior

Pacific serviceberry 5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier interior is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A sweet taste[177, K] and a juicy texture[229, K], even before the fruit is fully ripe[K]. The fruit is produced in small clusters and is up to 8mm in diameter[229]. The fruit is rich in iron and copper[226]. This species has been seen fruiting well at Kew where the fruit ripened about 3 weeks later than most of the other species[K].

nrakta Central N America - Wisconsin to S Minnesota and south to S. Dakota ksacta Hillsides and banks of streams[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta We have very little information on this species. We do not know if it will be hardy in Britain, though it is growing and fruiting well at Kew Gardens in London[K] and judging by its native range it should succeed outdoors in most parts of the country. This species is not stoloniferous[43]. The following notes are based on the general needs of the genus. Prefers a rich loamy soil in a sunny position or semishade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

# 6.2.169 Lilium columbianum

Columbia Tiger Lily, Columbia lily, Oregon Lily, Tiger Lily 5 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium columbianum is a BULB growing to 1.5 m (5ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[61, 105, 161, 213, 257]. The oval-shaped bulb is up to 5cm in diameter and is used as a vegetable in the same way as potatoes (Solanum tuberosum)[85, 256]. Starchy, with a slightly sweet taste[85]. The flavour of the cooked hulbs is said to resemble sweet chestnuts but with a slight bitterness[256]. The bulbs were highly prized by various native North American Indian tribes and were used as a staple food[118, 257].

nrakta Western N. America - British Columbia to California. ksacta Moist soils in woodlands, meadows, amongst ferns and amongst shrubs in sun or shade from sea level to

propta Seed - autumnal hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[163]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant,

a flavouring in mixed salads, whilst older leaves are used freely when in a suitable site [14]. as a potherb[183]. Seed - sprouted and eaten raw[1, 34, 37, 52]. The seed takes about 4 days to be ready[244]. A hot flavour, it is often used in salads. A nutritional analysis is available[218]. The seed can be ground into a powder and used as a food flavouring[17, 34, 89, 171], it is the 'white mustard' of commerce[100, 105]. This is milder than the black mustard obtained from Brassica nigra[183]. The pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter

tcanta Green manure OilThe seed contains up to 35% of a semi-drying oil[74]. It is used as a lubricant and for lighting etc[21, 46, 57, 61]. The plant can be grown as a green manure crop[17, 89]. It is very fast growing, producing a good bulk in just a few weeks from seed, but it is shallow rooted so does not do so well in dry periods[87]. It is also susceptible to all the diseases of the cabbage family such as club-root so is best avoided if this is likely to be a problem[17].

dwatta Antibacterial Antifungal Antirheumatic Appetizer Carminative Cathartic Diaphoretic Digestive Diuretic Emetic Expectorant Rubefacient Stimulant VesicantThe seed is antibacterial, antifungal, appetizer, carminative, diaphoretic, digestive, diuretic, emetic, expectorant, rubefacient and stimulant[14, 176, 218, 238]. The seed has a cathartic action due to hydrolytic liberation of hydrogen sulphide[218]. In China it is used in the treatment of coughs with profuse phlegm and tuberculosis, pleurisy[176]. The seed is seldom used internally as a medicine in the west[238]. Externally it is usually made into mustard plasters (using the ground seed), poultices or added to the bath water. It is used in the treatment of respiratory infections, arthritic joints, chilblains and skin eruptions etc[238]. At a ratio of 1:3, the seed has an inhibitory action on the growth of fungus[176]. Care should be exercised in using this remedy because the seed contains substances that are extremely irritant to the skin and mucous membranes[238]. The leaves are carminative[218].

nrakta Europe - Mediterranean. Naturalized in Britain[17], ksacta A weed of arable and waste land, especially on calcareous soils[17].

propta Seed - sow in situ from early spring to late summer. Germination takes place in less than a week. The earlier sowings are for a seed crop, the later sowings are for edible leaves and green manure[82]. When sowing seed for use in mustard and cress, the seed is soaked for about 12 hours in warm water and then placed in a humid position. Traditionally, it is sown in a tray on a thin layer of soil, or on some moist blotting paper, and the tray is placed in a warm dark place for a few days to encourage rapid and rather etiolated growth. The seedlings can then be placed in a lighter position for a couple more days to turn green before being eaten. The mustard seed should be sown about 3 - 4 days later than the cress for them both to be ready at the same time[264].

nwatta Prefers a light well-drained soil[52]. Succeeds on most soils when growing in a sunny position[238]. For best production, it requires high nutrient soils with a high level of nitrogen, but it may be grown on a wide range of soils from light to heavy, growing best on relatively heavy sandy loamy soils[269]. It is not suited to very wet soils[269]. White mustard grows best where the annual precipitation varies from 35 to 179cm, annual temperature from 5.6 to 24.9°C and pH from 4.5 to 8.2[269]. White mustard is a quick-growing long-day annual which prefers temperate climates with some humidity. It is sometimes cultivated, both in the garden and commercially, for its edible seed[4, 183]. The plant can withstand high temperatures, but very hot days during flowering and ripening may reduce seed setting and lower quality of seed[269]. There are some named varieties[183]. It is a very fast growing plant, but requires plenty of moisture for optimum growth[87]. Seed yields are usually a bit less than 1 tonne per hectare, though experimental plantings have suggested that up to 8 tonnes per hectare is possible[269]. White mustard is sometimes also grown as a seed sprout, usually with cress seeds (Lepidium sativum) to supply mustard and cress. This is a mixture of the two types of sprouted seeds, used when about 7 - 10 days old[K]. The mustard seed should be sown three days before the cress seed[238]. The plant is not very deep rooted[87], it self-sows

#### 6.2.201 Pinus jeffrevi

**Ieffrey Pine** 

5 tlin 8 cvuc 3 kcak 3 tcan 2 dwat 25 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasilut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus jeffreyi is an evergreen Tree growing to 25 m (82ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. and the seeds ripen from January to February. The species is monoecious (individual flowers are either male or female. but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Sap SeedEdible Uses: CondimentSeed - raw or cooked[105, 177]. Large[183]. The oilrich seed has a resinous flavour and is about 10 - 12mm long[82, 200]. The crystallised sap has been gathered and eaten like candy[257]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dve Herbicide Resin WoodLandscape Uses: Aggressive surface roots possible, Specimen. A tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4]. 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4]. 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. The resin contained in this plant is very unusual in that it contains the hydrocarbon n-heptane. This is unmixed with other isomers of heptane and is formed by a very complex and little understood biochemical process. Its purity lead it to be used as the zero-point in the octane rating for petrol[200]. Wood - light, strong and fine-grained, it can vary from soft to hard[229]. It is used for making furniture, boxes, toys etc[229]. Special Features: Attractive foliage, North American native, Inconspicuous flowers or blooms.

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta South-western N. America - Oregon to California ksacta Usually found on dry and exposed slopes, 1800 - 2700 metres in California[71, 82]. Found on a variety of soils, but growing best in those that are deep and well-drained[229].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when hardy to UK zone 6. It is in leaf from October to July, in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked. The raw bulb contains an acrid principle, but this is destroyed by drying or thorough heating[4]. When cooked the bulb is pulpy, sweet and sugary[4]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

tcanta Essential $\rm An$  essential oil from the flowers is used in perfumery[4, 61].

dwatta Astringent Demulcent Emmenagogue Emollient Epilepsy ExpectorantThe Madonna illy has a long history of herbal use, though it is seldom employed in modern herbalism because of its scarcity[238]. The bulb and the flowers are astringent, highly demulcent, emmenagogue, emollient and expectorant[4, 7, 238]. The plant is mainly used externally, being applied as a poultice to tumours, ulcers, external inflammations etcl(4, 238]. The bulb is harvested in August and can be used fresh or dried[4, 238]. The flowers are harvested when fully open and used fresh for making juice, ointments or tinctures[238]. The pollen has been used in the treatment of epilepsy[240].

nrakta S.W. Asia. Naturalized in Europe around the Mediterranean. ksacta Rocky slopes and in scrub to  $600 \text{ metres} [50,\,90]$ 

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]. Bulblets are formed on the stem just below the soil surface. These should be dug up in the autumn and replanted immediately, preferably in a cold frame for growing on until large enough to plant out into the garden[143, 163]. The formation of bulbils on the stem can be induced by either removing the stem at flowering time and layering it just below the soil surface, or by removing all the flowers before they open.

nwatta Prefers an open free-draining humus-rich fertile loamy soil with its roots in the shade and its head in the sun[90, 200]. Prefers a sunny position[143] but also succeeds in shade[163]. Succeeds in ordinary garden soil[1]. Grows well in acid[42] and limy soils[4, 42, 47, 90], though it prefers a limey soil[200]. A very ornamental plant[1, 7]. It is seen as a symbol of purity and in Christian tradition is devoted to the Virgin Mary, in pre-Christian times it was sacred to Juno, the Goddess of heaven[238]. The flowers have a scent of heather honey[245]. The Madonna lily is generally very hardy and easy to grow[143] but it is unpredictable and does not grow or flower well in all gardens[90, 238]. It is also susceptible to botrytis[143]. Only just cover the bulb with soil[47, 200]. It is best to leave the clumps undisturbed since they resent being moved[143, 238], but if you need to transplant then this is best done in late August to early September, certainly no later than mid-October[143]. Plants produce a basal rosette of over-wintering leaves in the autumn[200], these die off as the plant comes into flower[188]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### 6.2.199 Vaccinium membranaceum

Mountain Huckleberry, Thinleaf huckleberry 5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli hgattcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Vaccinium membranaceum is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 159, 172, 257]. A sweet but rather acid flavour[11]. Sour but delicious according to other reports[177, 200]. A reasonable source of vitamin C[257]. This fruit is amongst the largest and best flavoured of all the wild blueberries[183]. The native North Americans would often dry the fruit for use in the winter[256].

dwatta Antiarthritic Antiseptic Astringent Cardiac Carminative Hypoglycaemic Vitamin CAntiseptic, astringent, carminative, hypoglycaemic[172]. An infusion of the roots and stems has been used in the treatment of heart troubles, arthritis and rheumatism[257].

nrakta Western N. America - Michigan and Alaska to California. ksacta Thickets and woodland edges[43]. Moist woods[235]

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Established plants are extremely drought resistant[183]. Plants are very hardy, tolerating temperatures down to about -40°c in N. America[160]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.200 Sinapis alba

White Mustard

5 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sinapis alba is a ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed contains substances that irritate the skin and mucous membranes[238]. The plant is possibly poisonous once the seedpods have formed[76]. Mustard allergy possibly especially in children and adolescents. Retention of seeds possibly in intestines if taken internally [301].

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Condiment OilLeaves - raw or cooked[2, 5, 14, 52]. A hot pungent flavour, especially if eaten raw[K]. Young leaves are used as

putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division in autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]. Stem or leaf cuttings[163].

nwatta Landscape Uses:Border, Massing, Rock garden. Requires a moist not too heavy well-drained acid loam in light shade[47, 143]. Succeeds in full sun[143]. Plant bulbs 10 - 15cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late autumn[200]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. Special Features:North American native.

# 6.2.170 Ouercus coccifera

Kermes Oak

5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus coccifera is an evergreen Shrub growing to 4 m (13ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure

cooked[2, 63, 105]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in runing water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Dye Řepellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is rich in tannin[148]. A black dye can be obtained from the bark[89] and also from the seeds[148].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe - Mediterranean. ksacta Dry places on limestone and siliceous rocks[89].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A very ornamental plant[1], it thrives in Britain[200]. A shrub growing in dappled woodland shade at Cambridge Botanical Gardens produced a few ripe seeds after the hot summer of 1989, though the vast majority of seeds were aborted[K]. The fruit ripens in its second year[11]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Any transplanting should be done once growth has commenced in late May or in September[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200].

# 6.2.171 Fragaria viridis

Green Strawberry

5 tlin 9 cyuc 3 kcak 3 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Frágaria viridis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK cone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It brefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[74, 177]. The fruit are greenish-tinged with red and are sweet and succulent with a rich musky pineapple-like flavour[183]. Absolutely delicious, though they are not produced very freely[K].

tcanta An excellent ground cover plant, spreading vigorously by means of surface stolons and forming a dense carpet[K]. It grows well amongst shrubs but can out-compete smaller plants[K].

nrakta Europe, ksacta Woods and banks[45].

propta Seed - sow early spring in a greenhouse. The sed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta Prefers a fertile, well-drained, moisture retentive soil in a sunny position[200]. Tolerates semi-shade though fruit production will be reduced when plants grow in such a position. This species is closely related to F. vesca[200]. Plants are sometimes dioecious. In this case, male and female plants will be needed if fruit and seed is required.

#### **6.2.172** Castanea ozarkensis

Ozark Chinkapin

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 18 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Castanea ozarkensis is a deciduous Tree growing to 18 m (59ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105, 117, 177]. Small but tasty[183]. Eaten raw, there is a distinct astringency, especially if the fleshy inner skin beneath the outer shell of the seed is not removed[K]. When cooked, however, and especially when baked, the seed

makes an excellent food and can be used as a staple food in much the same way as potatoes or cereals[K]

tcanta TanninThe bark, leaves, wood and seed husks all

nrakta Central N. America - Mississippi to Oklahoma. ksacta Woods and rocky slopes[43]. Deciduous forest at elevations of 150-600 metres[270].

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors [78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K].

nwatta Prefers a good well-drained slightly acid loam but it also succeeds in dry soils[1, 11, 200]. Once established, it is very drought tolerant[1, 11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. Although it is winter-hardy in most parts of Britain, this species only really thrives in areas with hot summers[200]. An excellent soil-enriching understorey in pine forests[200]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.173 Castanea henryi

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 25 m hkuc hmimhtut cyutli hqatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hionli

drutta Castanea henryi is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105, 177]. Small[61, 63]. Said to be of excellent eating quality[183]. Eaten raw, there is a distinct astringency, especially if the fleshy inner skin beneath the outer shell of the seed is not removed[K]. When cooked, however, and especially when baked, the seed becomes much sweeter and has a floury texture[K]. It then makes an excellent food and can be used as a staple food in much the same way as potatoes or cereals[K]

tcanta Tannin WoodThe bark, leaves, wood and seed husks all contain tannin. Wood - valued locally for construction[61]

nrakta E. Asia - W. and C. China. ksacta Mixed mesophytic forests on mountain slopes at elevations of 100 - 1800 metres[266]

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K].

nwatta Prefers a good well-drained slightly acid loam but succeeds in dry soils[1, 11, 200]. Once established, it is very drought tolerant[1, 11, 200]. Very tolerant of highly

becomes much sweeter and has a floury texture[K]. It then acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. Although it is very winter-hardy, this species only really thrives in areas with hot summers[200]. It is very slow growing and small in Britain[11, 200]. A shrub at Kew was 3 metres tall in 1990[K]. Resists endothia blight[105]. Plants in this genus are notably resistant to honey fungus[200]. An excellent soil-enriching understorey in pine forests[200]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members

#### 6.2.174 Calamintha sylvatica

Calamint, Woodland calamint

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Calamintha sylvatica is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaA sweet and aromatic herb tea is made from the leaves[200]. Very refreshing[4, 200]. Leaves - used as a flavouring in cooked dishes[177]. Pleasantly pungent and strongly aromatic, the flavour is said to resemble a cross between mint and marioram[183]

dwatta Aromatic Diaphoretic Expectorant Stomachic-Calamint was commonly used as a medicinal herb in medieval times, though is little used by modern herbalists[238]. It has very similar properties to lesser calamint (C. nepeta) though is milder in its actions[238]. It is sometimes cultivated as a medicinal herb for household use. The whole plant is aromatic, diaphoretic and expectorant[4]. The leaves are harvested in July as the plant comes into flower and are dried for storage[4]. An infusion is beneficial in cases of fevers, flatulent colic and weaknesses of the stomach[4], it is also used to treat depression, insomnia and painful menstruation[238]. Its expectorant action makes it a good cough and cold remedy and it is of value for treating mild respiratory infections [254]. It is best mixed with other herbs, especially yarrow (Achillea millefolium) and Thyme (Thymus vulgaris)[254]. Calamint should not be prescribed for pregnant women since in excess it can cause a miscarriage[238].

nrakta Western Europe, including Britain, from France and W. Germany south to Spain, Algeria and N. Syria. ksacta Dry grassy banks, usually on calcareous soils, from southern Britain north to Durham and Yorkshire[5, 17].

propta Seed - sow spring in a greenhouse and only just cover the seed. It usually germinates in 2 weeks at 21°c[138]. Prick out the seedlings when they are large enough to handle and, if they grow sufficiently, plant them out into their permanent positions in the summer otherwise wait until the following spring. Division in spring. Very easy, larger clumps can be planted direct into their permanent positions. It is best to pot up smaller clumps and grow them on in a cold frame until they are well rooted before planting them out in the summer. Basal cuttings in May or June. They should be rooted in a sandy compost[245]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in a well-drained dry to moist neutral to alkaline soil and a sunny position[1]. Likes semishade[200]. Succeeds in a woodland garden[200]. Bees love the flowers of this plant[K].

#### 6.2.175 Chaenomeles x superba

Dwarf Quince, Flowering Quince 5 tlin 8 cyuc 3 kcak 3 tcan 0 dwat 1 m hkuc mild-flavoured slightly sweet fruit. The fruit can also be bletted. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit. The fruit is up to 15mm across[200].

nrakta E. Asia - E. Himalayas to Burma. ksacta Dense forests on slopes or in valleys, rocky slopes, streambanks and shrubby thickets at elevations of 2400 - 3800 metres in Tibet[266]

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. Closely related to S. cuspidata[11]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 6.2.196 Phyllostachys flexuosa

Zig-Zag Bamboo, Drooping timber bamboo 5 tlin 9 cyuc 3 kcak 2 tcan 0 dwat 6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys flexuosa is an evergreen Bamboo growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked[25, 61, 105, 177]. A delicious flavour[266]. Slightly acrid raw, they are usually boiled in at least one change of water and added to salads etc[183]. The canes are about 10mm in diameter[K]. The shoots, which are generally 2-4cm in diameter, though occasionally up to 7cm[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta Basketry WoodThe canes are not of the highest quality but can be used for plant supports etc. The medium quality wood is good for all standard bamboo uses for canes of this size[195]. The culms are used as handles of tools[266]. The splints made from the stems are used for weaving articles[266].

nrakta E. Asia - China. ksacta Not known

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position[200] and plenty of moisture in the growing season[1]. A very hardy plant, tolerating temperatures down to about -17°c. According to another report the plant only suffers minor leaf damage at -22°c[195]. The plants dislike prolonged

after a frost[K]. At this stage it has a mealy texture and a exposure to hard frosts[200]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. A plant at Trebah gardens in Cornwall was flowering heavily in May 1995[K]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. The rootstock is running[25] but not aggressively so, especially in the cooler climate of Britain[200]. New growth appears from late March[25]. This species is closely related to P. angusta[266]. Plants need quite a lot of space because the outer culms spread out sideways and arch over[162].

#### 6.2.197 Scirpus maritimus

Seaside Bulrush, Cosmopolitan Bulrush 5 tlin 9 cvuc 3 kcak 0 tcan 1 dwat m hkuc

htut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli hionli

drutta Scirpus maritimus is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female. but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water. The plant can tolerate maritime exposure.

kcakta Edible Parts: Root SeedEdible Uses: Root - raw or cooked. Rich in starch, it is usually dried and ground into a powder[2, 55, 74, 144]. The roots form tubers at intervals along their length and new plants are formed from these tubers. When first formed, the tubers are white and starchy with a sweet coconut-milk flavour, they become black and woody with age[193]. Tubers can be up to 2.5cm in diameter[193]. Seed - cooked[257]. They can be ground into a powder and used as a mush[257].

tcanta Basketry WeavingThe leaves are used in weaving and basketry[74, 257]. The leaves have been used to secure the edges of woven mats, as the warp for sandals, as the warps and twining wefts for clothing, to secure the edges of skirts etc[257]. They have been used to make twined mats for the insides of houses[257].

dwatta Astringent DiureticThe root is astringent and diuretic[240] It is used in the treatment of amenorrhoea, dysmenorrhoea, abdominal pain or tumours for post-partum females, abdominal distension and indigestion[176].

nrakta Found in most regions of the world, including Britain, but absent from the Arctic. ksacta Along the seashore, in shallow water of tidal rivers, also in ditches and ponds near the sea, avoiding shady positions[1, 17].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly guickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any wet to moisture retentive ground, pond margins and shallow water in full sun or shade[200].

# 6.2.198 Lilium candidum

Madonna Lily

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hionli

drutta Lilium candidum is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is chlorotic if the pH is too high. Prefers a pH between 6 and 6.5[200]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62,

#### 6.2.193 Mahonia bealei

Beale's barberry, Leatherleaf Mahonia 5 tlin 8 cyuc 3 kcak 0 tcan 2 dwat 2 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia bealei is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from January to March, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasant acid flavour, it is nice when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit is about 10mm long and 6mm wide[200], it ripens in April/May and if the plant is in a sheltered position the crops can be fairly heavy[K].

dwatta Antibacterial Antiphlogistic Antirheumatic Cancer Depurative Dysentery Febrifuge TonicThe leaf is febrifuge and tonic[218]. A decoction of the root and stems is antiphlogistic, antirheumatic, depurative and febrifuge[147, 218]. A decoction is used in the treatment of pulmonary tuberculosis, recurring fever and cough in rundown body systems, rheumatoid arthritis, backache, weak knees, dysentery and enteritis[147]. The root and root bark are best harvested in the autumn[213]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activitv[218].

nrakta E. Asia - W. China in Hupeh, Hubei, Sichuan and Taiwan, ksacta Damp woodlands in uplands around 2000 me-

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Foundation, Pest tolerant, Massing, Rock garden, Specimen, Woodland garden. Thrives in any good garden soil[11]. Grows well in heavy clay soils. Survives under quite heavy tree cover[11], thriving in dense shade[182]. Prefers a semi-shaded woodland position in a damp, slightly acid to neutral humus-rich soil[200]. The fully dormant plant is hardy to about -20°c[184], though the young growth in spring can be damaged by late frosts. Scarcely distinct from M. japonica[11, 200], differing mainly in its broader leaflets which are placed closer together on the stem and its erect flower racemes[245]. It is often treated as a subspecies of M. japonica, despite the fact that this species is found in the wild whilst M. japonica is a cultigen and not a wild plant[11, 200]. Plants of the two species are often confused in cultivation. The flowers are sweetly scented[245]. Hybridizes freely with other members of this genus. Special

Features: Attractive foliage, Not North American native, Extended bloom season in Zones 9A and above, Fragrant flowers, Attractive flowers or blooms.

#### 6.2.194 Arctostaphylos stanfordiana

Stanford's manzanita, Rincon manzanita 5 tlin 9 cyuc 3 kcak 1 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Arctostaphylos stanfordiana is an evergreen Shrub growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The dried fruit is said to have a better flavour than most members of this genus[183]. The fruit is about 5 - 7mm in diameter[200].

tcanta DveA vellowish-brown dve is obtained from the leaves, it does not require a mordant[168].

nrakta South-western N. America - California. ksacta Open ridges and slopes, 300 - 1200 metres[71].

propta Seed - best sown in a greenhouse as soon as it is ripe. Pre-soak dried seed in boiling water for 10 - 20 seconds or burn some straw on top of them and then stratify at 2 -5°c for 2 months[11, 200]. The seed usually germinates in 2 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or greenhouse for at least their first winter. Plant out in late spring or early summer. Cuttings of side shoots of the current season's growth, 5 - 8cm with a heel, August to December in a frame. The cuttings are very slow and can take a year to root[1, 78]. The cuttings of this species usually strike readily[11]. Division in early spring. Take care because the plant resents root disturbance. Pot the divisions up and keep them in a lightly shaded position in a cold frame or greenhouse until they are growing away actively. Layering in spring[200].

nwatta Requires a deep moist well-drained light or medium lime-free loam in sun or semi-shade[3, 11, 166, 200], but plants produce less fruit when they are grown in the shade[200]. Best given a neutral or slightly acid soil[11]. A difficult plant to cultivate, even in its native California[11]. It is best given a sunny position against a wall[11]. Plants resent root disturbance and should be placed in their final positions as soon as possible[11, 134]. There are some named varieties selected for their ornamental value[200].

#### 6.2.195 Sorbus thibetica

Tibetan whitebeam

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 20 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus thibetica is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cvanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Very nice raw when it is fully ripe, preferably picked pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chaenomeles x superba is a deciduous Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - very harsh and acid raw but fragrant when cooked. Used for jams, jellies etc and as a flavouring with cooked apples[K]. The fruit can be apple or pear-shaped and up to 6cm long x 6cm wide[200].

tcanta Hedge HedgePlants can be grown to make a medium sized hedge[200]. Some cultivars, such as 'Crimson and Gold' produce suckers prolifically and are suitable for ground cover[182].

nrakta A hybrid of garden origin, C. japonica x C. speciosa. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. This species is a hybrid and so will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200].

nwatta Landscape Uses:Border, Erosion control, Ground cover, Massing, Woodland garden. Easily cultivated in any reasonably good soil[1, 11]. Prefers a deep moist welldrained loam[11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[200]. Tolerates atmospheric pollution[200]. Plants are hardy to about -25°c[200]. A very ornamental plant, there are many named varieties[200, 202]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native. Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 6.2.176 Carva ovalis

Sweet Pignut

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 30 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carya ovalis is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Sap SeedEdible Uses: Seed - raw or cooked[1, 101, 105]. Small but sweet[11, 82] with a thin shell[159, 235]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. Sap - raw. Tapped in the spring, it has a sweet flavour[101].

tcanta Fuel WoodWood - heavy, hard, tough and elastic. Used for making wagons, agricultural implements, tool handles etc[63, 82].

nrakta Eastern N. America - Massachusetts to Michigan, Virginia, Illinois, Georgia and Missouri. ksacta Rich woodlands and on hillsides[43, 82].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. Considered by some botanists to be no more than a form of C. glabra[101], this tree is more regular cropping than other species[159]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229]. The leaves are richly aromatic[245].

#### 6.2.177 Amelanchier arborea

Downy Serviceberry, Alabama serviceberry, Juneberry, Com mon Serviceberry, Downy Serviceberry

5 tlin 8 cyuc 3 kcak 2 tcan 1 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier arborea is a deciduous Tree growing to 10 m (32ft) by 12 m (39ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked[101, 227]. The fruit has a few small seeds at the centre, some forms are dry and tasteless[11, 177, 227] whilst others are sweet and juicy[183, 227]. The fruit ripens unevenly over a period of 2 - 3 weeks and is very attractive to birds, this makes harvesting them in quantity rather difficult[229]. The fruit is borne in small clusters and is up to 10mm in diameter[200]. It is rich in iron and copper[226].

tcanta Soil stabilizationThe trees have an extensive root system and can be planted on banks etc for erosion control[200]. Wood - close-grained, hard, strong, tough and elastic. It is one of the heaviest woods in N. America, weighing 49lb per cubic foot[227, 274]. Too small for commercial interest, it is sometimes used for making handles[227, 229].

dwatta Anthelmintic Astringent Tonic VDA compound infusion of the plant has been used as an anthelmintic, in the treatment of diarrhoea and as a spring tonic[257]. An infu-

sion of the bark has been used in the treatment of gonor-rhoea[257].

nrakta Eastern N. America - New Brunswick to Florida, west to Minnesota and Texas. ksacta Rich woods, thickets and slopes[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Landscape Uses: Specimen, Street tree, Woodland garden. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main drawback to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. The plant becomes dwarfed when growing in sterile (poor and acid) ground[227]. Hybridises with A. bartramiana, A. canadensis, A. humilis and A. laevis. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. Special Features: Attracts birds, North American native, Attracts butterflies. Blooms are very showy. The plant is heat tolerant. in zones 9 through 4. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant. in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown

#### 6.2.178 Helianthus maximilianii

Maximillian Sunflower, Maximillian Daisy 5 tlin 10 cyuc 3 kcak 0 tcan 0 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Helianthus maximilianii is a PERENNIAL growing to 2.4 m (7ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Tubers - raw or cooked[22, 46, 61, 257]. Similar in flavour to Jerusalem artichokes, but lower yielding. Seed - raw or cooked[183]. An edible oil is obtained from the seed[183].

nrakta Central N. America - Minnesota and Manitoba to Saskatchewan, Missouri, Nebraska and Texas. ksacta Rich prairies[43], usually on drier soils[60]. Low moist areas, roadsides and prairies in Texas, often forming large

colonies[274].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Management: Standard Staple Crop: ProteinoilLandscape Uses:Border, Container, Specimen, Succeeds in most soils in a sunny position[1]. Requires a rich soil[1]. Dislikes shade[1]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. At least one named form has been developed. Called 'Prairie Gold', it is being investigated by the Land Institute in Salina, Kansas for its oil-seed potential in a non-tillage permaculture system[183]. The yield of edible tubers is not very high. This species is closely related to H. giganteus[1]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Plants have a running root system and can be invasive[1]. Special Features: Attracts birds, North American native. Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

#### 6.2.179 Rubus amabilis

5 tlin 9 cyuc 3 kcak 1 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rubus amabilis is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 11, 61, 105]. Large with a good flavour[46]. A sweet taste[177]. The fruit is about 16mm in diameter[200]. tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta E. Asia - China to the Himalayas. ksacta Scrambles on the forest floor, 1300 - 3800 metres[184]. Foothills, along ditches, montane valleys, slopes, forests, thickets, forest margins and roadsides at elevations of 1000 - 3700 metres[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Division in early spring or just before leaf-fall in the autumn[200].

Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible. July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Hardy to about -15°c[184]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Closely allied to V. lantana[1, 11], but not as hardy as that species[11].

# 6.2.190 Gavlussacia frondosa

Dangleberry, Blue huckleberry 5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli yre7t hionli

drutta Gaylussacia frondosa is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 62]. Sweet and juicy[11, 43, 235], they are good to eat[183]. The fruit is about 8mm in diameter[235].

nrakta Eastern N. America - New Hampshire to Virginia, Alabama, Ohio and Louisiana. ksacta Dry woods and clearings[43]. Moist woods according to another report[235].

propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 1 month warm stratification followed by 2 months cold[113]. When large enough to handle, prick the seedlings out into individual pots of lime-free compost and grow them on in light shade in a greenhouse or cold frame for at least their first winter. Plant out into their permanent positions in late spring or early summer when they are at least 15cm tall. Cuttings of half-ripe wood, fully/August in a frame[200]. Layering. Division in spring.

nwatta Requires a lime-free moist peaty soil, thriving in sun or part shade[11, 182]. Prefers partial shade[3]. The fruit is not often produced on plants growing in Britain[11, 182].

# 6.2.191 Hedeoma pulegioides

American Pennyroyal, American false pennyroyal 5 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Hedeoma pulegioides is a ANNUAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

pcista In large quantities this plant, especially in the form of the extracted essential oil, can be toxic if taken internally[222]. Skin contact with the pure essential oil can cause dermatitis[222]

kcakta Edible Parts: LeavesEdible Uses: CondimentThe leaves have a very strong mint-like aroma and taste[171], they can be brewed into a refreshing tea that promotes good digestion, or they can be used as a culinary flavouring[183, 238]. An essential oil from the plant is used by the food industry as a flavouring in beverages, ice cream, baked goods etc[183].

tcanta Essential RepellentThe essential oil is used as an ingredient in commercial insect repellents and cleaning products[238]. The plant is used as an insect repellent[169, 171]. When rubbed on the body it is said to repel ticks[207].

dwatta Abortifacient Birthing aid Carminative Diaphoretic Rubefacient StimulantAmerican pennyroval has a long history of medicinal use by various native North American Indian tribes and has become a traditional household remedy in North America[238]. It is used mainly in the treatment of digestive disorders, colds, whooping cough, painful menstruation and as an aid in childbirth[238]. A tea made from the leaves or flowering stems is carminative, rubefacient, stimulant[46, 61, 171]. It is used to treat colds because it promotes perspiration[207]. A tea with brewers yeast can induce an abortion[213]. The plants are harvested when flowering and can be used fresh or dried[213, 238]. The essential oil is distilled from the plants when they are in flower and used medicinally in the same ways as the leaves. Caution is advised since the pure essential oil is very toxic and ingestion can be lethal whilst skin contact can cause dermatitis[222, 2381.

nrakta N. America - S. Quebec to Minnesota and S. Dakota, then south to Tennessee and Arkansas. ksacta Dry soils[43 in open woods and fields[169].

propta Seed - sow in situ in spring or autumn[169].

nwatta Prefers a sunny position in a well-drained acidic soil of low to moderate fertility[169]. Another report says that it prefers a rich sandy soil in sun or partial shade[238]. The plants neat habit and aromatic foliage make it a good candidate for growing in containers or planting near seats[238].

#### 6.2.192 Viola canina

Dog Viole

5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 0.4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Viola canina is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers most soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[105, 177]. When added to soups, they thicken them in much the same way as okra[85, 159]. A tea can be made from the leaves[85].

dwatta Cathartic EmeticThe flowers and leaves are powerfully cathartic and emetic[4]. The plant has also had a reputation for curing skin diseases[4].

nrakta Europe, including Britain, from Scandanavia south and east to Spain and temperate Asia to Japan. ksacta Heaths, dry grasslands, dunes and fens to 420 metres[17].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Tolerates sandstone and limestone soils but becomes

well as celery leaf (A. graveolens secalinum) and celeriac (A. graveolens rapaceum). This entry only deals with the wild celery, the other plants are dealt with separately. A very aromatic plant, the aroma being most noticeable when the foliage is bruised. The growing plant is a good companion for leeks, tomatoes, French beans and brassicas[18].

#### 6.2.187 Lepidium latifolium

Dittander, Broadleaved pepperweed 5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hna7tmwatli yra7t hionli

drutta Lepidium latifolium is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: CondimentYoung leaves - raw or cooked[2, 61, 74]. A very hot cress-like flavour[K]. The leaves are nice when used in small quantities as a flavouring in salads[K]. Some reports also suggest using them as a potherb[183], though they have always seemed to be too strong for us to want to try this[K]. The leaves are available very early in the year[K]. Root - it can be grated and made into a sauce which is used as a horseradish substitute[2, 5, 183]. It has a pungently hot flavour. Seed used as a condiment[177, 183].

tcanta InsecticideUsed as an insecticide[100]. No further details are given, but it is likely to be a strong infusion of the leaves and stems that is used.

dwatta Antiscorbutic Depurative Hepatic Kidney Resolvent StomachicThe plant is antiscorbutic, depurative and stomachic[61, 240]. An infusion of the plant is used in the treatment of liver and kidney diseases, it increases cardiac amplitude, decreases frequency and regulates the rhythm[240]. It is also used as a resolvent in the treatment of skin diseases[240].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and W. Asia. ksacta Salt marshes and wet sands[17] on the south and east coasts[5].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the spring. Division in spring. Plant them out direct into their permanent positions. Division is very simple and succeeds at almost any time of the year[K].

nwatta A very easily grown plant, it succeeds in most soils in sun or light shade. Plants have been surviving quite happily with us, and are still spreading freely, in dense grass that is rarely cut[K]. Dittander was formerly cultivated as a food condiment in Britain and in ancient Greece[17, 183]. It is a very invasive plant, capable of spreading more than a metre per year by means of its aggressive root system[K]. It produces new growth early in the year and so can be a useful salad ingredient in late winter[K].

# 6.2.188 Berberis x lologensis

5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Berberis x lologensis is an evergreen Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no

shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasant sub-acid flavour, though there are a lot of seeds to relatively little flesh[K]. Children generally love this fruit, along with some adults, though most adults seem to prefer it cooked in pies, preserves etc[K]. The fruits are about 7mm long[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Ántibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A garden hybrid, B. darwinii. x B. linearifolia ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. This plant does not breed true from seed because it is a hybrid species. Most of the seedlings seedlings revert back to one of the parents, usually B. darwinii[11]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Grows well on chalky soils[11]. Plants are hardy to about -15°[184]. A very ornamental plant[1], there are several ammed varieties[182]. The cultivar 'Mystery Fire' bears very large crops of fruit, even on small plants[K]. A good bee plant[108], the flowers are very fragrant. Plants can be pruned back quite severely, they resprout well from the base[200].

#### 6.2.189 Viburnum cotinifolium

5 tlin 9 cyuc 3 kcak 3 tcan 0 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli dyatxre7t hjonli

drutta Viburnum cotinifolium is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 51, 146, 158]. A sweetish flavour[183]. The ovoid fruit is about 12mm long and contains a single large seed[200].

tcanta WoodWood - hard, close grained[146, 158].

nrakta E. Asia - Himalayas. ksacta Amongst oak and deodar in forests and shrubberies, affecting open spaces on the rather drier exposures, to 3600 metres[51, 146].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Prefers a humus-rich soil[184]. Hardy to about -20°c[184]. A very ornamental plant[1]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey funqus[200].

# 6.2.180 Lactuca perennis

Perennial Lettuce

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lactuca perennis is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no specific mention of toxicity has been seen for this species, many plants in this genus contain a narcotic principle, this is at its most concentrated when the plant begins to flower. This principle has been almost bred out of the cultivated forms of lettuce but is produced when the plant starts to go to seed[13].

kcakta Edible Parts: Leaves Edible Uses: Leaves - raw or cooked[27, 46, 61, 105, 183]. The leaves are often blanched to reduce any bitterness. They are fairly acceptable raw in salads (even without being blanched), especially in late winter and spring when the flavour is quite mild[K]. The leaves do become much more bitter in the summer, however, especially as the plant comes into flower[K].

dwatta Although we have seen no specific reports for this species, most if not all members of the genus have a milky sap that contains the substance 'lactucarium' and can probably be used as the report below details[K]. The whole plant is rich in a milky sap that flows freely from any wounds. This hardens and dries when in contact with the air[4]. The sap contains 'lactucarium', which is used in medicine for its anodyne, antispasmodic, digestive, diuretic, hypnotic, narcotic and sedative properties[9, 21, 46, 165, 192, 213, 238]. Lactucarium has the effects of a feeble opium, but without its tendency to cause digestive upsets[4], nor is it addictive[7]. It is taken internally in the treatment of insomnia anxiety neuroses, hyperactivity in children, dry coughs, whooping cough, rheumatic pain etc[238]. Concentrations of lactucarium are low in young plants and most concentrated when the plant comes into flower[238]. It is collected commercially by cutting the heads of the plants and scraping the juice into china vessels several times a day until the plant is exhausted[4]. An infusion of the fresh or dried flowering plant can also be used[9]. The plant should be used with caution, and never without the supervision of a skilled practitioner. Even normal doses can cause drowsiness whilst excess causes restlessness[238] and overdoses can cause death through cardiac paralysis[7, 9]. Some physicians believe that any effects of this medicine are caused by the mind of the patient rather than by the medicine[213]. The sap has also been applied externally in the treatment of warts[222].

nrakta S. Europe. ksacta Rocky or other dry places, especially on calcareous soils[27, 50].

propta Seed - sow April in a greenhouse, only just covering the seed. Germination is usually fairly quick When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. It is best to pot up the divisions and keep them in a lightly shaded position in a cold frame until they are growing away well. Plant them out in the summer. Root cuttings in spring[K].

nwatta Prefers a light well-drained sandy loam and a sunny position [187]. Plants are hardy to about -25°c[187]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) informa-

tion on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

#### 6.2.181 Lycium pallidum

Pale Wolfberry, Pale desert-thorn, Rabbit thorn 5 tin 9 cyuc 3 kcak 3 tcan 2 dwat 1.8 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lycium pallidum is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista Although no records of toxicity have been seen for this species, it does belong to a family that contains many poisonous plants. Some caution should be applied, especially towards leaves or unripe fruits, though ripe fruits are almost certainly edible.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked or dried for later use[[46, 61, 85, 183, 257]. The fruit keeps well when dried and ground into a meal[183]. The fruit should be perfectly ripe if it is eaten raw[95]. The Hopi Indians boiled the fruit, drained off the water and ground the fruit nto a mush. Clay was then mixed with water until a thick consistency was achieved, this was mixed with the berries and the whole lot eaten[216]. The fruit is about 10mm in diameter[200].

tcanta Soil stabilizationPlants have an extensive root system and can be planted to stabilize banks[200].

dwatta Cancer OdontalgicThe ground up root has been placed in a tooth cavity to bring relief from toothache(257). The bark and the dried berries have been used as a 'life medicine' [257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Central and Southern N. America. ksacta Dry plains and hills.

propta Seed - sow early spring in a greenhouse. Germination is usually good and fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Pinch out the shoot tips of the young plants in order to encourage bushy growth[78]. Cuttings of half-ripe wood, 5 - 10cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, autumn to late winter in a cold frame. High percentage[78, 2001. Division of suckers in late winter. Very easy, the suckers can be planted out direct into their permanent positions. Layering.

nwatta Does not require a rich soil, flowering and fruiting better in a well-drained soil of moderate quality[11]. Succeeds in impoverished soils[200]. Requires a sunny position[200]. Tolerates maritime exposure[200]. Hardy to about -17°c[200]. Plants do not always fruit well in Britain[11], particularly after a cool summer[200].

#### 6.2.182 Crambe cordifolia

Flowering sea kale

5 tlin 9 cyuc 3 kcak 3 tcan 1 dwat 2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Crambe cordifolia is a PERENNIAL growing to 2 m (6ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: lidht (sandy), medium

(loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves -cooked[2, 105, 177]. Used as a potherb[183]. Young leaves have a pleasant cabbage-like flavour, though older leaves are rather tough[K]. Root - cooked[2, 145, 177].

tcanta Plants can be used for ground cover when planted about 1.2 metres apart each way. They form large clumps[208].

 $\bar{d}$ watta AntipruriticThe plant is used as a cure for itch[240].

nrakta W. Asia - Afghanistan and Iran. ksacta Grows on the steppes and open stony places[74, 187].

propta Seed - sow March/April in a seedbed outdoors and either thin the plants out or move them to their permanent positions when about 10cm tall[111]. The young plants are very attractive to slugs so some protection will often be needed. Germination can be slow so it is best to sow the seed in pots in a cold frame[164]. Germination usually takes place in 3 - 26 weeks at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions when they are at least 10cm tall. Division in spring or autumn[1, 111]. Dig up the root clump and cut off as many sections as you require, making sure they all have at least one growing point. The larger of these divisions can be planted out straight into their permanent positions, though small ones are best potted up and grown on in a cold frame until they are established. Root cuttings, 3 - 10 cm long, in spring[104]. These can be planted straight into the open ground or you can pot them up in the greenhouse and plant them out once they are growing strongly.

watta An easily grown plant, succeeding in a good loam and an open sunny position[1, 111, 200] but also tolerating some shade[188]. Prefers a slightly alkaline soil in a position sheltered from strong winds[200]. Another place in this report says that the plant tolerates maritime expoure[200]. Tolerates poor and dry soils and some shade[200]. Dislikes acid soils[1]. Established plants are drought tolerant[190]. Plants are hardy to about -20°c[187]. A deeproted plant[233], it dislikes root disturbance. The young growth in spring is adored by slugs[K]. Plants can be grown in the summer meadow if the grass is not cut too low, since this would damage the growing point[200]. The flowers emit a delicious wallflower-like scent in hot sunny weather[245].

#### 6.2.183 Viburnum nudum

Smooth Withe Rod, Possumhaw, Withe-rod, Swamp Haw, Smooth Witherod, Possum Haw Viburnum, Possum Haw 5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 4.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum nudum is a deciduous Shrub growing to  $4.5~\mathrm{m}$  ( $14\mathrm{ft}$  9in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105]. It usually has a sweetish flavour[2, 183] but is sometimes bitter[43] and is usually unpalatable[227]. The ovoid fruit is about 8mm long and contains a single large seed[200].

dwatta Antispasmodic Diuretic TonicA tea made from the bark is antispasmodic, diuretic, tonic and uterine sedative [222].

nrakta Eastern N. America - Maryland to Florida, west to Arkansas and Kentucky. ksacta Wooded swamps, wet pinelands and bogs[43]. Also found on rich hillsides[82].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully

developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78]

nwatta Landscape Uses:Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants often grow in quite acid soils in the wild[227]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. This species is closely related to V. cassinoides[11]. Special Features: Attracts birds, North American native, Wetlands plant, Fragrant flowers, Attractive flowers or blooms.

#### 6.2.184 Sidalcea malviflora

Checkerbloom, Dwarf checkerbloom, California checkerbloom, Siskiyou checkerbloom
5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat m hkuc
hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis
hpa7tmwatli xre7t hjonli

drutta Sidalcea malviflora is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. The leaves have a very mild flavour and a slightly mucilaginous texture, they make a very acceptable salad[K]. The leaves can be cooked as greens[257]. The dried mashed leaves have been used as a flavouring with black manzanita berries (Arctostaphyllos spp)[257].

nrakta South-western N. America - Oregon to Baja California. ksacta Grassy slopes and open forest glades[200].

propta Seed - sow spring in a greenhouse. When the seedlings are large enough to handle, prick them out into individual pots and plant them out in the summer. Division in the spring.

nwatta Prefers a deep fertile well-drained but moistureretentive soil in full sun or with some shade at the hottest part of the day[200]. This species thrives in climates with a relatively cool summer and mild winters and tolerates temperatures down to about -15°c[200]. However, where prolonged cold temperatures are experienced without snow cover, it is best to mulch the plants well in winter with material such as bracken litter[200]. If the plants are cut back immediately after flowering they will usually produce a second flush of bloom in late summer[200]. There are many named varieties, selected for their ornamental value[200].

#### 6.2.185 Prunus angustifolia

Chickasaw Plum, Watson's plum, Hally Jolivette Cherry 5 tlin 9 cyuc 3 kcak 3 tcan 1 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus angustifolia is a deciduous Tree growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw, cooked or dried for later use[82, 149, 274]. Large and thin-skinned with a soft juicy sweet pulp, it has a dlicious flavour and is very good eaten out of hand, whilst it can also be used in pies, preserves etc[183, 274]. The fruit is up to 18mm in diameter[227]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Shelterbelt Soil stabilization WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. This species is sometimes used in shelterbelt planting[227]. It has an extensive root system and often forms thickets, which make it useful for erosion control[229]. Wood - heavy, rather soft, not strong[82]. It weighs 43lb per cubic foot[227] and is of little commercial value[229].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta South-eastern N. America - New York to Florida, west to Texas. ksacta Usually found in sandy soils, occurring along fence rows, in pastures, fields, stream banks, sand dunes and disturbed sites, often forming thickets[229].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Landscape Uses:Border, Espalier, Standard, Specimen. Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Although it should be hardy in all parts of Britain, it grows better in the warmer areas of the country[11]. A fast-growing but short-lived tree in the wild[229], it has become rather rare in a truly wild state[227], though it is often cultivated for its edible fruit in N. America. There are some named varieties [82, 183]. The fruit is not freely produced in British gardens[11]. The flowers, which appear just before the leaves unfold, have a refreshing fruity scent[245]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. This species suckers freely in the wild, often forming thickets[82]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native, All or parts of this plant are poisonous, Attracts butterflies, Fragrant flowers, Blooms are very showy. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 6.2.186 Apium graveolens

Wild Celery. Ajmod, Ajwain-ka-patta (Indian) 5 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 0.6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli fyifxre7t hjonli

drutta Apium graveolens is a BIENNIAL growing to  $0.6\,\mathrm{m}$  ( $2\mathrm{ft}$ ) by  $0.3\,\mathrm{m}$  ( $1\mathrm{ft}$  in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semishade (light woodland). It prefers moist soil.

pcista If the plant is infected with the fungus Sclerotinia sclerotiorum, skin contact with the sap can cause dermatitis in sensitive people[65]. This is more likely to happen to Caucasians[218]. Allergic responses include anaphylaxis in sensitive individuals. Cross-allergenicity between celery, cucumber, carrot, watermelon and possibly apples. Avoid during pregnancy as emmenagogue, abortifacient and uterine stimulant activity reported [301].

kcakta Edible Parts: Leaves Root SeedEdible Uses: CondimentLeaves - raw or cooked[52, 105]. Mainly used as a flavouring in soups etc[5, 7, 9, 46]. They can be eaten raw but have a very strong flavour[52]. They are toxic if consumed in large amounts[238]. Seed - a flavouring. Used in small quantities to flavour soups and stews[238]. An essential oil from the seed is also used as a flavouring[46, 105]. Root - cooked[74].

tcanta EssentialThe growing plant is an insect repellent, it repels the cabbage white butterfly so is a good companion for brassicas[20]

dwatta Antianxiety Antirheumatic Aperient Appetizer Carminative Diuretic Emmenagogue Galactogogue Nervine Stimulant TonicWild celery has a long history of medicinal and food use, it is an aromatic bitter tonic herb that reduces blood pressure, relieves indigestion, stimulates the uterus and is anti-inflammatory[238]. The ripe seeds, herb and root are aperient, carminative, diuretic, emmenagogue, galactogoque, nervine, stimulant and tonic[4, 7, 21, 165]. Wild celery is said to be useful in cases of hysteria, promoting restfulness and sleep and diffusing through the system a mild sustaining influence[4]. The herb should not be prescribed for pregnant women[238]. Seeds purchased for cultivation purposes are often dressed with a fungicide, they should not be used for medicinal purposes[238]. The root is harvested in the autumn and can be used fresh or dried[238]. The whole plant is harvested when fruiting and is usually liguidized to extract the juice[238]. The seeds are harvested as they ripen and are dried for later use[238]. An essential oil obtained from the plant has a calming effect on the central nervous system. Some of its constituents have antispasmodic, sedative and anticonvulsant actions. It has been shown to be of value in treating high blood pressure [254]. A homeopathic remedy is made from the herb[9]. It is used in treating rheumatism and kidney complaints[9].

nrakta Central and southern Europe, including Britain, to temperate areas of Africa and Asia. ksacta Ditches, by rivers and in other damp locations, especially near the sea in salt marshes[9, 17, 100].

propta Seed - sow spring or autumn in situ. If seed is in short supply it can be sown in a cold frame in spring. The seed can harbour certain diseases of celery, it is usually treated by seed companies before being sold but if you save your own seed you should make sure that only seed from healthy plants is used[1].

nwatta Prefers a rich moist soil in sun or semishade[238], but with some shade in the summer[52]. It is tolerant of saline soils[238]. The plants are fairly hardy, though they can be damaged by hard frosts[238]. Wild celery is the parent of the cultivated celery (A. graveolens dulce) as

bowel syndrome, gastritis, gall bladder complaints, painful menstruation etc[238]. The root is harvested in the autumn and dried for later use[238]. The root should not be stored for longer than 1 year, since it is likely to lose its medicinal virtues[4]. Caution is advised in the use of the this plant, when taken fresh it can cause vomiting and other side effects[222]. The root, harvested in September, is used to make a homeopathic remedy[232]. Its main use is in the treatment of infant colic[232].

nrakta Eastern N. America - New England to Minnesota and Ontario, south to Virginia and Texas. ksacta Borders of bogs, swamps, marshes, river and lake margins, creek bottoms, sandy or rocky soils, moist or dry woods, hammocks, thickets, limestone or talus slopes, roadsides, sea level to 1500 m[2701.

propta Seed - sow March to April in a sunny position in a warm greenhouse and only just cover. It germinates in 1 -3 weeks at 20°c[175]. Prick out the seedlings as soon as they are large enough to handle and grow on in a greenhouse for their first year. Plant out in late spring as the plant comes into new growth. Basal stem cuttings in the summer[37]. Division in the dormant season, never when in growth[1]. The plant will often produce a number of shoots, the top 5 - 10 cm of the root below each shoot can be potted up to form a new plant whilst the lower part of the root can possibly be eaten[K]. Tubercles (baby tubers) are formed in the leaf axils. These are harvested in late summer and early autumn when about the size of a pea and coming away easily from the plant. They should be potted up immediately in individual pots in a greenhouse or cold frame. Plant out in early summer when in active growth[K].

nwatta An easily grown plant, succeeding in a fertile well-drained soil in a sunny position or light shade[200]. Prefers a rich light soil[1]. Plants are hardy to at least - 15°c[238]. Plants produce tubercles (small tubers that are formed in the leaf axils of the stems), and can be propagated by this means[K]. A climbing plant that supports itself by twining around the branches of other plants[219]. This is a highly polymorphic species, some botanists dividing it up into several species[235, 270]. Dioecious. Male and female plants must be grown if seed is required.

# 6.2.325 Oplopanax japonicus

5tlin 9 cyuc 2 kcak 0 tcan 1 dwat 3 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Oplopanax japonicus is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil. The plant can tolerate maritime exposure.

pcista The plant is densely armed with spikes and these spikes are irritant[200]. Although no specific mention has been seen for this plant, it belongs to a genus where the species are usually rich in calcium oxylate, this is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it. However, calcium oxylate is easily destroyed by thoroughly cooking or drying the plant.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - peeled and then cooked[46, 61, 105, 106]. Only the very young shoots are used[172]. The roots can be chewed after peeling[105, 106, 161].

dwatta Analgesic Antiphlogistic Antirheumatic Hypoglycaemic TonicThe root bark and stems are analgesic, antiphlogistic, antirheumatic, hypoglycaemic and tonic[172].

nrakta E. Asia - Japan. ksacta Moist woods, especially by streams[11] and usually in rich soils[99].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of suckers in the dormant season. Root cuttings in a greenhouse in the winter[188].

nwatta Requires a cool moist soil[11, 200]. Prefers a position in light shade[182]. Prefers dense shade and is probably best if grown in moist woodland[1, 11]. Tolerates maritime exposure[200]. (Rather a strange report for a plant that needs to be grown in dense shade[K]) A very hardy plant, tolerating temperatures down to at least -15°c, but the young shoots in spring can be damaged by late frosts[11, 200]. It is therefore best not grown in a frost pocket[182]. This species used to be included in O. horridus as the Japanese form of that species, but it has recently (1991) been recognised as a distinct species[200]. A very ornamental plant, but it is densely armed with spikes[60]. It transplants easily and also tolerates pruning[200]. The leaves and stems are excessively spiny[182].

#### 6.2.326 Chrysolepis sempervirens

Dwarf Golden Chinquapin, Bush chinquapin 5 tlin 9 cyuc 2 keak 0 tcan 0 dwat 3 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli hionli

drutta Chrysolepis sempervirens is an evergreen Shrub growing to 3 m (9ft) by 5 m (16ft). See above for USDA hardness. It is hardy to UK zone 6. It is in leaf all year, in flower in July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[257]. Very sweet and much appreciated, tasting somewhat like a hazel nut[183]. The small seed is up to 13mm wide[270].

nrakta South-western N. America - California and Oregon. ksacta Alpine regions of the coastal ranges and the Sierra Nevada[82]. Rocky slopes, chaparral and conifer forest, mostly at high elevations up to 3300 metres, but sometimes down to sea level[270].

propta Seed - best sown in a cold frame as soon as it is ripe, the seed must be protected from mice etc[200]. The seed has a short viability and should not be allowed to dry out. If stored overwinter it should be kept cool and moist. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors.

nwatta Requires a lime-free soil[1]. Prefers a sheltered semi-shaded position and a light deep moist soil[1, 11]. Plants can only be grown in oceanic and Mediterranean climates, thriving in Britain[200]. In N. America this plant grows better at low elevations than C. chrysophylla. A specimen at Edinburgh Botanical Gardens is 3.5 metres tall and 6 metres across[11]. A very ornamental shrub[183].

# 6.2.327 Chimonobambusa quadranqularis

Square Bamboo

St tlin 9 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

drutta Chimonobambusa quadrangularis is an evergreen Bamboo growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots - cooked. An excellent relish. The canes are up to 20mm in diameter[K].

tcanta Hedge Hedge Plant support WoodThe canes make good plant supports and are excellent material for handicrafts[195]. Can be grown as a hedge or screen[200].

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

# 6.2.230 Ribes himalense

5tlin 9 cyuc 3 kcak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes himalense is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[51, 272]. The fruit is quite large, but so are the seeds[200]. The fruit is red, turning purplish black on maturity and is about 7mm in diameter[266].

dwatta Astringent Dysentery PoulticeThe juice of the leaf is used in the treatment of diarrhoea and dysentery[272]. A paste of the leaves is applied to cuts and wounds[272].

nrakta E. Asia - Himalayas to China. ksacta Mixed, coniferous, or broad-leaved forests and forest margins, thickets on mountain slopes, river banks, or in ravines, grasslands on mountain slopes, mountain valleys, stream banks, roadsides[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°c[200]. This species is closely related to R. petraeum[200]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.231 Mahonia napaulensis

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia napaulensis is an evergreen Shrub growing to 2.5 m (8ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay

soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[272]. An acid flavour, but it is rather nice raw especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit can also be dried and used as raisins[2, 51, 158, 177]. The ovoid fruit is about 12mm long[200].

tcanta DyeA yellow dye is obtained from the stem and leaves[61].

dwatta Antibacterial Antitumor Dysentery Ophthalmic TonicThe fruits are said to be diuretic and demulcent[240, 272]. They are used in the treatment of dysentery[240]. A decoction of the bark is used as eye drops to treat inflammations of the eyes[272]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta E. Asia - Bhutan, Nepal, Sikkim and Uttar Pradesh. ksacta Dense wet oak and rhododendron forests to 2900 metres[51, 184].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Cuttings of half ripe wood 15cm long, July in individual pots in a frame[78]. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown plant, it thrives in any good garden soil[11]. Grows well in heavy clay soils. Prefers a semishaded woodland position in a damp slightly acid to neutral humus rich soil[200]. Requires a position sheltered from cold or strong winds[1]. The plant is slightly tender in Britain[1] though it does well in Cornwall[59]. It under performs in areas where temperatures regularly fall below -10°c[200]. The young growth in spring can be damaged by late frosts[K]. Hybridizes freely with other members of this genus. The flowers have a delicate sweet fragrance[245]. At least one named variety has been developed for its ornamental value. 'Maharajah' appears to be hardier than the type species[182]. Closely allied to M. acanthifolia[11] (which is quoted as a synonym of this species in some books). The differences stated between the two species do not hold true in the wild but in cultivation M. acanthifolia has leaflets with a dull surface, flowers in the autumn and is hardier than many of the spring flowering introductions of M. nepaulensis. Resistant to honey fungus[88]

#### 6.2.232 Mentha requienii

Corsican Mint, Mint

5 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha requienii is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. A very strong peppermint-like aroma, it is used as a flavouring in salads, cooked foods and liqueurs[183]. A herb tea is made from the leaves.

tcanta Essential Repellent StrewingAn essential oil with a strong peppermint scent is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. An ornamental ground cover plant[183].

dwatta Antiseptic Carminative FebrifugeA tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[2221.

nrakta Europe - Mediterranean in Corsica, Sardinia and Italy, Occasionally naturalized in Britain, ksacta Not known

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Reaching only 1-3 cm in height. Succeeds in most soils and situations so long as the soil is not too dry[200]. This species of mint will grow in drier soils than the other mints[245]. It also grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Prefers a shady position[188]. Fairly tolerant of being walked on, it grows well in the cracks of paving stones and also as a lawn with thyme and camomile[245]. This species is not hardy in all areas of Britain[238]. However, the plant usually self-sows even when the parent plant is killed by frost[238]. The whole plant is strongly aromatic with a peppermint aroma[245]. The flowers are very attractive to bees and butterflies. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233]. The plant is heat tolerant in zones 9 through 6 (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 6.2.233 Vaccinium parvifolium

Red Bilberry, Red huckleberry 5 tlin 9 cyuc 3 kcak 1 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hionli drutta Vaccinium parvifolium is a deciduous Shrub growing to 1.8 m (6ft) by 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked and used in making jams, pies, jellies etc[1, 2, 101, 118, 183, 257]. The fruit can also be dried for later use[183]. An acid flavour, but it is very palatable[11]. The fruit makes a very superior jelly[257]. The fruit is about 12mm in diametr[200]. A tea is made from the dried fruit and leaves[118].

tcanta BroomThe long straight green stems and twigs have been used to make brooms[257].

dwatta Antiseptic Astringent Carminative HypoglyacemicAntiseptic, astringent, carminative, hypoglycaemic[172]. A decoction of the bark has been used in the treatment of colds[257].

nrakta Western N. America - Alaska to California. ksacta Coastal forests[11].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. A very ornamental plan[60]t. This species is closely related to V. ovalifolium[182]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.234 Acer macrophyllum

Oregon Maple, Bigleaf maple, Oregon Maple 5 tlin 9 cyuc 3 koak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Acer macrophyllum is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Ēdible Parts: Flowers Inner bark Leaves Sap SeedĒdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177, 183]. The syrup is used as a sweetener on many foods. The concentration of sugar is somewhat lower than in the sugar maples (A. saccharum). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Inner bark[177]. Eaten in small quantities with oil[257]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread. The leaves, when wrapped round food during baking, impart a nice flavour to the food[99, 118]. Yel-

infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas in northern Assam, northeastern India, Nepal, Sikkim and eastern Tibet. ksacta In the subalpine to alpine zone, growing on rocky slopes and scree.

propta Seed - best sown as soon as it is rine in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[200]. Plants can be pruned back quite severely and will resprout well from the base[200]. This species comes into leaf very early in the spring[11]. Hybridizes freely with other members of this genus[1]. This species is closely related to B. angulosa[200].

#### 6.2.322 Vaccinium oldhamii

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli dyatxre7t hjonli

drutta Vaccinium oldhamii is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 11, 105, 177]. The fruit is about 6mm in diameter[200].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and woods at low elevations in the mountains of Japan[58].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Self-sterile, at least two plants from different sources must be grown if fruit is required. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.323 Forestiera neomexicana

Wild Oli

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Forestiera neomexicana is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from July to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 257]. Although only 4 - 8mm long[227], it has been suggested as a substitute for the true olive, Olea europaea[105, 177, 183].

tcanta MiscellanyPlants growing in the wild are used as indicators of underground water[257].

nrakta South-western N. America - Texas to New Mexico, west to California. ksacta Dry slopes and ridges below 2000 metres[71].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[11, 200]. Easy. Cuttings of mature wood, November to February in a frame or sheltered outdoor bed.

nwatta Succeeds in most soils[1, 11, 182]. Requires a sunny position and a well-drained soil[200]. Tolerates dry sites[200]. Flowers are produced in the axils of the previous years leaves[227]. Plants do not fruit well in Britain, probably due to a lack of sunshine[11].

# 6.2.324 Dioscorea villosa

Wild Var

5 tlin 9 cyuc 2 kcak 0 tcan 4 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Dioscorea villosa is a PERENNIAL CLIMBER growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Edible species of Dioscorea have opposite leaves whilst poisonous species have alternate leaves[174]. Use of the fresh plant can cause vomiting and other side effects[222]. Known to cause headaches, menstrual irregularities and acne. May cause hair loss and oily skin. Avoid during pregnancy. Avoid in patients with cancers of the breast, ovaries, prostate and uterus [301].

kcakta Edible Parts: RootEdible Uses: Tuber -cooked[177]. Some caution should be exercised with this plant. See 'Medicinal Uses' for more information.

dwatta Antiinflammatory Antirheumatic Antispasmodic Cholagogue Contraceptive Diaphoretic Homeopathy VasodilatorWild yam roots, and the roots of many other members of the genus, contains diosgenin[222]. This is widely used in modern medicine in order to manufacture progesterone and other steroid drugs. These are used as contraceptives and in the treatment of various disorders of the genitary organs as well as in a host of other diseases such as asthma and arthritis[222, 254]. The roots are anti-inflammatory, antispasmodic, cholagogue, diaphoretic and vasodilator[165, 238]. They are also a visceral relaxant[165]. This plant affords one of the best and fastest cures for bilious colic, it is especially helpful in treating the nausea of pregnant women[4] and has been used to ease the pain of childbirth[257]. It is also taken internally in the treatment of arthritis, irritable

hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

pcista Shoots may contain toxic cyanogens (removed by cooking)[301]. Do not use during pregnancy [301].

kcakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[2, 105, 177]. Harvested in the late spring when about 8 - 10cm above ground level, cutting the stems 5cm or more below soil level. They have a rather bitter flavour[K]. Seed - used as a cereal[105]. Small quantities of seed are produced in many years but it is seldom viable.

tcanta Hedge Hedge Plant support Soil stabilization-Plants can be grown along the river edge to protect the banks from erosion[195]. Canes are fairly thin walled but make very good plant supports[25, 75, 195]. Smaller canes can be plaited together and used as screens or as lathes for walls and ceilings[195]. Tolerant of maritime exposure, it can be grown as a screen or windbreak hedge in very exposed positions[75, 166]. The culms make an excellent wind filter, slowing its speed without creating turbulence. The leaves may look somewhat tattered by the end of the winter but plants will soon produce new leaves[K].

dwatta Abortifacient Anthelmintic Antivinous Aphrodisiac Stimulant TonicAnthelmintic, antivinous, stimulant, tonic[178]. Used orally in Chinese medicine for asthma, coughs and gallbladder disorders. In India leaves are used for spasmodic disorders of the stomach and to arrest bleeding [301]. Leaves used as a aphrodisiac [301].

nrakta E. Asia - Japan. Frequently naturalized in Britain. ksacta Woodland and damp places, forming thickets in open country, C. and S. Japan[162].

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°c. Stored seed is best. sown as soon as it is obtained. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Prick out the seedlings when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse until they are large enough to plant out, which might take a few years. Plants only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Very easy, single canes of the current years growth can be used. Pot them up in light shade in a greenhouse. Make sure the foliage is not allowed to dry out - misting 2 - 3 times a day for the first couple of weeks following division can be very helpful. Plant out in the summer once they are growing away strongly. Cane layering in May. Detach individual canes and lay them horizontally in trenches 15cm deep. New shoots should arise from each joint. Rhizome cuttings.

nwatta One of the easiest bamboos to grow in Britain, it prefers an open loam of fair quality and a position sheltered from cold drying winds[1, 11, 29] but it tolerates maritime exposure[75, 166]. Succeeds on peaty soils[11]. Succeeds in soils that are half earth and half stone[195]. Reguires abundant moisture and plenty of organic matter in the soil[200]. Endures near-saturated soil conditions[200]. Dislikes drought[1]. A very ornamental plant[1], it is said to be the hardiest bamboo[25], tolerating temperatures down to about -15°c[200]. Down to -24°c according to another report. In warmer parts of Britain plants can attain a height of 6 metres or more. The rootstock is running and very invasive[25]. It is fairly easy to control, however, if any new shoots that are not wanted are broken off whilst they are still small and brittle. New shoots appear from April[25]. This species is notably resistant to honey fungus[200]. Plants often flower lightly for a number of years without dving out though they seldom produce viable seed[122]. Occasionally the plants can produce an abundance of flowers and this severely weakens, though does not usually kill, the plants. They can take some years to recover. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. Many plants flowered heavily in the late 1980's and are only slowly recovering.

#### 6.2.320 Zanthoxvlum schinifolium

Peppertre

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyat hjonli

drutta Zanthoxylum schinifolium is a deciduous Shrub growing to 4 m (13ft lin). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen in October. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: CondimentSeed - cooked. It is used as a condiment, a pepper substitute[151]. Young leaves[105]. No more details are given.

dwatta Anaesthetic Diuretic Parasiticide Stimulant Tonic VasodilatorThe pericarp is anaesthetic, diuretic, parasiticide and vasodilator[176]. It is used in the treatment of gastralgia and dyspepsia due to cold with vomiting, diarrhoea, abdominal pain, ascariasis and dermal diseases[176]. It has a local anaesthetic action and is parasiticide against the pork tapeworm (Taenia solium)[176]. The pericarp contains geraniol. In small doses this has a mild diuretic action, though large doses will inhibit the excretion of urine[176]. There is a persistent increase in peristalsis at low concentration, but inhibition at high concentration[176]. The resin contained in the bark, and especially in that of the roots, is powerfully stimulant and tonic[82].

nrakta E. Asia - China, Japan, Korea. ksacta Low mountains, C. and S. Japan[58]. Roadsides in Korea[151].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Uses: Clearstem tree, multi-stem tree, specimen tree, specimen shrub; Parks, tree containers, cemeteries, roof gardens, large gardens. Prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. Flowers are formed on the old wood[206]. Dioecious. Male and female plants must be grown if seed is required. Self-sown seedlings have occasionally been observed growing in bare soil in the shade of the parent plant[K].

# 6.2.321 Berberis parisepala

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 3 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis parisepala is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: FruitEdible Uses: The following report is for the closely related B. angulosa - it quite possibly can also be applied to this species[K]. Fruit - raw or cooked. The relatively large berries are freely borne and are more palatable than most barberries. The fruit is about 15mm long and 8mm wide(2001.

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric

low flower clusters - raw. They are sweet with nectar[183]. Seeds - sprouted and then boiled[226]. The sprouted seeds are generally bitter, but the young shoots are quite sweet and juicy[257]. The seeds are about 6mm long and are produced in small clusters[82].

tcanta Basketry Companion Fibre Fuel Hair Preservative Scourer WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. A sticky gum obtained from the buds in spring has been mixed with oil and used as a hair tonic[257]. A fibre obtained from the inner bark is used for making scouring pads, rope and crude dresses[99, 118, 257]. It was harvested in the spring and was also used in making baskets[257]. Young stems are used as coarse twine warp and weft in the manufacture of baskets[257]. Wood - light, soft, not strong, close grained. It is highly valued for timber, furniture and indoor use and is also used for carving bowls, veneer etc[46, 61, 82, 99, 118, 229]. It makes an excellent fuel, producing a hot smokeless flame[226].

dwatta TB TonicAn infusion of the bark has been used in the treatment of TB[257]. The raw sap has been used as a tonic[257].

nrakta Western N. America - southern Alaska to California. ksacta Found in a variety of soil types, on the banks of streams, in rich bottom lands and on rocky slopes of mountain valleys[82, 229].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter.

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Specimen, Street tree. Of easy cultivation, it prefers a good moist well-drained soil[11] and a position that is at least moderately sunny[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Growth of young plants is rapid in the wild, slowing down after 40-50 years with a maximum life span of about 275 years[229]. This species thrives in Britain but it can be cut back in a severe winter if that follows a mild autumn[11]. A very ornamental plant[1]. Most maples are had companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features:North American native, Fragrant flowers, Inconspicuous flowers or blooms

#### 6.2.235 Allium acuminatum

Hooker's Onion, Tapertip onion 5 tlin 9 cyuc 3 koak 0 tcan 2 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium acuminatum is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Bulb - raw or cooked[105, 177]. Eaten in spring and early summer[161]. A strong flavour[257]. The bulb is 10 - 15mm wide[200]. Leaves - raw or cooked. Used as a relish[257]. Flowers - raw. Used as a garnish on salads. The seed heads can be placed in hot ashes for a few minutes, then the seeds extracted and eaten[257].

tcanta RepellentThe growing plant is said to repel insects and moles[20]. The bulbs can be rubbed on the skin to repel insects[257].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Western N. America - Washington to N. California. ksacta Amongst dry sunny rocks on hills and plains[60, 203]

propta Seed - sow spring in a cold frame. Prick out the sedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta Prefers a sunny position in a light well-drained soil[1]. The bulbs tend to rot when grown in cool wet climates, even if they are given sharp drainage[203]. This species is best in a cold frame and given a dry summer rest[163, 203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.236 Zanthoxylum simulans

Szechuan Pepper, Chinese-pepper, Prickly Ash 5 tlin 8 cyuc 3 koak 0 tcan 2 dwat 4 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Zanthoxylum simulans is a deciduous Shrub growing to 4 m (13ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe fruit is dried and used as a condiment[46, 61, 105, 177]. A pepper flavour, it is stronger and more pungent than black pepper[183]. It can be used whole or ground into a powder and used as a table seasoning[183]. A light roasting brings out more of the flavour[206]. It is an ingredient of the famous Chinese 'five spice' mixture[206].

dwatta Anodyne Anthelmintic Antidote Antiphlogistic Astringent Carminative Diaphoretic Digestive Diuretic Emenagogue Stimulant Stomachic Tonic VasodilatorAstringent, diaphoretic, emmenagogue[116, 178]. The pericarp is anaesthetic, diuretic, parasiticide and vasodilator[176]. It is used in the treatment of gastralgia and dyspepsia due to cold with vomiting, diarrhoea, abdominal pain, ascariasis and dermal diseases[176]. It has a local anaesthetic action and is parasiticide against the pork tapeworm (Taenia solium)[176]. The pericarp contains geraniol. In small doses this has a mild diuretic action, though large doses will inhibit the excretion of urine[176]. There is a persistent increase in peristalsis at low concentration, but inhibition at high concentrations.

tration[176]. The leaves are carminative, stimulant and sudorific[147, 218]. The fruit is carminative, diuretic, stimulant, stomachic and tonic[147, 218]. The seed is antiphlogistic and diuretic[218]. A decoction of the root is digestive and also used in the treatment of snakebites[218]. The resin contained in the bark, and especially in that of the roots, is powerfully stimulant and tonic[82].

nrakta E. Asia - China. ksacta Virgin wilds, hillsides and open woods[147].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Landscape Uses:Border, Massing. Easily grown in loamy soils in most positions, but prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. A plant has been growing well for many years in deep woodland shade at Cambridge Botanical gardens, it was fruiting heavily in autumn 1996[K]. Cultivated for its seed, which is used as a condiment in China[46, 61]. Flowers are formed on the old wood[206]. The bruised leaves are strongly aromatic[245]. Dioecious. Male and female plants must be grown if seed is required. Special Features:Inconspicuous flowers or blooms, Blooms appear periodically throughout the year.

#### 6.2.237 Chaenomeles japonica

Dwarf Quince, Maule's quince, Japanese Flowering Quince 5 tiin 8 cyuc 3 kcak 3 tcan 0 dwat 1 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flat-priklwis hpa7tmwatli xre7t hionli

drutta Chaenomeles japonica is a deciduous Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen from November to January. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay) soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 4, 11, 177, 183]. Very harsh and acid raw but fragrant when cooked, imparting a strong pleasant flavour to jams and jellies[1, 200], it is especially good cooked with apples in apple pies[K]. The fruit is apple-shaped and about 4cm in diameter[200]. The rich aromatic juice, as tart as a lemon, is squeezed and used for culinary purposes[183].

tcanta Plants sucker freely and can be used as a ground cover. The form C. japonica alpina grows to about half the size of the species, it is especially suitable and can be planted about 1 metre apart each way[208].

nrakta E. Asia - Japan ksacta Woods in low mountains, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a sheltered position outdoors or in a cold frame[200]. Sow stored seed in February in a greenhouse[78]. Germination usually takes place within 6 weeks[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle. If well grown, these seedling can be large enough to plant out in the summer, but give them some protection in their first winter. Otherwise plant them out in late spring of the following year[K]. Cuttings of half-ripe wood, July/August in a frame[11]. Easy[113]. Cuttings of mature wood of the current year's growth, November in a cold frame. Layering in late spring or in autumn. This is a sure and easy method, though it takes 12 months[78, 200]. Division of suckers in late winter[113]. They can be planted out straight into their nermanent nositions.

nwatta Landscape Uses:Border, Hedge, Massing, Woodland garden. Easily cultivated in any reasonably good soil[1]. Prefers a deep moist well-drained loam[4, 11]. Grows well in heavy clay soils. Tolerates full shade but requires a sunny position for best fruit production[3, 11, 200]. Becomes chlorotic on very alkaline soils[200]. Tolerates atmospheric pollution[200]. A very ornamental plant[1], it is hardy to about -25°c[200] and fruits freely in Britain[11]. Plants are occasionally cultivated for their edible fruit[183]. This species is closely allied to C. speciosa[11]. A good bee plant, flowering early in the year and providing pollen and nectar[108]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1]

#### 6.2.238 Viburnum dilatatum

Linden Viburnum, Linden arrowwood 5 tlin 8 cyuc 3 koak 2 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum dilatatum is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[105, 177, 179]. A sweet flavour[178]. The ovoid fruit is about 8mm long and contains a single large seed[200]. Leaves - cooked[105, 177].

tcanta FibreA fibre obtained from the inner bark is used for making ropes[178].

dwatta Anthelmintic Astringent VulneraryA decoction of the leaves is astringent and vermifuge. It is used for washing and healing maggoty sores[178, 218]. The twigs are also vermifuge whilst the fruits are used as a vermifuge for children[218].

nrakta E. Asia - China, Japan. ksacta Thickets in hills and at low elevations in mountains in Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200].

in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Often found on calcareous soils in the wild. All members of this genus have edible fruits and, whilst this is dry and unintersting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Considered to be part of A. ovalis by some botanists, whilst others give it specific status. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

#### **6.2.317** Asparagus verticillatus

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta Asparagus verticillatus is a PERENNIAL growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots -cooked[2, 105, 177].

nrakta Europe to W. Asia - Russia to Iran. ksacta Woody margins, scrub, stony places and shores[74].

propta Seed - pre-soak for 12 hours in warm water and then sow in spring or as soon as the seed is ripe in early autumn in a greenhouse. It usually germinates in 3 - 6 weeks at 25°c[134]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a sunny position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Division in early spring as the plant comes into growth.

nwatta Easily grown in any good garden soil[200]. Prefers a rich sandy loam[1]. Dormant plants are hardy to about -20°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Dioecious. Male and female plants must be grown if seed is remiired.

#### 6.2.318 Prunus salicina

Japanese Plum 5 tlin 8 cyuc 2 kcak 2 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus šalicina is a deciduous Tree growing to 4 m (13ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[46, 61, 105, 171]. The fruit ripens early[74]. A unique taste[74]. Sweet and juicy, it can be eaten out of hand, made into pies, preserves etc, or be dried for later use[183]. The fruit is very resistant to rotting[74]. The plum-shaped fruit is up to 7cm long and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wild populations of this species are primary genetic relatives of the cultivated Japanese Plum (Prunus salicina) and they also belong to the secondary Gene Pool of the Apricot (Prunus armeniaca), Myrobalan Plum (Prunus cerasifera) and Peach (Prunus persica). As a result, this species has the potential for use as a gene donor for crop improvement[338]. Espalier: tree or other plant that is trained to grow flat against a support (such as a trellis or wall).

dwatta StomachicThe fruit is stomachic[240]. It is said to be good for allaying thirst and is given in the treatment of arthritis[240]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China. ksacta Sparse forests, forest margins, scrub, along trails in mountains, beside streams in valleys, thickets at elevations of 200 - 2600 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. This species does not grow well in Britain, the summers are not warm enough to properly ripen the wood and the springs are too unpredictable for the flowers to be fertilized[11]. An important temperate fruit tree, it is widely cultivated in China and other regions of Asia for its edible fruit, and is being increasingly grown in N. America[266]. There are several named varieties[46, 58, 183]. This species does not cross-pollinate with the English plum, P. domestica[200]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, All or parts of this plant are poisonous, Blooms are very showy. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2].

# 6.2.319 Pseudosasa japonica

Metake - Ramboo

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 4.5 m hkuc pcimhmimhtut cyutli tcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pseudosasa japonica is an evergreen Bamboo growing to 4.5 m (14ft) by 3 m (9ft). See above for USDA

to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[229]. Intensely bitter[1, 11, 82, 99]. Some native North American Indian tribes saw the fruit as a great delicacy and an important food source, though others only ate it occasionally because of its bitter taste[257]. The fruit is 8 - 15mm in diameter with a thick flesh, and contains one large seed[229]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Basketry Dye Fuel Plaster String WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The bark is used to ornament baskets and is also split into strips and used for making baskets that are watertight and resist decay[99, 257]. The bark is both strong and flexible as well as being ornamental[257]. The thin outer bark can be peeled off the tree in the same way as birch trees[226]. It has been used to make baskets, mats, ropes and as an ornament on bows, arrows etc[226, 257]. The bark can also be made into a string[257]. Wood - close-grained, soft, brittle[82]. It is sometimes used for furniture because it takes a high polish[229]. An excellent fuel[99].

dwatta Blood purifier Cardiac Contraceptive Eczema Laxative Plaster TB TonicBitter cherry was employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. The bark is blood purifier, cardiac, laxative and tonic[257]. An infusion of the bark has been used in the treatment of tuberculosis and eczema[257]. A decoction of the root and inner bark has been taken daily as a treatment for heart troubles[257]. An infusion of the bark, combined with crab apple bark (Malus spp) has been used as a cure-all tonic in treating colds and various other ailments[257]. The bark, stuck on with resin, has been used as a dressing for wounds, swellings etc[226, 257]. An infusion of the rotten wood has been used as a contraceptive[257]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin. substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Western N. America - British Columbia to California and New Mexico. ksacta Moist woods or by watercourses in grassland and sagebrush desert at medium elevations in mountains [60].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as posible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. This species is unable to tolerate much shade competition from other trees[229]. A fast growing but short-lived species in the wild[229]. The flowers diffuse a soft honey scent[245]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

#### 6.2.315 Celtis tenuifolia

Small Hackberry, Dwarf hackberry 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 4.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Celtis tenuifolia is a deciduous Tree growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. Sweet but thin fleshed[227]. The thin flesh has a sweet, mealy pleasant taste[K]. The fruit is small, up to 10mm in diameter, with a single large seed[82, K]. The trees often produce large crops of fruit in Britain, but there is so little that is edible on each fruit that it is scarcely worthwhile[K].

tcanta Wood - very tough, pliable, durable. Of no commercial value [229]. The flexible thin shoots are used as walking sticks, the wood is also an excellent fuel.

nrakta Southeaster N. America. ksacta Dry rocky or gravelly soils in foothills and bluffs[229]. On slopes and along streams in open woods from sea level to 500 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cuttings

nwatta Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soil[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Established plants are very drought resistant[200]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. This species is very closely related to C. occidentalis, and it is considered to be no more than a sub-species by many authorities[200]. Trees can be very long-lived, perhaps surviving for 1000 years in the wild[200]. Plants in this genus are notably resistant to honey funous[200].

# 6.2.316 Amelanchier ovalis integrifolia

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier ovalis integrifolia is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Edible fruit, raw or cooked[74]. The fruit is rich in iron and copper[226].

nrakta Europe - Greece to W. Asia. ksacta Rocky sites up to the middle mountain zone[74]

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly

Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. A very ornamental[1] and polymorphic species[58], there are some named varieties developed for the ornamental value of the fruit[182]. Special Features: Attractive foliage, Not North American native, Fragrant flowers, Attractive flowers or blooms.

#### 6.2.239 Berberis rubrostilla

5 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatnriklwis hpa7tmwatli fyifxre7t hionli

drutta Berberis rubnostilla is a deciduous Shrub growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Fairly large for a barberry, it is pear shaped with an acid flavour[K]. It can be eaten raw in small quantities, though most people would probably prefer to cook it in pies, preserves etc[K]. The fruits are about 15mm long[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A hybrid of garden origin, B. aggregata x B. wilsoniae? ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off. so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. A hybrid species, it will not breed true from seed. Cuttings of halfripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. This is probably not a true species but a hybrid involving B. wilsonae and perhaps B. aggregata. There are a number of named varieties selected for their ornamental value, many of these have quite large fruits which are freely borne. The cultivar 'Crawleyensis' has fruits up to 1.5cm long[200]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200].

#### 6.2.240 Zanthoxylum planispinum

Winged Prickly Ash

5 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklv hpa7tmwatli nvanhien hionli

drutta Zanthoxylum planispinum is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown

if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: CondimentSeed - cooked. It can be ground into a powder and used as a condiment[183], a pepper substitute[2, 46, 177]. A light roasting brings out more of the flavour[206]. The seed is an ingredient of the famous Chinese 'five spice' mixture[206]. The peel is also used[105]. Young leaves are eaten[105, 177, 183]. No further details are given.

dwatta Stimulant Stomachic Tonic VermifugeThe seeds and roots are stomachic and vermifuge[46, 61, 147]. A decoction of 7 · 14 seeds is used in the treatment of abscesses, arthritis, bruises, gastritis, swellings etc[218]. The resin contained in the bark, and especially in that of the roots, is powerfully stimulant and tonic[82].

nrakta E. Asia - China, Japan, Korea. ksacta Low mountains in Japan[58].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months rold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. A very ornamental plant[1], it is usually hardy in most parts of Britain but can be damaged in severe winters[11]. Fruits are freely produced after a hot summer[11]. The flowers are formed on the old wood[206]. Dioecious. Male and female plants must be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 6.2.241 Tilia oliveri

5 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tilia oliveri is a deciduous Tree growing to 15 m (49ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw or cooked[179]. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta FibreA fibre is obtained from the tough inner bark It can be made into diverse items such as mats, shoes and coarse cloth[229]

dwatta Antispasmodic Diaphoretic Sedative Atea made from the flowers is antispasmodic, diaphoretic and sedative [226].

nrakta E. Asia - China. ksacta Moist woods in N.W. Hupeh[109]. In evergreen or mixed evergreen and deciduous forests at elevations of 1300 - 2250 metres[266].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring

though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soils[200]. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188] Prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. Closely related to T. tomentosa[1]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Ouite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

# 6.2.242 Calamintha nepeta

Lesser Calamint

5 tlin 9 cvuc 3 kcak 2 tcan 2 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwisslip

drutta Calamintha nepeta is a PERENNIAL growing to 0.6 m (2ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves have a strong pennyroyal-like fragrance and are more pungent than calamint (C. sylvatica)[183]. They can be used as a flavouring[183]. A sweet and aromatic herb tea is made from the leaves[200].

tcanta Attracts wildlife.

dwatta Aromatic Diaphoretic Expectorant Febrifuge StomachicLesser calamint was commonly used as a medicinal herb in medieval times, though is little used by modern herbalists[238]. It is sometimes cultivated as a medicinal herb for household use. The whole plant is aromatic, diaphoretic, expectorant, febrifuge and stomachic[4, 148]. The leaves are harvested in July as the plant comes into flower and are dried for later use[4]. An infusion is beneficial in cases of flatulent colic and weaknesses of the stomach[4], it is also used to treat depression, insomnia and painful menstruation[238]. It should not be prescribed for pregnant women since in excess it can cause a miscarriage[238].

nrakta Europe, including Britain, south from France and S. Russia to N. Africa and to Iran in W. Asia. ksacta Dry banks, usually on calcareous soils[17].

propta Seed. I swally germinates in 2 weeks at 21°c[138]. Prick out the seed. It usually germinates in 2 weeks at 21°c[138]. Prick out the seedlings when they are large enough to handle and, if they grow sufficiently, plant them out into their permanent positions in the summer otherwise wait until the following spring. Division in spring. Very easy, larger clumps can be planted direct into their permanent positions. It is best to pot up smaller clumps and grow them on in a cold frame until they are well rooted before planting them out in the sumer. Basal cuttings in May or June. They should be rooted

in a sandy compost[245]. Harvest the shoots when they are about  $10 - 15 \mathrm{cm}$  long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Prefers a well-drained dry to moist neutral to alkaline soil and a warm sunny position[200, 238]. Plants are hardy to about -15°c[187]. This species is very closely related to C. sylvatica, and is considered to be no more than a subspecies by some botanists[4]. A very good bee plant[187]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground

# 6.2.243 Amelanchier huroensis

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Amelanchier huroensis is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers projet soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is rich in iron and copper[226].

nrakta North-western N. America - Ontario, Michigan, Wisconsin and Minnesota. ksacta Open woods, cliffs and shores, chiefly on trap or other basic rocks[43].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if required.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of the country. The following notes are based on the general needs of the genus. Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main drawback to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. Hybridizes freely with other members of this genus[200]. Grafting onto

#### 6.2.312 Pyrocydonia danielii

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Pyrocydonia danielii is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. Fully ripe fruits are crisp and juicy and the flavour is rather pear-like, though of inferior quality to most pears[K].

nrakta A graft hybrid of garden origin, Cydonia oblonga x Pyrus communis 'Williams Bon Cretien' ksacta Not known in the wild.

propta Seed. A bigeneric hybrid, it will not breed true from seed even if fertile seed is produced. If by chance you do obtain seed, then it is best sown in the autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of softwood in early summer, treated with rooting hormone and rooted in a closed case with bottom heat[200]. Grafting onto Pyrus communis.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[2001.

#### 6.2.313 Ouercus acutissima

Sawthorn Oak

5 tlin 9 cyuc 2 kcak 3 tcan 2 dwat 5 m hkuc hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus acutissima is a deciduous Tree growing to 5 m (16ft) by 15 m (49ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed cooked[105, 177]. The seed is up to 25mm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. Young leaves - cooked. A famine food when all else fails[177]. The roasted seed is a coffee substitute.

tcanta Charcoal Dye Fodder Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of

tannin, that can also be used as a dyestuff[4]. A black dye is obtained from the seed cups[109]. Wood - used for boat building and construction[109]. The wood is also used for fuel and charcoal[11, 109].

dwatta Astringent DysenteryThe stem bark is used to clean foul sores[218]. The seeds are used in the treatment of diarrhoea, menorrhagia and gastrointestinal hypertrophy[218]. The cupule (seed cup) is astringent[218]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, Korea. ksacta Often forming pure forests or growing with Pinus species, to 1000 metres in W. China[109].

propta Seed - quickly loses viability if allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed but must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Fodder: Mast Industrial Crop: nin Management: Standard Regional Crop Staple Crop: Balanced carbLandscape Uses:Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. The seed ripens in its second year[200]. This species is closely related to Q. variabilis[1]. Often cultivated in China as a coppiced tree for fuel and charcoal[109]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native. Attractive flowers or blooms. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 6.2.314 Prunus emarginata

Bitter Cherry

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus emarginata is a deciduous Tree growing to 5 m (16ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity

enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Not all forms of this species are hardy in Britain[11]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. A polymorphic species[11]. This form of V. erubescens fruits freely in Britain[200].

#### 6.2.310 Aesculus pavia

Red Buckeye

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 5 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus pavia is a deciduous Shrub growing to 5 m (16ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins[169]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. It can be dried and ground into a powder and used as a gruel. The seed is quite large, about 25mm in diameter[227], and is easily harvested. Unfortunately, the seed is also rich in saponins and these need to be removed before it can be eaten. See also the notes above on toxicity. The following notes apply to A. californica, but are probably also relevant here: The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213]. Most of the minerals etc would also have been leached out by this treatment[K].

tcanta Soap WoodSaponins in the seed and roots are a soap substitute[149, 169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[Kl.

dwatta Cancer Hypnotic Odontalgic SalveThe powdered bark is hypnotic and odontalgic. It is used in the treatment of ulcers[149, 192, 227]. A poultice of the powdered seeds has been used in the treatment of cancer tumours and infections, and as a salve for sores[257]. An infusion of the roots has been used as a bath in the treatment of dyspessia[257].

nrakta South-eastern N. America - Virginia to Florida, west to Louisiana. ksacta Rich moist soils in deciduous woods, on the sides of streams and swamp margins[149, 192, 220]

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar'

downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer. Division of suckers in the dormant season[200]. The suckers can be planted out straight into their permanent positions if required.

nwatta Landscape Uses:Specimen, Street tree, Woodland garden. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. Very shade tolerant, it also succeeds in a sunny position[200]. A very ornamental shrub, when dormant it is hardy to about -15°c[184] though the young growth in spring can be damaged by late frosts. It prefers a continental climate, growing best in eastern and south-eastern England[200]. Trees are fast-growing in the wild, though they are also short-lived[229]. They can commence flowering when only 1 metre tall[229]. Plants spread by means of suckers[200]. There are a number of named varieties, developed for their ornamental value. Var. 'Humilis' is a low growing form[182]. Most members of this genus transplant easily, even when fairly large[11]. Special Features: Attractive foliage, North American native, All or parts of this plant are poisonous, Attracts butterflies, Blooms are very showy.

### 6.2.311 Amelanchier ovalis

Snowy Mespilus, Dwarf Garden Serviceberry 5 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier ovalis is a deciduous Shrub growing to 5 m (16ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Edible fruit - raw or cooked. Not very palatable, but it can be used for preserves etc[183]. The fruit is rich in iron and copper[226].

tcanta WoodWood - fine grained, hard, very heavy, reddish. Used for small articles[74].

nrakta C. and S. Europe ksacta Rocky places and stony woods[45], mainly on limestone[50, 184].

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if re-

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Fairly lime tolerant[200]. Hardy to about -20°c[184]. All members of this genus have edible fruits and, whilst this is dry and uniteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. A very ornamental plant[74]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. Special Features:Not North American native, Blooms are very showy.

seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1].

# 6.2.244 Pyrus balsanae

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus balsanae is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A reasonable size, to 2.5cm[200]. The flesh is rather hard and harsh, though it becomes soft and sweet when bletted and then makes a very good dessert fruit [K].

nrakta W. Asia - Caucasus. ksacta Forests and shrub thickets[74].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at  $1^{\circ}c$  and should be sown as early in the year as possible[200]. Temperatures over 15 -  $20^{\circ}c$  induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[1]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Hardy to about -15°c[200]. Plants are growing and fruiting well at Kew Botanical Gardens[K].

#### 6.2.245 Lilium auratum

Golden-Rayed Lily

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lilium auratum is a BULB growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[4, 46]. Sweet and mucilaginous with a mild flavour that makes them acceptable to people who have never tried them before[2, 183]. The bulbs are used as a vegetable, and can also be boiled, sweetened, powdered and used in dumplings[183]. Large, they can be up to 17cm in diameter[61, 143].

nrakta E. Asia - Japan. ksacta Hills and mountains[58] in scrub or grassy places[90], in volcanic ash or poor gravelly soils, always on steep well-drained slopes[143].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant,

putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Root bulbils - dig up in autumn and pot up in a cold frame for the first year[163]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Requires a well-drained lime-free peaty soil in a warm position with its roots in the shade[1, 28, 47, 90, 200] Enjoys abundant moisture so long as the soil is very well drained[47]. Prefers an open woodland position or growing amongst dwarf evergreens[1]. The plant deteriorates rapidly if grown in much shade[143]. Fertilizers, rich soils and lime are fatal to this plant[143]. Stem rooting, the bulbs should be planted about 25 - 30 cm deep[143, 200]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. A very ornamental plant[1], but short-lived in cultivation[200]. It grows better in warmer climates than Britain[90]. The variety 'Platyphyllum' has larger flowers than the type and is more amenable to adverse conditions[245]. The flowers have a penetrating spicy aroma[245]. Cultivated for its edible bulb in Japan[2, 163]. The plant should be protected against slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200].

#### 6.2.246 Plantago coronopus

Buck's-Horn Plantain

5 tlin 9 cyuc 3 kcak 2 tcan 2 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Plantago coronopus is a ANNUAL/PERENNIAL growing to  $0.3 \, \mathrm{m}$  (1ft) by  $0.3 \, \mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Young leaves raw or cooked[2, 13, 132, 183]. High yielding[27]. One of the nicer tasting members of this genus, the leaves are fairly tender and have a slight bitterness[K]. Some people blanch the leaves in boiling water for a few seconds before using them in salads in order to make them more tender[183]. This leaf is one of the ingredients of 'misticanze', a salad mixture of wild and cultivated leaves that originated in the Marche region of Italy[183].

tcanta Dynamic accumulator.

dwatta Antiperiodic Laxative OphthalmicThe leaves are antiperiodic and ophthalmic. They are used as a remedy for ague and sore eyes[4]. Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238].

nrakta Coasts of west and south Europe, including Britain, south and east from Sweden to N. Africa, W. Asia ksacta Sandy or gravelly soils and cracks in rocks, in sunny places in dry soils usually near the sea[4, 17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200]. A polymorphic species[132]. This plant has sometimes been cultivated for its edible leaves[2, 52]. An important food plant for many caterpillars[30].

#### 6.2.247 Vaccinium vacillans

Dryland Blueberry

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 1.2 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium vacillans is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Fruit - raw or cooked. Very sweet, it is considered to be one of the best tasting blueberries[183]. The fruit is about 5mm in diameter[200].

nrakta Eastern N. America - Maine to Minnesota, south to Georgia, Tennessee and Missouri. ksacta Woods, thickets and clearings in dryish situations[43].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Plants often form extensive colonies in the wild[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.248 Amelanchier obovalis

Southern Juneberry, Coastal serviceberry 5 tlin 9 cyuc 3 kcak 1 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Amelanchier obovalis is a deciduous Tree growing to 1.5 m (5ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit, raw or cooked[177]. Sweet and of very good quality, the fruit is eaten out of hand or used in pies, preserves, drinks etc[183]. The fruit is rich in iron and copper[226].

nrakta South-eastern N. America - Georgia and Alabama north to southern New Jersey[43]. ksacta Pinelands and low

propta Seed - it is best harvested 'green', when the seed is fully formed but before the seed coat has hardened, and then sown immediately in pots outdoors or in a cold frame. If stored seed is obtained early enough in the autumn, it can be given 4 weeks warm stratification before being left out in the winter and it should then germinate in the spring. Otherwise seed can be very slow to germinate, perhaps taking 18 months or more. When large enough to handle, prick the seedlings out into individual pots and grow them on in a sheltered outdoor position, planting them out once they are 20cm or more tall. If there is sufficient seed it is best to sow it thinly

in an outdoor seedbed[78, 80]. Grow the seedlings on for two years in the seedbed before planting them out into their permanent positions during the winter. Layering in spring takes 18 months[78]. Division of suckers in late winter. The suckers need to have been growing for 2 years before you dig them up, otherwise they will not have formed roots. They can be planted out straight into their permanent positions if re-

nwatta Prefers a rich loamy soil in a sunny position or semi-shade[1, 200] but thrives in any soil that is not too dry or water-logged[11]. Grows well in heavy clay soils. Plants are stoloniferous[43]. All members of this genus have edible fruits and, whilst this is dry and uninteresting in some species, in many others it is sweet and juicy. Many of the species have potential for use in the garden as edible ornamentals. The main draw-back to this genus is that birds adore the fruit and will often completely strip a tree before it is fully ripe[K]. There is at least one named variety with improved fruits. 'Jennybelle' is a small bush, to 3.5 metres and produces few suckers so is easier to manage[183]. The fruit is up to 12mm in diameter and is sweet even before it is fully ripe. Plants fruit heavily and start to yield when young. They are resistant to drought, frost and high temperatures[183]. Hybridizes freely with other members of this genus[200]. Grafting onto seedlings of A. lamarckii or Sorbus aucuparia is sometimes practised in order to avoid the potential problem of hybridizing[1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]

#### 6.2.249 Pyrus pyraster

5 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus pyraster is a deciduous Tree growing to m (23ft) by 5.5 m (18ft). See above for USDA hardiness. It is hardy to UK zone 6. The seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is often borne in abundance and is up to 35mm in diameter. It ripens in late summer to early autumn. It is rather hard and astringent at first, but bletts as soon as it falls from the tree and then has guite a good flavour, becoming soft and quite juicy[K].

nrakta C. and S.W. Europe. ksacta Thickets and open

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to about -15°c[200].

# **6.2.250** Ulmus glabra

Wych Elm, Table-top Scotch Elm, Scotch Elm 5 tlin 7 cyuc 3 kcak 0 tcan 2 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

close to a genetically distinct plant in the same species in do not normally contain very high quantities of hydrogen order to produce fruit and fertile seed[11, 200]. The flowers are deliciously scented[245]. A polymorphic species[11]. The sub-species V. erubescens gracilipes. Rehd. fruits freely in Britain[11].

#### 6.2.307 Vitis arizonica

Canvon Grape

5 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 5 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Vitis arizonica is a deciduous Climber growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or dried for winter use[161, 177, 257]. The fruit is fairly small, but it is quite luscious[2]. The fruit is about 10mm in diameter[200] and is borne in bunches. Leaves - raw. Chewed to allay thirst. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta South-western N. America, ksacta Streamsides and in canyons, often climbing into trees, 600 - 2260 metres in Arizona and Utah.

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 6.2.308 Malus glabrata

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus glabrata is a deciduous Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. Up to 3cm in diameter[200].

nrakta N. America - Western N. Carolina, ksacta Valleys, 600 - 900 metres[82]

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. This species is closely related to M. glaucescens[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.309 Viburnum erubescens gracilines

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Viburnum erubescens gracilipes is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A sweet flavour but there is very little flesh in relation to the size of the single large seed[K].

tcanta WoodWood - soft to hard, close and even grained. The wood is hardest in the cooler parts of its range, the Himalayan form is a possible Boxwood (Buxus spp) substi-

nrakta E. Asia - China to the Himalayas and Sri Lanka. ksacta Forests and shrubberies, 1500 - 3300 metres, from Uttar Pradesh to S.W. China[51, 146].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood. 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large

mental plant, there are many named varieties [200, 202]. It is the state flower of Virginia[212]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Attracts butterflies, Blooms are very showy. The plant is heat tolerant in zones 8 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is a heart root, dividing from the crown into several primary roots going down and out [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

# 6.2.305 Crataegus nigra

Hungarian Hawthorn

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crataegus nigra is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A soft flesh[200]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. The fruit is about 1cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K]

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

nrakta E. and C. Europe - Hungary. ksacta Woods[50]. propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with

protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year [K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 6.2.306 Viburnum erubescens

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Viburnum erubescens is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[272]. A sweet flavour but there is very little flesh in relation to the size of the single large seed[K].

tcanta Miscellany WoodWood - soft to hard, close and even grained. The wood is hardest in the cooler parts of its range, the Himalayan form is a possible Boxwood (Buxus spp) substitute[146].

dwatta MiscellanyThe juice of the roots is used in the treatment of coughs[272].

nrakta E. Asia - China to the Himalayas and Sri Lanka. ksacta Forests and shrubberies, 1500 - 3300 metres, from Uttar Pradesh to S.W. China[51, 146].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Not all forms of this species are hardy in Britain[11]. Plants are self-incompatible and need to grow

drutta Ulmus glabra is a deciduous Tree growing to 30 m (98ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from February to March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and saic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Leaves - raw or cooked[179, K]. They can be a little bit bitter, especially if not very young, and have a mucilaginous texture[K]. They make a nice addition to a mixed salad[K]. Immature fruits, used just after they are formed, can be eaten raw[132]. An aromatic, unusual flavour, leaving the mouth feeling fresh and the breath smelling pleasant[132]. They contain about 34.4% protein, 28.2% fat, 17% carbohydrate, 5% ash[179]. The fruit is about 2.5cm long[200]. Inner bark - mucilaginous[179]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[K].

tcanta Fibre WoodA fibre from the inner bark is used for mats and making ropes[100]. Wood - very durable under water, fairly hard, elastic, withstands abrasion and salt water. Used for water pipes, wheels, mallet heads, ships keels etcl46. 61. 67. 1001.

dwatta Astringent Bach Demulcent Diuretic Eczema HomeopathyThe inner bark is astringent, demulcent and mildly diuretic[9]. It is used both internally and externally in the treatment of diarrhoea, rheumatism, wounds, piles etc and is also used as a mouthwash in the treatment of ulcers[4, 9, 66]. The inner bark is harvested from branches 3 - 4 years old and is dried for later use[9]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Occasional feelings of inadequacy', 'Despondency' and 'Exhaustion from over-striving for perfection'[209]. A homeopathic remedy is made from the inner bark[9]. It is used in the treatment of eczema[9].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, north and west Asia. ksacta Woods, hedges and by streams, commoner in the west and north[17].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or copniced shoots[2001].

nwatta Landscape Uses:Specimen. Easily grown in any soil of at least moderate quality so long as it is well drained[1]. Prefers a deep or heavy soil that is moist but not waterlogged and does not thrive if the soil is markedly acid[186]. Moderately shade tolerant[186]. Very wind resistant and tolerant of maritime exposure[186]. Trees cast a dense shade[186]. Rarely produces suckers but responds well to coppicing[186]. The wych elm is subject to 'Dutch elm disease' (though less so than U. procera), a disease that has destroyed the greater part of all the elm trees growing in Britain. Mature trees killed back by the disease will often regrow from suckers, but these too will succumb when they get larger. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant to the disease so the notential exists to develop new resistant hybrids with the native species. The various species hybridize freely, the pollen stores well and can be kept for use with species that flower at different times. A very ornamental tree[1], it is a food plant for the caterpillars of many lepidoptera species[30]. A good tree for growing

grapes into[18]. Special Features: Not North American native, Inconspicuous flowers or blooms.

# **6.2.251** Abies alba

prik hpa7tmwatli hionli

Silver Fir, Christmas Tree Fir, European Silver Fir, Silver 5 tlin 8 cyuc 2 kcak 4 tcan 3 dwat 45 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flat-

drutta Abies alba is an evergreen Tree growing to 45 m (147ft) by 15 m (49ft) at a fast rate. See above for USDA hardness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Inner barkEdible Uses: Inner bark - cooked. It is dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[105, 177].

tcanta Essential Lacquer Paint Resin Tannin WoodAn oleo-resin is obtained from blister-like swellings in the bark[64, 100]. It is harvested in the summer and used fresh, dried or distilled for oil[238]. The resin extracted from it is used in perfumery, medicine and for caulking ships[46, 61, 64, 100]. It is called 'Strasburg Turpentine' [46]. Oil of turpentine is an important solvent in the paint industry[238]. The residue, known as 'rosin oil', is used in making varnishes, lacquers and carbon black (for pigments and ink)[238]. Resin is tapped from trees about 60 - 80 years old in the spring and used for the distillation of oil[238]. An essential oil obtained from the leaves is used as a disinfectant and also in medicine and perfumery[46, 61]. It is a common ingredient in many bath products, giving them their familiar pine scent[7]. The bark is a source of tannin[7]. Wood - light, soft, durable, elastic. The timber of this tree is especially sought after for its lightness, it is used for construction, furniture, boxes, pulp etc[7, 46, 61, 89, 101].

dwatta Antibiotic Antirheumatic Antiseptic Astringent Balsamic Diuretic Expectorant Vasoconstrictor VulneraryThe buds are antibiotic, antiseptic and balsamic[7]. The bark is antiseptic and astringent[7]. It can be harvested as required throughout the year[238]. The leaves are expectorant and a bronchial sedative[7]. They are best harvested in the spring and can be dried for later use[238]. The resin is antiseptic, balsamic, diuretic, eupeptic, expectorant, vasoconstrictor and vulnerary[7]. Both the leaves and the resin are common ingredients in remedies for colds and coughs, either taken internally or used as an inhalant[238]. The leaves and/or the resin are used in folk medicine to treat bronchitis, cystitis, leucorrhoea, ulcers and flatulent colic[268]. The resin is also used externally in bath extracts, rubbing oils etc for treating rheumatic pains and neuralgia[238]. Oil of Turpentine, which is obtained from the trunk of the tree, is occasionally used instead of the leaves or the resin. The oil is also rubefacient and can be applied externally in the treatment of neuralgia[268].

nrakta C. and S. Europe ksacta Forests in mountains, 1000 - 1600 metres.

propta Seed - sow early February in a greenhouse or outdoors in March[78]. Germination is often poor, usually taking about 6 - 8 weeks[78]. Stratification is said to produce a more even germination so it is probably best to sow the seed in a cold frame as soon as it is ripe in the autumn[80, 113]. The seed remains viable for up to 5 years if it is well stored[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in pots. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Alternatively, if you have sufficient seed, it is possible to sow in an outdoor seedbed. One report says that it is best to grow the seedlings on in the shade at a density of about 550 plants per square metre[78] whilst another report says that they are best grown on in a sunny position[80].

nwatta Landscape Uses:Screen, Specimen. Prefers a good moist but not water-logged soil[1] though it tolerates

most soils except infertile sands and peats[11, 81]. Grows well in heavy clay soils. Prefers a slightly acid soil, with a pH down to about 5, and a north-facing slope[200]. Plants are very shade tolerant and this species has often been used to underplant in forests[11, 81], but growth is slower in dense shade[81]. Intolerant of atmospheric pollution[1]. Requires a generous rainfall and a sheltered position[11, 81]. Intolerant of windy sites[81]. The silver fir is a very hardy plant when dormant but it comes into growth in April and is then susceptible to damage by late frosts and aphis[185, 238]. This species is particularly subject to aphis infestation in many parts of the country[11], and is also prone to dieback and rust caused by fungal infections[238]. Trees are slow growing for the first few years but from the age of around 6 years growth accelerates and height increases of 1 metre a year are not uncommon[185]. Grows best in moist valleys in Scotland[11] and in S.W. England where it often self-sows. This species also thrives in E. Anglia[17]. Another report says that this species is not happy in the hot, dry, Lower Thames Valley, and does not thrive in many low-lying and frosty parts of southern England[11]. It has been planted as a timber tree in northern and western Europe[50]. It is also commonly used as a 'Christmas tree'[61, 200]. This tree is notably resistant to honey fungus[11, 81, 200]. Trees should be planted into their permanent positions when they are quite small, preferably between 30 and 90cm in height. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Unlike most species of conifers, this tree can be coppiced and will regenerate from the stump[126]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. The cultivar 'Pendula' used to be widely planted for ornament, shelter and timber but because it is now susceptible to damage by Adelges nordmannianae it is seldom planted. Research is going on (1975) to find provenances that are resistant[185]. Special Features:Not North American native, There are no flowers or blooms.

#### 6.2.252 Ouercus petraea

Sessile Oak, Durmast oak 5 tlin 8 cyuc 2 koak 0 tcan 3 dwat 40 m hkuc hmimhtut cyutli tcuphja7n hwicli jlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli hionli

drutta Quercus petraea is a deciduous Tree growing to 40 m (131ft) by 25 m (82ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Coffee GumSeed - cooked[2, 5, 8, 13]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[21, 61]. An edible gum is obtained from the bark[177].

tcanta Basketry Charcoal Compost Fuel Gum Ink Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20, 201]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient

therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is an ingredient of 'Quick Return' herbal compost activator[32]. This is a dried and powdered mixture of several herbs that can be added to a compost heap in order to speed up bacterial activity and thus shorten the time needed to make the compost[K]. The bark is very rich in calcium[13]. An ink is made from the oak galls, mixed with salts of iron[7, 66]. The wood is a source of tar, quaiacol, acetic acid, creosote and tannin[123]. Tannin is extracted commercially from the bark and is also found in the leaves[223]. Wood - hard, tough, durable even under water. It is highly valued for furniture, construction etc[4, 13, 66]. It is also a good fuel and charcoal[6, 61]. Trees can be coppiced to provide material for basket making, fuel, construction etc[23].

dwatta Antiseptic Astringent Bach Decongestant Dysentery Haemostatic TonicThe oak tree has a long history of medicinal use. It is anti-inflammatory, antiseptic, astringent, decongestant, haemostatic and tonic[4, 7, 9, 13, 21, 165]. The bark is the part of the plant that is most commonly used[4], though other parts such as the galls, seeds and seed cups are also sometimes used[7]. A decoction of the bark is useful in the treatment of chronic diarrhoea, dysentery, intermittent fevers, haemorrhages etc[4]. Externally, it is used to bathe wounds, skin eruptions, sweaty feet, piles etc[9]. It is also used as a vaginal douche for genital inflammations and discharge, and also as a wash for throat and mouth infections[9]. The bark is harvested from branches 5 - 12 years old, and is dried for later use[9]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Despondency', 'Despair, but never ceasing effort'[209]. A homeopathic remedy is made from the bark. It is used in the treatment of disorders of the spleen and gall bladder[9].

nrakta Europe, including Britain, from Norway south and east to Spain, S.W. Russia and Greece. ksacta Woods, especially on acid soils and in the western part of Britain, where it is often dominant1171.

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[11]. Dislikes heavy clay[98]. Young plants tolerate reasonable levels of side shade[200]. Found mainly on acid soils in the wild. Thrives in well drained soils but is also tolerant of periodic flooding[186]. Tolerates exposure and strong winds if these are not salt-laden[186]. A very important timber tree in Britain, it is also a food plant for the caterpillars of many species of butterfly[30], there are 284 insect species associated with this tree[24]. Trees were often coppiced or pollarded in the past for their wood[186], though this is best done on a long rotation of perhaps 50 years. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Older trees have a thick corky bark and this can protect them from forest fires, young trees will often regenerate from the base if cut down or killed back by a fire[186]. Trees transplant badly unless moved regularly[11]. Hybridizes freely with other members of the genus [200]. Immune to attacks by the Tortix moth[1]. This species is notably resistant to honey fungus[88, 200]. Special Features:Not North American native. Inconspicuous flowers or blooms.

# 6.2.253 Fraxinus excelsior

Ash, European ash, Common Ash 5 tlin 8 cyuc 2 kcak 3 tcan 2 dwat 30 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Fraxinus excelsior is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft) at a fast rate. See above for

year-old wood[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

The fruit, when infused in 'Eau de Vie' makes a bitter but acceptable drink[4]. One report says that the fruit is points.

# 6.2.303 Thamnocalamus aristatus

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thamnocalamus aristatus is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is polinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[177]. The new shoots are about 15mm in diameter[K]. Seed - used as a cereal[177]. The plants only flower and produce seed at intervals of several years.

tcanta Basketry Hedge Hedge Plant supportThe canes are used for making walking sticks, baskets and pipes[25, 46, 51, 272]. They can also be used as plant supports[146]. Valuable for screen planting in wet areas[200].

nrakta E. Asia - N.E. Himalayas. ksacta Damp sites in woodland and high savannah[200]. Open, rocky ground at elevations of 2200 - 3100 metres in Nepal[272].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more [200]. Basal cane cuttings.

nwatta Succeeds in most soils in sun or shade so long as the soil is moist[200]. Prefers a good loamy soil in a semishaded position[1, 11, 25], the leaves curling up when the plant grows in strong sunlight. Dislikes drought[1]. Requires a position sheltered from cold winds[25]. This species is only hardy in the milder areas of Britain. Plants are hardy to about -20°c according to another report. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rootstock is caespitose[25]. Closely related to T. spathiflorus[200].

# 6.2.304 Cornus florida

Flowering Dogwood 5 tlin 9 cyuc 2 kcak 3 tcan 2 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Cornus florida is a deciduous Shrub growing to 6 m (19ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a report that the fruit is poisonous for humans[229].

kcakta Edible Parts: Edible Uses: DrinkFruit - cooked. The fruit is not poisonous, but is almost inedible raw[226]. When the seed is removed and the flesh is mashed, it can be mixed with other fruits and made into jams, jellies etc[226].

The fruit, when infused in 'Fau de Vie' makes a bitter but acceptable drink[4]. One report says that the fruit is poisonous for humans[229]. The fruit is borne in clusters, each fruit being up to 15mm in diameter with a thin mealy bitter flesh[229]. The fruit is high in lipids, uo to 35% of dry weight[274].

tcanta Brush Dye Ink Repellent Teeth WoodA red dye is obtained from the fibrous root[4, 95]. The peeled twigs are used as toothbrushes, they are good for whitening the teeth[4, 95, 102]. The juice from the twigs preserves and hardens the gums[4]. The twigs can also be chewed to make natural paintbrushes[102]. A black ink can be made from the bark mixed with gum arabic and iron sulphate[4]. The bark is very bitter, could it be used to make an insect or bird repellent[K]? Wood - hard, heavy, strong, close grained, durable, takes a good polish and is extremely shock-resistant. It weighs 51lb per cubic foot and is used for making wheel hubs, tool handles, the heads of golf clubs, bearings, turnery etc[4, 46, 61, 82, 102, 171, 227]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anthelmintic Antidiarrhoeal Antiperiodic Appetizer Astringent Bitter Diaphoretic Malaria Poultice Stimulant TonicFlowering dogwood was employed medicinally by a number of native North American Indian tribes who valued it especially for its astringent and antiperiodic properties[257]. It is little used in modern herbalism. The dried root-bark is antiperiodic, astringent, diaphoretic, mildly stimulant and tonic[4, 46, 61, 95, 257]. The flowers are said to have similar properties[4]. A tea or tincture of the astringent root bark has been used as a guinine substitute to treat malaria[95, 222, 257] and also in the treatment of chronic diarrhoea[222]. The bark has also been used as a poultice on external ulcers, wounds etc[222, 257]. The glycoside 'cornin' found in the bark has astringent properties[213]. The inner bark was boiled and the tea drunk to reduce fevers and to restore a lost voice[213, 257]. A compound infusion of the bark and the root has been used in the treatment of various childhood diseases such as measles and worms[257]. It was often used in the form of a bath[257]. The fruits are used as a bitter digestive tonic[222]. A tincture of them has been used to restore tone to the stomach in cases of alcoholism[4].

nrakta Eastern N. America - Maine to Florida, east to Kansas and Texas. ksacta Rich well-drained soils in acidic woods to 1500 metres[43, 82]. An understorey tree in dry deciduous woods[82, 222].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Border, Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Dislikes shallow clay soils and chalky soils[98, 182]. Requires a neutral to acid soil according to another report[202]. Prefers a rich loamy well-drained soil[98]. Succeeds in full sun or light shade[[188]. Plants can be trained to grow against a wall when they prefer a position in light shade[202]. Plants are very hardy, tolerating temperatures down to about -25°c, but they are subject to damage by late frosts and are rarely successful away from the warmer counties of Britain[11, 200]. They require a long hot humid summer if they are to grow well, doing best in the east or southeast of Britain[182, 200] in areas that are not subject to late or early frosts. They do not generally do very well in the south-west, where the flower bracts are often damaged by frosts[200]. Medium to fast growing when young, but slowing with age[202]. Trees are short-lived[229]. A very ornaYoung leaves are fried and used as a Buddhist ceremonial dish[183].

tcanta OilAn oil obtained from the plant is used as a hair oil[151]. It is probably obtained from the oil[K].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and copses[151].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse. The seed has a short viability and should not be allowed to dry out[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in early summer. Cuttings of half-ripe wood, July in a frame[200]. Layering.

nwatta Requires a lime-free rather moist soil[200]. Prefers partial shade or dappled sunlight in a fertile moisture-retentive soil enriched with leafmould[200]. Plants can be pruned right back to the base if required, though any drastic pruning is best spread over several seasons[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious, male and female plants must be grown if seed is required[188].

#### 6.2.301 Crataegus heterophylla

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crataegus heterophylla is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit can be used in making pies, preserves, etc., and can also be dried for later use. The fruit is up to 1.5cm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Europe to E. Asia - Spain to China. Rarely self-sown in Britain. ksacta Found in secondary georgian oak forests

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with

protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. A very ornamental plant[1]

#### 6.2.302 Pseudocydonia sinensis

Chinese Quince, Quince 5 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Pseudocydonia sinensis is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - eaten as a sweetmeat, candied, preserved in syrup or made into a liqueur[46, 183]. The juice can also be mixed with ginger and made into a beverage[183]. The fruit is very large, up to 18cm long[105, 179].

tcanta Pot-pourri WoodThe fruits are very aromatic and are placed in a bowl to impart a delightful spicy scent to a room[46]. Wood - hard, dark red. Used for picture frames[174].

dwatta AntitussiveThe fruit is antitussive[174, 279]. It contains several medically active constituents including organic acids plus the flavonoids rutin and quercetin[279]. It is used in Korea to treat asthma, the common cold, sore throats, mastitis and tuberculosis[279].

nrakta E. Asia - China. ksacta Found at elevations around 1000 metres in Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hebei, Hubei, Jiangsu, Jiangxi, Shaanxi, Shandong and Zhejiang Provinces[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn[200]. Stored seed requires 3 months cold stratification and should be sown as early in the year as possible[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering.

nwatta Landscape Uses: Specimen. Requires a sunny position[1, 11], succeeding in any reasonably good soil that is well-drained but not dry[1, 200]. Trees are very hardy when grown in a continental climate with long hot summers but in the cooler climate of Britain where they do not always ripen their wood they are only reliably hardy to about -5°c[200]. They grow well on a south-facing wall[11, 200] and this is the only way to ensure that they fruit well in Britain[1]. A plant growing in a sunny position on the south side of tree cover at Kew was 3.5 metres tall in spring 1995 and looked healthy[K]. Occasionally cultivated, especially in China[46], for its edible fruit, there are some named varieties[183]. There is a disagreement over the correct name for this species, with some authorities using Pseudocydonia sinensis[11, 200] and others Chaenomeles sinensis[266]. Flowers are produced on

USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf from May to October, in flower from April to May, and the seeds ripen from September to January. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

pcista Poisonous to ruminants[76], it has also caused dermatitis in some people[76].

kcakta Edible Parts: Manna Oil SeedEdible Uses: Oil Tealmmature seed - usually pickled by steeping in salt and vinegar, and then used as a condiment for other foods[2, 8, 66, 183]. The leaves are sometimes used as an adulterant for tea[2, 177, 183]. A manna is obtained from the tree[183]. No further details are given. An edible oil similar to sunflower (Helianthus annuus) oil is obtained from the seed[7].

tcanta Dye Fuel Oil Shelterbelt String Tannin WoodA green dye is obtained from the leaves[7]. The bark is a source of tannin[4]. A tying material can be obtained from the wood[6] (does this mean the bark?). Very tolerant of extreme exposure and relatively fast growing, though often windshaped in exposed positions, it can be grown as a shelterbelt tree[49, 200]. However, it is late coming into leaf and also one of the first trees to lose its leaves in the autumn and this makes it less suitable in a shelter belt. Wood - hard, light, flexible, strong, resilient. A very valuable wood, it is much used for tool handles, oars, furniture, posts etc[4, 6, 7, 13, 46, 66]. An excellent fuel, burning well even when green[6]. There is some doubt over how well the green wood burns with several people claiming that it needs to be properly seasoned[K].

dwatta Antiperiodic Astringent Carminative Cathartic Diaphoretic Diuretic Laxative Purgative TonicThe leaves are astringent, cathartic, diaphoretic, mildly diuretic, laxative and purgative[4, 7, 9, 13, 21, 165, 254]. The have been used as a laxative, making a mild substitute for senna pods[254]. The leaves should be gathered in June, well dried and stored in airtight containers[4]. The bark is antiperiodic, astringent and a bitter tonic[4, 240]. Little used in modern herbalism, it is occasionally taken in the treatment of fevers[254]. The seeds, including their wings, have been used as a carminative[4]. They will store for 12 months if gathered when ripe[4].

nrakta Europe, including Britain south of latitude 64°, to N. Africa and W. Asia. ksacta Forming woods on calcareous soils in the wetter parts of Britain, also in oakwoods, scrub, hedges etc[17]. It is also often found on acid soils[17].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Approximately 5% of stored seed will germinate in the first year, the remainder germinating in the second year[186]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds. Cuttings of mature wood, placed in a sheltered outdoor bed in the winter, sometimes strike

nwatta Landscape Uses:Firewood, Pollard, Specimen. Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants can succeed in very exposed positions, including maritime exposure, though they can become wind-shaped[49]. Thrives in alkaline soils[11] but not in shallow soils over chalk. Tolerates a pH as low as 4.5, but prefers a base-rich soil above 5.5[186]. Trees are surprisingly tolerant of seasonally water-logged soils[186]. Dislikes dryness at the roots, especially in late spring[186]. Very intolerant of shade, young plants fail to develop properly in

such a position and often die. Although the dormant plant is very cold-hardy, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A fast growing tree, it is sometimes cultivated for its valuable timber. Very tolerant of cutting, ash was also at one time frequently coppiced for its wood[186]. However, modern use of plastics have reduced its economic values. There are many named varieties, selected for their ornamental value[11]. Trees have a light canopy and cast little shade[186]. A food plant for many insect species, there are 41 associated insect species[24, 30]. Trees can be male, female, monoecious or hermaphrodite, they can also change sex from year to year[11]. Trees take 30 - 40 years to flower from seed[186]. The flowers are produced on one-year old wood[7]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil reguirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 6.2.254 Pinus wallichiana

Himalayan Blue Pine, Bhutan pine, Himalayan Pine 5 tlin 7 cyuc 2 kcak 0 tcan 2 dwat 25 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus wallichiana is an evergreen Tree growing to 25 m (82ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Manna SeedEdible Uses: CondimentSeed - raw or cooked[183]. It has a very resinous flavour and so is not much relished[158]. The seed is quite small, to 7mm long[200]. The honeydew from aphid infested leaves is eaten as a manna[51, 146, 158]. Another report says that a manna-like substance that exudes from the leaves and twigs is eaten or used like honey[183]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Fuel Herbicide Lighting Pitch Shelterbelt Stuffing WoodA commercial source of turpentine and tar. It is said to be superior to P. roxburghii but not produced so freely [64, 146, 158]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. The leaves are used as a stuffing for pillows etc[158]. A tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Wood - moderately hard, durable, highly resinous. Used in construction, carpentry etc[46, 51, 146, 158, 272]. A good firewood but it gives off a pungent resinous smoke[51]. The wood is rich in resin. It can be splintered and used as a torch[145, 158].

dwatta Antiseptic Diaphoretic Diuretic Rubefacient Stimulant VermifugeThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4]. The wood is diaphoretic and stimulant[240]. It is useful in treating burning of the body, cough, fainting and ulcers[240].

nrakta E. Asia - Himalayas from Afghanistan to S.E. Tibet. ksacta The dominant species in drier areas, it is also found in secondary forest in wetter areas to  $4300 \, \text{metres} [51]$ .

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Industrial Crop: Hydrocarbon Management: Standard Regional CropLandscape Uses: Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils or shade[1, 11]. Established plants tolerate drought[200]. Prefers sandy or clay soils rather than limestone[146]. A very hardy but relatively short-lived tree in cultivation[11]. The Himalayan blue pine succeeds in exposed positions but it looks much better when grown in a sheltered position[11, 81]. It is a very fast growing tree when young, with new shoots up to 1metre long per vear[11] and 30 year old trees 20 metres tall. New growth takes place from April to mid-July[185]. Growth in height diminishes rapidly when trees are 25 metres tall, probably due to their dislike of exposure at that height[185]. Cultivated for timber in Italy[50]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Cones open and shed their seed whilst still on the tree[1]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attractive foliage, Not North American native. Inconspicuous flowers or blooms.

# 6.2.255 Liquidambar styraciflua

Sweet Gum, Red Gum, American Sweet Gum, Red Sweet

5 tlin 9 cvuc 2 kcak 3 tcan 3 dwat 25 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Liquidambar styraciflua is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist roil

kcakta Edible Parts: Edible Uses: GumA chewing gum and a stabilizer for cakes etc is obtained from the resin[102, 105, 149, 159]. It can also be chewed to sweeten the breath[183].

tcanta Adhesive Gum Incense Parasiticide Resin Teeth WoodThe aromatic resin 'Storax' is obtained from the trunk of this tree[46, 57, 61, 64]. It forms in cavities of the bark and also exudes naturally. It is harvested in autumn[181, 238]. Production can be stimulated by beating the trunk in the spring[171, 238]. The resin has a wide range of uses including medicinal, incense, perfumery, soap and as an adhesive[149]. It is also chewed and used as a tooth cleaner[183]. Wood - heavy, fairly hard, fine-grained, not strong, light tough, resilient. It weighs about 37lb per cubic foot[227]. The wood takes a high polish and can be stained then used as a cherry, mahogany or walnut substitute[171]. It is also used for furniture, flooring, fruit dishes, veneer etc[46, 61, 82, 149, 227].

dwatta Antiseptic Astringent Carminative Cholera Diurctic Dysentery Expectorant Parasiticide Poultice Salve Sedative Stimulant VulneraryA resin obtained from the trunk of the tree (see 'Uses notes' below) is antiseptic, carminative, diuretic, expectorant, parasiticide, poultice, salve, sedative, stimulant, vulnerary[21, 46, 57, 61, 149, 171, 213, 218, 222, 238]. It is chewed in the treatment of sore throats, coughs, asthma, cystitis, dysentery etc[222, 238, 257]. Externally, it is applied to sores, wounds, piles, ringworm, scabies etc[222, 238]. The resin is an ingredient of 'Friar's Balsam', a commercial preparation based on Styrax benzoin that is used to treat colds and skin problems[238]. The mildly astringent inner bark is used in the treatment of diarrhoea and childhood cholera[2221.

nrakta Eastern N. America - Connecticut to Florida, west to Texas and Illinois. ksacta Swampy woods which are often inundated annually[43] and on rich bottom lands[82].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Harvest the seed capsules at the end of October or November, dry in a warm place and extract the seed by shaking the capsule. Stored seed requires 1 - 3 months stratification and sometimes takes 2 years to germinate. Sow it as early in the year as possible. Germination rates are often poor. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse for their first winter. Since they resent root disturbance, it is best to plant them out into their permanent positions in early summer of their second year and give them some protection from cold for their first winter outdoors[K]. Cuttings of half-ripe wood, July/August in a frame. Suckers in early spring. Layering in October/November. Takes 12 months.

nwatta Landscape Uses:Aggressive surface roots possible. Specimen, Street tree. Prefers a moist but not swampy loam in a sunny sheltered position[11, 200]. Succeeds in light shade [188]. Prefers a neutral to acid soil [130]. Plants grow poorly in shallow soils overlying chalk[188]. Young plants are susceptible to damage from late frosts. A highly ornamental plant, especially in its autumn foliage[1, 227], it grows well in Cornwall[59] and S. England but does not do well in the north[98]. A fast-growing and long lived tree. it is fairly free from pests and diseases and has the potential to be a re-afforestation tree in cutover lands[227]. Trees commence flowering when about 20 - 25 years old[229]. The leaves emit a balsam-like fragrance when they fall in the autumn, this is retained until the leaves are guite withered[245]. Plants in the north of their range do not produce much resin[183]. Resists honey fungus[88]. This species resents root disturbance, young plants should be pot-grown and be placed in their permanent positions as soon as possible[200]. Special Features: Attractive foliage. North American native. Invasive. Naturalizing, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

#### 6.2.256 Aesculus x carnea

Red Horse Chestnut, Ruby Red Horsechestnut 5 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 25 m hkuc

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. The fruit is a good wildlife food source, especially for birds[200]. There is some confusion over the correct name of this species, [43] lists this name as a synonym of M. coronaria lancifolia whilst [200] treats it as a species in its own right. This species is closely related to M. ioensis[200]. It hybridizes freely with other members of the genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 6.2.298 Malus sikkimensis

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus sikkimensis is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fuits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is up to 15mm in diameter[200] and is freely produced in Britain[11].

nrakta E. Asia - Himalayas from India to Sikkim and western China. ksacta Open forests on slopes, mixed forests in valleys at elevations of 2500 - 3000 metres in western China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood. November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade, though it fruits less well in such a situation[200]. Closely related to M. baccata[1]. The fruit, which is freely produced in Britain[11], is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.299 Thamnocalamus spathiflorus

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thamnocalamus spathiflorus is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[177]. Seed - cooked and used as a cereal[177]. The plants only flower and produce seed at intervals of several years.

tcanta Basketry Hedge Hedge Plant supportA valuable plant for screen planting in wet areas[200]. The canes are used for making baskets and pipes[25, 46, 51, 195]. They can also be used as plant supports[146]. The canes are quite brittle and so are not very useful for weaving, in their native range they are only used when better species are not available[220].

nrakta E. Asia - W. Himalayas. ksacta Forming thickets in damp sites in cedar, oak and fir forests up to 3600 metres[51, 200]. Prefers growing on steeply sloping sites[220].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings.

nwatta Succeeds in most soils in sun or shade so long as the soil is moist[200]. Prefers a good loamy soil in a semishaded position[1, 11, 25], the leaves curling up when the plant grows in strong sunlight. Dislikes drought[1]. Requires a position sheltered from cold winds[25, 195]. When grown outdoors, this species is only hardy in the milder areas of Britain[195]. Plants are hardy to about -20°c according to another report. This species is notably resistant to honey fungus[200]. A clump-forming species, it does not hinder the regeneration of tree growth in its native range and is also a very valuable species for providing food and shelter for wildlife[267]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rootstock is caespitose[25]. Closely related to T. aristatus[200]

#### 6.2.300 Lindera obtusiloba

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli nyanhjen hjonli

drutta Lindera obtusiloba is a deciduous Shrub growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil

kcakta Edible Parts: Leaves OilEdible Uses: Oil TeaThe young buds and leaves are used as a tea substitute [177, 183].

of side shade[200]. Prefers warmer summers than are usually experienced in Britain[200]. The seed ripens in its second year[200] and is frequently produced in Britain[11]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.295 Vitis flexuosa

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Vitis flexuosa is a deciduous Climber growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK cone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: Fruit Leaves SapEdible Uses: Fruit raw or dried for winter use[105, 177]. The fruit is about 7mm in diameter[200] and is carried in bunches. Some forms of this plant have edible leaves[177] - it is unlikely that the leaves of any forms are poisonous, but perhaps some are more palatable than others[K]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked. Sap - a sweet taste[178], it can be made into a drink[105, 177].

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

dwatta Restorative TonicThe fruit is restorative, strengthening and tonic[218]. The sap is used to restore youth and black hair[218]. The root is said to be warming to the sinews[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woodlands in hills and mountains of C. and S. Japan [58, 200].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. A very ornamental plant[1], it climbs by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

## 6.2.296 Morus bombycis

Kuwa

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Morus bombycis is a deciduous Tree growing to 8 m (26ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral

and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or used in preserves[183]. The fruit is about 1cm in diameter[266].

tcanta FibreThe bark fibers are used for making paper[266].

dwatta Diuretic PectoralThe root bark is diuretic and pectoral[147]. A decoction is used in the treatment of 'hot' pulmonary coughing, asthma, excessive sputum production, oedematous face and difficult urination[147].

nrakta E. Asia - Japan. ksacta Mountains all over Japan[58].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. There is some doubt over the validity of this name. [183] lists it as a synonym of M. alba stylosa (which we list as a synonym of M. australis) whilst [200] lists it as a synonym of M. alba. A plant seen at Hilliers Arboretum, Hampshire at the end of October 1996 seemed to be guite distinct from M. alba - it was still clothed in the lush green growth of early summer and was also still making new growth[K]. According to the Flora of China, this name is only a synonym for M. australis[266], though we are maintaining it as a separate species for the time being because we have seen specimens growing at Hilliers Arboretum that appear to be distinct[K]. Mulberries have brittle roots and so need to be handled with care when planting them out [238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.297 Malus bracteata

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus bracteata is a deciduous Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The fruit is about 3cm in diameter[200].

nrakta Southern N. America - Missouri to Florida. ksacta Bottoms, wooded slopes, thickets and clearings[43] in most soil types and moisture levels[159]. hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus x carnea is a deciduous Tree growing to 25 m (82ft 0in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins[169]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: SeedEdible Uses: We have no details for this species, but the following notes almost certainly apply to it. Seed-cooked. It can be dried, ground into a flour and used as a gruel. The seed is quite large, about 20mm in diameter, and is also easily harvested. Unfortunately, it is rich in saponins and these toxins need to be removed before the seed can be eaten. See also the notes above on toxicity. The following notes apply to A. californica, but are probably also relevant here: The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213]. Most of the minerals etc would also have been leached out by this treatment[K].

tcanta SoapSaponins in the seed are a soap substitute[169]. The saponins can be easily obtained by choppine the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts(K1.

dwatta BachThe plant is used in Bach flower remedies the keywords for prescribing it are 'Excessive fear' and 'Anxiety for others' [209].

nrakta A cultivated hybrid of garden origin, A. hippocas-

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer. This species is a garden hybrid though it breeds relatively true from seed[200].

nwatta Landscape Uses:Pest tolerant, Pollard, Specimen, Street tree. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. The dormant tree tolerates temperatures down to at least -15°c[200], though the young growth in spring can be damaged by late frosts. It prefers a continental climate, growing best in eastern and south-eastern England[200]. There are some named forms selected for their ornamental value[11, 200]. Most members of this genus transplant easily, even when fairly large[11]. Abnormal cell development in this species may result in eruptions on trunks over 30cm in diameter - these ultimately decay[200]. Although a hybrid species, it breeds true from seed due to a doubling of the chromosomes[11, 17]. Special Features:Attractive foliage, Not North American native, Blooms are very showy.

#### 6.2.257 Corvlus chinensis

Chinese Hazel 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 24 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyif hjonli

drutta Corylus chinensis is a deciduous Tree growing to 24 m (78ft 9in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[63, 105, 177, 183]. Rich in oil. A shrub at Kew was 2 metres tall and 2 metres wide in July 1996 with a reasonable crop of immature fruit[K]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

nrakta E. Asia - China. ksacta Shady mixed forests[74]. Forests on moist mountain slopes at levations of 1200 - 3500 metres[266].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta An easily grown plant, it succeeds in most soils. but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. Once established, this species is drought resistant[183]. It does not produce suckers[183]. A very ornamental tree[1], it is closely allied to C. colurna[11]. It has become very rare in China where it is considered to be at risk of extintion[266]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11]. For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 6.2.258 Celtis caucasica

Caucasian hackberry

5 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 20 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Celtis caucasica is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[3, 105]. A mealy pleasant taste[74]. The fruit is about 4 - 5mm in diameter, it has a thin, dry, sweet flesh with a pleasant flavour but a slight astringency[K]. The trees often produce large crops of fruit in Britain, but there is so little that is edible on each fruit that it is scarcely worthwhile[K].

tcanta Fuel WoodWood - very tough, elastic, durable, of high quality[74, 146]. An excellent fuel[146].

nrakta E. Europe to Asia - Bulgaria to the Himalayas. ksacta Dry stony bluffs, rocks, ravines etc and occasionally as undergrowth in clearings[74].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cuttings

nwatta Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soils[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Established plants are very drought resistant[74, 200]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. Trees can be very long-lived, perhaps to 1000 years[200]. This species is closely allied to C. australis but it is much hardier and is more likely to thrive in Britain than most other species in this genus[11, 200]. A tree at Kew in September 1989 was 12 metres tall though it was not bearing fruit[K]. Coppices well[146]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.259 Aesculus turbinata

Japanese Horse Chestnut 5 tlin 7 cyuc 2 kcak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus turbinata is a deciduous Tree growing to 20 m (65ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

poista The seed is rich in saponins[169]. Although poisonus, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite litter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves cooked[177]. Some caution is advised on this entry since the leaves are likely to contain toxic saponins (see notes above on toxicity). Seed - cooked. It can be dried, ground into a flour and used as a gruel. The starch is extracted and eaten[177]. The seed is quite large, about 25 - 30mm in diameter and is easily harvested. Unfortunately it is also rich in saponins and these need to be removed before the seed can be eaten. See also the notes above on toxicity. The following notes apply to A. californica, but are probably also relevant here:- The seed needs to be leached of toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213]. Most of the minerals etc would also have been leached out by this treatment[K].

tcanta Soap WoodSaponins in the seed are a soap substitute[169]. The saponins can be easily obtained by chopping the 18ed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes

etc. Its main drawback is a lingering odour of horse chestnuts[K]. Wood - weak, nicely grained. Used for house fittings, domestic items etc[11].

nrakta E. Asia - China, Japan ksacta Mountains, especially in ravines, all over Japan[58]. In deciduous forests, especially in moist slopes along streams[275].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Landscape Uses:Specimen. Prefers a deep loamy well-drained soil but is not too fussy[1, 11]. The dormant plant is very cold-hardy, though the young growth in spring can be damaged by late frosts. It prefers growing in a continental climate, doing best in eastern and south-eastern England[200]. Most members of this genus transplant easily, even when fairly large[11]. Special Features:Attractive foliage, Not North American native, Blooms are very showy.

# 6.2.260 Ampelopsis brevipedunculata

Porcelain Berry, Amur peppervine, Blueberry Climber, Porcelain Berry Vine

5 tlin 8 cvuc 2 kcak 1 tcan 2 dwat 20 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ampelopsis brevipedunculata is a deciduous Climber growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from July to August, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Leaf buds - cooked[105]. Leaves and stems - cooked[2, 105, 177]. Fruit - raw or cooked[105, 177]. The fruit is 6 - 8mm in diameter[200] and is carried in small bunches like grapes[K]. Not very palatable[K].

tcanta An ornamental plant. Landscape Uses: Arbor, Container, Pollard.

dwatta Antiphlogistic Depurative FebrifugeThe fresh fruits, roots and leaves are antiphlogistic, depurative and febrifuge. Resolves clots[147]. It is used externally in the treatment of boils, abscesses and ulcers, traumatic bruises and aches[147].

nrakta E. Asia - China, Japan, Korea, E. Russia. ksacta Thickets in hills all over Japan[58]. Climbing up trees in valleys or over shrubs on hillsides at elevations of 100-600 metres in Heilongjiang, Jilin and Liaoning provinces of China[266]

propta Seed - sow in pots in a cold frame in the autumn or stratify for 6 weeks at 5°c and sow in the spring[200]. Germination can be quite slow, sometimes taking more than a year. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. When they are more than 20cm tall, they can be planted out into their permanent positions, preferably in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long, July/August in a frame[78]. Cuttings or eyes in late autumn or winter. Either place them in the ground in a greenhouse or cold frame, or put them in pots. An eve cutting is where you have just one bud at the top and a short length of stem with a small part of the bark removed. These normally root well and grow away vigorously, being ready to plant into their permanent positions the following autumn. Layering into pots in late summer. Partially sever the stem in spring and then lift the new plants in the autumn[78].

a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils, including peat, chalk, gravels, sand and shales[186], so long as they are not waterlogged, though wild plants are occasionally found in situations with standing winter water[186]. Grows well in heavy clay soils[186]. Established plants are fairly drought tolerant[186]. Dislikes dry soils according to one report[31] whilst another says that it succeeds in dry shade[188]. Tolerates a pH range from 3.5 to 7.2[186]. Succeeds in full sun or fairly dense shade[17, 28, 31], self-sown seedlings from woods and shady places making the most shade tolerant plants[28]. Tolerant of maritime exposure[75] though in such a situation it may lose some or all its leaves in the winter[186]. Plants require a minimum July temperature of 12°c for good fruit production[186]. They tolerate short periods in winter down to -15°c[184]. Severe frosts can kill whole branches, especially if they are open to the sky[186]. The young growth in spring can be damaged by late frosts. A very ornamental plant, there are many named varieties[182]. Flowers and fruits are formed on wood of the previous year's growth[229]. A good bee plant[108], the minute flowers are sweetly scented[245]. The fruit is a valuable winter food source for birds. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Only move the plants in May or, preferably, in September[1]. Plants are quite slow growing, even when in good soils and situations[11, 75]. Trees are usually dioecious but hermaphrodite forms are available. Male and female plants must usually be grown if seed is required. Plants are capable of regenerating from the main stem both above and below ground level and, although the top may be killed in a fire, the plants will usually regrow from the base[186]. Rabbits are particularly fond of this species and will quickly remove the bark. This species is notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 6.2.293 Vitis parvifolia

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis parvifolia is a deciduous Climber growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Édible Parts: Fruit LeavesEdible Uses: Drink-Fruit - raw or dried for winter use[105, 177]. The fruit about 7mm in diameter[200] and is carried in bunches. Some forms of this plant have edible leaves[177] - it is unlikely that the leaves of any forms are poisonous, but perhaps some are more palatable than others[K]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked. Sap - a sweet tastel 1781, it can be made into a drink[105, 1771.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

dwatta OphthalmicThe fruit is restorative, strengthening and tonic[218]. The sap is used to restore youth and black hair[218]. The root is said to be warming to the sinews[218]. nrakta E. Asia - China, Japan, Korea. ksacta Woodlands in hills and mountains of C. and S. Japan[58, 200].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germina-

tion rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. A very ornamental plant[1], it climbs by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.294 Ouercus libani

Lebanon Oal

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 8 m hkuc

hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus libani is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked. The seed is about 2.5cm in diameter[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent TanninA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff[4].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta W. Asia - Turkey, Iran, Iraq. ksacta Not known

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels are remarkably variable in shape[11]. Trees are used in the re-afforestation of arid areas[74].

## 6.2.291 Aralia spinosa

Hercule's Club, Aralia spinosa, American Angelica Tree, Hercules' Club, Devil's Walking Stick

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 9 m hkuc

pcimhmim cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aralia spinosa is a deciduous Tree growing to 9 m (29ft 6in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from August to September, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Handling the roots can cause dermatitis in some people[222]. Large amounts of the berries are poisonous[222].

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 177]. The leaves usually have a number of slender prickles, they must be gathered before the prickles harden[159] and are then chopped finely and used as a potherb[183].

tcanta WoodWood - close-grained, weak, light, soft, brittle[82, 227]. Of little economic value[229].

dwatta Alterative Analgesic Diaphoretic Ophthalmic Sialagogue StimulantAnalgesic [46, 61]. The bark, especially of the roots[82] is the part most commonly used medicinally, though other parts of the plant, including the fruit[82], also possess medicinal properties[4]. The fresh bark is strongly emetic, ophthalmic, purgative and sialagogue[4, 46, 61, 222, 257], when dried it is a stimulating alterative and is diaphoretic[82]. A tincture of the berries is used in the treatment of toothache and rheumatism[4, 222, 257]. A poultice of the roots is applied to boils, skin eruptions, varicose veins, old sores and swellings[222, 257]. A cold infusion of the roots is used as drops for sore eyes[257].

nrakta South-eastern N. America - New York to Florida, east to Texas. ksacta Buffs, rich woods and river banks in deep moist soils[43].

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Landscape Uses:Border, Massing, Specimen, Woodland garden. Prefers a good deep loam and a semishady position[1]. Requires a sheltered position[1]. A fast-growing but short-lived tree in its native zone[229], this species is of little value in Britain[1]. It is generally a single-stemmed plant, often spreading freely by means of suckers[182, 229]. Plants make finer foliage when growing in rich soils but are generally healthier and longer-lived in a comparatively poor soil[11]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Special Features:North American native, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Attractive flowers or blooms.

#### 6.2.292 Ilex aguifolium

Holly, English holl, Christmas Holly, Common Holly, English Holly

5 tlin 9 cyuc 2 kcak 4 tcan 2 dwat 9 m hkuc

pcimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ilex aguifolium is an evergreen Shrub growing to 9 m (29ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen from November to March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution

pcista The fruit and probaby other parts of the plant contain saponins and are toxic, causing diarrhoea, vomiting and stupor[10, 274]. However, toxicity levels are low and it is only in very large doses that problems are likely to arise[65, 76]. Do not exceed recommended doses. Fruits particularly poisonous to children [301].

kcakta Edible Parts: Edible Uses: TeaThe leaves have been used as a tea substitute[4]. The roasted fruit has been used as a coffee substitute[7]. Some caution is advised here, since the fruit can be purgative and emetic[K].

tcanta Fuel Hedge Hedge WoodAn excellent hedge plant, tolerating hard clipping and maritime exposure and forming a dense stock-proof shelter[4, 11, 29, 75, 186]. Plants are fairly slow growing however[11]. The cultivar 'Pendula' makes a very good carpeting ground cover plant when grown as a cutting on its own roots[208]. It can be planted up to 1.2 metres apart each way, but is fairly slow to cover the ground[208]. Wood - strong, hard and dense, it polishes well, though it must be well dried and seasoned or else it warps badly. It is beautifully white, except at the centre of very old trees, and is highly regarded by cabinet makers though it must be well seasoned[4, 7, 46, 61]. The heartwood of mature trees is used for printing blocks, engravings, turnery etc[11, 115]. The wood makes a good fuel, burning well even when green[6]. Landscape Uses:Border, Screen, Standard, Specimen.

dwatta Astringent Bach Diaphoretic Diuretic Emetic Expectorant Febrifuge PurgativeHolly is little used in modern herbalism. The leaves are diaphoretic, expectorant, febrifuge and tonic[4, 9, 21]. They can be use fresh at almost any time of the year or can be harvested in late spring and dried for later use[4, 9]. They are used in the treatment of intermittent fevers, rheumatism, catarrh, pleurisy etc[4, 238 2541 The juice of the fresh leaves has been successfully used in the treatment of jaundice[4]. The berries are violently emetic and purgative[4, 7]. They have been used in the treatment of dropsy and as a powder they have been used as an astringent to check bleeding[4]. The berries are toxic, especially to children, and should not be used medicinally except under professional supervision[254]. The root has been used as a diuretic, though there are more effective diuretics available[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Hatred', 'Envy', 'Jealousy' and 'Suspicion'[209].

nrakta Western and central Europe, including Britain, from Norway to Germany south to the Mediterranean. ksacta Found in most well-drained soils in scrub, hedges and woodland where it is often the dominant under-storey shrub[7].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them

nwatta Landscape Uses:Arbor, Container, Pollard, Prefers a deep rich loam in a warm sheltered position in full sun[11, 200]. Succeeds in poor soils[182]. Does well on a south wall[11, 219]. A very ornamental plant, there are some named varieties[182]. Most forms of this species, especially the sub-species A. brevipedunculata maximowiczii. (Reg.)Rehd. (syn A. heterophylla. Sieb. and Zucc.), are very hardy in Britain when dormant, but the cultivar 'Elegans' is frost-tender and usually grown as a pot plant[200]. The draft Flora of China has a different treatment for these plants, it recognises A. heterophylla as the correct name for A. brevipedunculata maximowiczii and reduces this species to a subspecies as A. heterophylla brevipedunculata[266]. The young growth in spring, even on mature plants, is frosttender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants rarely fruit in Britain except after a long hot summer[200]. Another report says that if the plant is growing in a poor soil on a south facing wall then it fruits quite regularly[182]. Plants fruit better if their roots are restricted, this can be achieved by root pruning in the winter or by putting the plant into a large container and then placing this in the soil[200]. Growth, especially in good soils, can be very vigorous and this is usually at the expense of the fruits[202]. Any pruning is best carried out in the winter[219]. The shoots have sticky pads and are selfsupporting on walls[11]. Other reports say that plants climb by means of coiling tendrils but large plants often need tying in to support the weight of foliage[200, 219]. Special Features: Attracts birds, Attractive foliage, Not North American native, Invasive, Inconspicuous flowers or blooms.

## 6.2.261 Juniperus excelsa

Grecian Juniper

5 tlin 9 cyuc 2 kcak 3 tcan 1 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus excelsa is an evergreen Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A liquid is obtained from the fruit[146] (used for drinking?). The cones are about 7 - 12mm in diameter and take 2 years to mature[200].

tcanta Fuel Incense Miscellany Roofing WoodThe bark is used for roofing[146]. Wood - moderately hard, close and even grained, fragrant, good quality. Used for construction, fuel and it is also burnt as an incense[1, 146, 158]. The crushed foliage emits a warm resinous scent[185].

dwatta MiscellanyThe smoke from the branches is used in India to treat the delirium of fevers[240].

nrakta S. Europe to E. Asia. ksacta Inner dry ranges of the Himalayas, 1500 - 4200 metres[146], from Nepal to Afghanistan.

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in dry soils. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[11] and succeeding on chalk[200]. Plants are tender when young, they require a sheltered position[1]. The crushed foliage emits a warm resinous scent[185]. Plants are usually dioecious though sometimes they are monoecious[11]. Male and female plants must be grown if seed is required. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

# 6.2.262 Quercus phellos

Willow Oak

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 20 m hkuc

hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus phellos is a deciduous Tree growing to 20 m (65ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[2, 63, 105]. Rather small, it is only 1cm long[11, 2001. The seed can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Buttons Charcoal Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark contains about 10% tannin and is a commercial source of that material[223]. Tannin is also found in the leaves and wood[223]. The seedcups are used as buttons[95]. Wood - close-grained. strong, not hard, heavy, not durable[46, 61, 82, 171, 227]. It weighs 46lb per cubic foot[227]. Of rather low quality for an oak but it is sufficiently abundant to be harvested commercially. The wood is used for construction, fellies of wheels and charcoal[46, 61, 82, 171, 227].

dwatta Analgesic Astringent Dysentery SalveA decoction of the wood chips or bark has been applied externally as an analgesic and as a bath for aches, pains, sores, cuts and haemorrhoids[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Staten Island to Georgia, west to Texas. ksacta Low wet borders of swamps and streams, bottom lands and sandy uplands on rich soils[43,

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left

in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Although it prefers warmer summers than are usually experienced in Britain[200], this species thrives in this country[11], though it rarely sets seed here[80]. Trees commence to bear seeds when about 20 years old in the wild and good crops are usually produced annually[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. A very ornamental plant[1]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

## 6.2.263 Ouercus nigra

Water Oak

5 tlin 9 cvuc 2 kcak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus nigra is a deciduous Tree growing to 20 m (65ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[61, 105, 161]. A staple food for some native North American Indian tribes[257]. The seed is about 15cm long and wide[82, 200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute[257].

tcanta Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves. the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - heavy, hard, strong, closegrained[61, 82, 227, 235]. It weighs 45lb per cubic foot[235]. It is used for cross-ties and poles[227], but is little valued except as a fuel[61, 82].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - New Jersey to Florida, west to Oklahoma. ksacta Dry woods or borders of streams and bottomlands[43]. The best specimens are found in well-drained, silty clay or loamy soils[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in

situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A fast-growing tree in its native habitat, it does not bear seeds until about 20 years old[229]. Seed production is cyclic, a year of high yields being followed by a year of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.264 Ulmus parvifolia

Chinese Elm, Lacebark Elm 5 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 18 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulmus parvifolia is a deciduous Tree growing to 18 m (59ft) by 18 m (59ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from March to January, in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit Inner bark LeavesEdible Uses: Leaves - raw or cooked[105, 177]. Immature fruits, used just after they are formed - raw or cooked[105, 132]. An aromatic, unusual flavour, leaving the mouth feeling fresh and the breath smelling pleasant[132]. It contains about 34.4% protein, 28.2% fat, 17% carbohydrate, 5% ash[132]. Inner bark - cooked. A mucilaginous texture[105, 177]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[K].

tcanta Shelterbelt WoodFairly resistant to maritime exposure, it can be grown in a shelter belt[K].

dwatta Antidote Demulcent Diuretic Expectorant Febrifuge Hypnotic LithontripicThe leaves are antidote and lithontripic[218]. The stem bark is demulcent, diuretic, expectorant, febrifuge, hypnotic and lithontripic[178, 218]. The flowers are used in the treatment of fevers and neuri-

nrakta E. Asia - China, Japan, Korea. ksacta Rich soil and near water courses in W. China[109] at elevations below 800 metres[266]...

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. One to two months stratification can improve germination rates. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Landscape Uses:Aggressive surface roots possible, Pollard, Specimen, Street tree, Easily grown in any soil of at least moderate quality so long as it is well drained[1]. Fairly tolerant of maritime exposure, it succeeds outdoors in a very exposed position at Rosewarne in N. Cornwall[K].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or 6.2.289 Pyrus nivalis cooked in preserves etc[K]. Rather mealy but a pleasant semi-sweet flavour when fully ripe[K]. The fruits are about 13mm across[200] and are borne in fairly large bunches making harvesting easy[K].

nrakta Europe - Switzerland to Austria and Hungary. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. This species is closely related to S. intermedia[200]. Plants are susceptible to fireblight[188]. Trees seen at Wisley and at Cambridge Botanical Gardens in September 1993 were bearing very good crops of fruit[K]. The name of this species might have been mis-spelt, it could be S. austrica[200].

#### 6.2.288 Vitis bailevana

Gravbark Grape

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis bailevana is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or dried for winter use[177, 257]. The fruit is about 4 -7mm in diameter[200] and is borne in bunches. Leaves - raw or cooked. They can be chewed to allay thirst. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DveA vellow dve is obtained from the fresh or dried leaves[168].

nrakta South-eastern N. America - Kentucky to Alabama and Arkansas. ksacta River banks and rich thickets[43].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This species is closely related to V. vulpina[43]. Plants in this genus are notably susceptible to honey fungus[200].

Snow Pear

5 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 10 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus nivalis is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A sour flavour, it is usually cooked or brewed into cider or perry[183, 200]. The fruit matures late in the season and is 3 - 5cm long[200].

nrakta S.E. Europe to W. Asia. ksacta Sunny slopes and dry open woods in S. Europe[50].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200]. A very ornamental plant[1].

# 6.2.290 Pyrus regellii

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 9 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus regellii is a deciduous Tree growing to 9 m (29ft 6in) See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is about 3cm in diameter[200].

tcanta RootstockUsed as a rootstock[74].

nrakta W. Asia - Turkestan. ksacta Dry stony slopes, rocks, sometimes in valleys on deeper moist soils, 1000 -2000 metres[74].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are very drought resistant[74]. Plants are hardy to at least -15°c[200]. Cultivated for its edible fruit in China and Japan, there are many named varieties. A hybrid between this plant and P. communis culta is more suitable for warmer climates. The leaves also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Gritty[1]. The fruit is 10 - 15mm in diameter[200].

nrakta E. Asia - China. ksacta Mixed forests on slopes at elevations of 1400 - 3500 metres in W Sichuan and NW Yunnan[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following year. Cuttings of mature wood, November in a frame[11].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. Plants fruit regularly at Kew[11]. The fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.285 Pyrus amygdaliformis

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyrus amygdaliformis is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft). See above for USDA hardness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is up to 3cm in diameter[200].

nrakta S. Europe to W. Asia. ksacta Dry rocky places in Bulgaria and the Mediterranean [50].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200].

# 6.2.286 Carya buckleyi

Black hickory

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carya buckleyi is a deciduous Tree growing to 10 m (32ft 10in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium

(loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105]. A sweet flavour[1, 82]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel WoodWood - hard and brittle. Used mainly for fuel[82].

nrakta Central N. America - Texas and Oklahoma. ksacta Dry sandy uplands[82].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection from mice et cand the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing, especially when young[11]. Succeeds outdoors at Kew[11]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have guite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. There is some confusion over the correct name of this species, some authorities place it under C. texana. Buckl.[137] whilst others say that C. buckleyi is the correct name and that there is also a distinct species C. texana. DC[11, 82]. According to the Flora of N. America. C. buckleyi Dewey. Is a synonym for C. brunnescens subsp. Sphaerostachya, whilst C. buckleyi Durand. Is a synonym for C. texana[270]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

#### 6.2.287 Sorbus austriaca

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus austriaca is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

Resistant to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by a beetle. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species hybridize freely, the pollen stores well and can be kept for use with species that flower at different times[200]. Trees retain their leaves until early in the new year[11] and in areas with mild winters will often retain them until new leaves are formed in the spring[188]. A good companion for grapes[18]. There are some named forms, developed for their ornamental value. 'Frosty' and 'Geisha' are small bushes whilst 'Pumila' is a minute bush for the rock garden. Special Features: Not North American native, Inconspicuous flowers or blooms.

# 6.2.265 Celtis laevigata

Sugarberry, Netleaf hackberry, Texan sugarberry, Sugar Hackberry

5 tlin 10 cyuc 2 kcak 3 tcan 1 dwat 18 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Celtis laevigata is a deciduous Tree growing to 18 m (59ft 1in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[61, 105, 257]. The flesh is thin, dry and sweetish, covering a single large seed[149, 183]. The fruit, which is orange to brown or red when fully ripe, is 5 - 8mm in diameter[235, 270].

tcanta Fuel Miscellany WoodWood - soft, not strong, close grained. It weighs 49lb per cubic foot and is used for cheap furniture, fencing, fuel[61, 82, 227].

dwatta Miscellany VDA decoction of the bark has been used in the treatment of sore throats[257]. It has also been used, mixed with powdered shells, as a treatment for VDI2571.

nrakta South-eastern N. America - Virginia to Illinois and Missouri, south to Florida and Texas. ksacta In rich bottomlands along streams, in flood plains, and on rocky slopes, generally in clay soils, from sea level to 300 metres[229, 270].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cuttings

nwatta Landscape Uses:Erosion control, Pest tolerant, Aggressive surface roots possible, Street tree, Woodland garden. Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soil[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Plants are usually found on clay soils in the wild[229]. Established plants are very drought resistant[200]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. A very variable species, according to some botanists these merit varietal status whilst other botanists say that the differences are too slight[227]. Trees are moderate to fast-growing, probably living no more than 125 - 150

report, perhaps surviving for 1000 years[200]. Trees fruit heavily most years [229]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Naturalizing, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

# 6.2.266 Cornus controversa

Giant Dogwood, Wedding Cake Tree, 5 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslin hpa7tmwatli xre7t hionli

drutta Cornus controversa is a deciduous Tree growing to 15 m (49ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit[105, 177]. No more details are given. The fruit is about 6 mm in diameter[200].

tcanta OilThe fruit provides an oil used in the lubricating and soap industry [266].

dwatta AntiphlogisticThe leaves are used in folk remedies to relieve pain and reduce swelling[266].

nrakta E. Asia - China, Japan, Himalayas. ksacta Woodland, hedges and thickets, 600 - 2000 metres in W. China[109]. Broad-leaved or mixed broad-leaved and needleleaved forests at elevations of 200 - 2600 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80] 1131. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Pest tolerant, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. A very ornamental plant[1, 11], it is hardy to about -20°c[184]. This species is unusual in having alternate leaves whilst almost all other members of this genus have opposite leaves[182]. Closely related to C. alternifolia[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Attractive flowers or blooms.

#### 6.2.267 Carva texana

Black Hickory

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carya texana is a deciduous Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105, 177]. A sweet flavour, but the seed is small with a very thick shell[149, 227]. Another report says that the kernel has a bitter flavour[274]. The seed is up to 4cm long[229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel WoodWood - close grained, tough, strong, brittle[82, 149]. It weighs 50lb per cubic foot[235]. Used mainly for fuel, it burns well giving off a lot of heat[82, 149].

nrakta Southern N. America - Texas. ksacta Dry sandy woods or rocky slopes[43, 137]. Bottomlands and low wet woods[82]. Lowland and upland woods, usually on sandy soils but also sometimes on limestone[274].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. Slow growing[200]. There is some confusion over the naming of this species, with two separate authors of the name being cited. C. texana. Buckl. is used by some authorities as the correct name and C. buckleyi (q.v.) is given as a synonym of that species[11, 137]. However, other authorities cite C. texana. DC. as the correct name, in this case C. buckleyi remains as a separate species[82]. Plants are strongly tap-rooted and should be planted in their permanent positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Most species in this genus have guite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

# 6.2.268 Picea breweriana

Weeping Spruce, Brewer spruce 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hionli

drutta Picea breweriana is an evergreen Tree growing to 15 m (49ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in

flower in May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH. mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. The cones are up to 10cm long[82]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food when all else fails. Seed - raw. The seed is about 2 - 4mm long[229] and is too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172].

tcanta WoodWood - soft, heavy, close grained[82]. It is valued for its use in the pulp industry to make paper[171].

nrakta South-western N. America - California to Oregon. ksacta Usually on dry mountain ridges and peaks near the timber line, forming small groves around 2100 metres[82], though the best specimens are found in deep moist welldrained soils[229].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame [78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Closely related to and often confused with P. smithiana. Very slow growing when young, plants are often no more than 1 metre tall when 10 years old. Growth increases somewhat with age and can average 30cm a year in older trees[185]. Increase in the girth of trees grown in the open can be guite fast, averaging 3cm a year [185]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. The crushed shoots have a resinous aroma[245].

# 6.2.269 Sinofranchetia chinensis

5tlin 9 cyuc 2 kcak 0 t<br/>can 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat<br/>priklwis hpa7tmwatli nyanhjen hjonli

drutta Sinofranchetia chinensis is a deciduous Climber growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so

can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant, otherwise they bleed profusely[182, 200]. This species is closely related to V. rupestris[43]. Plants in this genus are notably susceptible to honey fungus[200].

## 6.2.282 Vitis romanetii

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis romanetii is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or dried for winter use[105, 177]. The fruit is about 8 - 12mm in diameter[200] and is borne in small bunches. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168].

nrakta E. Asia - China. ksacta Thickets, 900 - 1200 metres in W. China.

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Requires a position in full sun[200]. This species is not hardy in the colder areas of the country[219]. Young growths and thin wood can be cut back by frosts[219]. Plants climb by means of tendrils[182]. Closely related to V. davidii[219]. Plants are rather tender in Britain when they are young, though older plants are hardy in most parts of the country[11]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 6.2.283 Koelreuteria paniculata

Golden Rain Tree, Varnish Tree 5 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 10 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Koelreuteria paniculata is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a fast rate. See above for

USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Leaves SeedEdible Uses: Berries - roasted[2, 177]. Leaves and young shoots - cooked[2, 105, 177, 179].

tcanta Beads DyeA yellow dye is obtained from the flowers.[46, 61, 178]. A black dye is obtained from the leaves[178]. The seeds are used as beads in necklaces etc[46, 61, 178].

dwatta OphthalmicThe flowers are ophthalmic[178, 218]. They are used in the treatment of conjunctivitis and epiphora[218].

nrakta E. Asia - N. China. Naturalized in Japan and S. Europe. ksacta Found by sea-shores in Japan[58]. Grows on plains and in secondary forest on poor soils in China[200].

propta The seed requires a period of cold stratification. It is probably best sown as soon as it is ripe in a cold frame[200]. Pre-soak stored seed for 24 hours in warm water. If it swells up then sow it in a cold frame. If it does not swell then soak it for a further 24 hours in hot water prior to sowing. This should cause the seed to swell but, should this fail, scarification (taking care not to damage the seed embryo) followed by a further 24 hours in warm water should do the trick[80]. Germination is usually good[78], though the seedlings are very variable[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Consider giving the plants some protection from the cold for their first winter outdoors[78]. Root cuttings, 4cm taken in December. Plant horizontally in individual pots in a warm greenhouse[78].

nwatta Landscape Uses:Pest tolerant, Specimen. Succeeds in any good loamy soil[1, 11] and in dry soils. Prefers a sunny sheltered position[1, 11]. A wind resistant plant, but it does not like salt-laden winds[200]. Tolerates atmospheric pollution[200]. This species is hardy to about -10°c when telly dormant[200], though the young growth in spring can be damaged by late frosts. Grows best in areas with long hot summers, it is fast growing in such conditions[200]. A short-lived tree[11]. A good bee plant[108]. Plants are susceptible to coral spot fungus, especially if the wood is not properly ripened due to insufficient summer heat[11]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, Blooms are very showy.

# 6.2.284 Malus prattii

Pratt apple

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Malus prattii is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is

ification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cuttings

nwatta Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soil[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Established plants are very drought resistant[200]. A moderate to slow-growing tree in the wild[229]. It prefers hotter summers and more sunlight than are normally experienced in Britain, so it often does not fully ripen its wood when growing in this country and is then very subject to die-back in winter[1, 11, 200]. Trees can be very long-lived, perhaps to 1000 years[200]. Considered by some botanists to be no more than a subspecies of C. laevigata[149]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.279 Berchemia racemosa

5tlin 9 cyuc 2 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Berchemia racemosa is a deciduous Climber growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit[177]. The ripe fruit is eaten[183]. The fruit is about 8mm in diameter[200]. Leaves - cooked and used as a vegetable[105, 177, 183]. The leaves are a tea substitute[177, 183].

nrakta E. Asia - Japan. ksacta Thickets in low mountains[58].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Cuttings of mature wood of the current season's growth, November to January in a frame. Root cuttings in winter[200]. Layering of young stems in winter[200].

nwatta Requires a good moist well-drained loam, succeeding in full sun if the soil does not dry out otherwise it is best in light shade[11, 200]. Plants are hardy to about -15°c[200]. Plants climb by means of twining around supports[182]. They are useful for covering walls, fences and tree stumps[188]. The fruit takes about one year to ripen[275]. It is only produced in Britain after a hot summer[182, 219]. Plants do not normally require pruning[219].

#### 6.2.280 Rhamnus carolinianus

Indian Cherry, Oak, Carolina Buckthorn 5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rhamnus carolinianus is a deciduous Tree growing to  $12\ m$  (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been found for this species, there is the suggestion that some members of this genus could be mildly poisonous[65].

kcakta Edible Parts: FruitEdible Üses: Fruit - raw or cooked. The fruit has a thin rather dry flesh[82] with a sweet and agreeable flavour[2, 11, 105, 229]. The fruit is about 7-10mm in diameter and contains 2 - 4 small seeds[229]. Some caution is advised, see the notes above on toxicity.

tcanta WoodWood - rather hard, light, close grained, not strong[82]. It weighs 34lb per cubic foot[227]. Too small to be of commercial value[229].

dwatta HepaticA tea made from the bark is emetic and strongly laxative[222]. It is used in the treatment of constipation with nervous or muscular atony of the intestines[222]. An infusion of the wood has been used in the treatment of jaundice[257].

nrakta Eastern N. America - Virginia to Florida, west to Texas and Nebraska. ksacta Rich woods, sheltered slopes, borders of streams and limestone ridges[43, 82]. Swamps and low ground[235].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed will require 1 - 2 months stratification at 5°c and should be sown as early in the year as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta Landscape Uses:Border, Erosion control, Pest tolerant, Standard, Specimen. Succeeds in any reasonably good soil[11], whether moderately acid or alkaline[149]. Prefers a moist moderately fertile soil in sun or partial shade[200]. One report suggests that the plant might not be very hardy in Britain[11], whilst another says that it is in climatic zone 6 and thus tolerates temperatures down to about ·15°c[200]. A slow-growing and usually short-lived plant in the wild[229]. Plants are susceptible to 'crown rust' of oats[149]. The species in this genus are notably resistant to honey fungus[200]. This species is closely related to R. purshiana[11]. Special Features: North American native, Inconspicuous flowers or blooms.

#### 6.2.281 Vitis acerifolia

Bush Grape, Mapleleaf grape 5 tiin 9 cyuc 2 koak 0 toan 0 dwat 10 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis acerifolia is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or dried for winter use. A sweet flavour[177]. The fruit is about 16mm in diameter[200]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DyeA yellow dye is obtained from the fresh or dried leaves[168]

nrakta Southern N. America - Texas to Kansas and Colorado. ksacta Ravines and sandy shores[43]. Stream bottoms and rocky slopes in Texas, usually scrambling over rocks and shrubs[274].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they

both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177]. Insipid[109]. The size of a grape[182]. The fruit is about 2cm in diameter[200].

nrakta E. Asia - C. and W. China. ksacta Woodland, 1500 - 2800 metres[109]. Dense forests along valleys, forest margins and among shrubs[266].

propta Seed - can be sown as soon as it is ripe or in late winter in a cold frame. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Layering of new shoots in summer.

nwatta Succeeds in any ordinary garden soil in sun or shade[1, 200]. Prefers semi-shade[188, 219]. The young growth in spring can be damaged by late frosts. A fast growing climbing plant[200], supporting itself by twining around other plants etc[219]. Any pruning is best carried out after the plant has finished flowering[219]. Dioecious, but female plants can produce fruits in the absence of male plants[11, 200]. The report does not say if this fruit contains viable seed, so it is best to assume that male and female plants must be grown if seed is required[K].

#### 6.2.270 Malus trilobata

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Malus trilobata is a deciduous Tree growing to 15 (49ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain the toxin hydrogen cyanide in their seeds and possibly also in their leaves, but not in their fruits. Hydrogen cyanide is the substance that gives almonds their characteristic taste but it should only be consumed in very small quantities. Apple seeds do not normally contain very high quantities of hydrogen cyanide but, even so, should not be consumed in very large quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A pleasant pear-like flavour[2, 105, 177]. The fruit is up to 2cm in diameter[200].

nrakta S. Europe to W. Asia. ksacta Evergreen scrub[50].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It usually germinates in late winter. Stored seed requires stratification for 3 months at 1°c and should be sown in a cold frame as soon as it is received[200]. It might not germinate for 12 months or more. Prick out the seedlings into individual pots as soon as they are large enough to handle. If given a rich compost they usually grow away quickly and can be large enough to plant out in late summer, though consider giving them some protection from the cold in their first winter. Otherwise, keep them in pots in a cold frame and plant them out in late spring of the following vear. Cuttings of mature wood. November in a frame[111].

nwatta An easily grown plant, it succeeds in most fertile soils, preferring a moisture retentive well-drained loamy soil[1, 200]. Grows well in heavy clay soils. Prefers a sunny position but succeeds in partial shade though it fruits less well in such a situation[1, 200]. A very ornamental plant[1], the fruit is a good wildlife food source, especially for birds[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.271 Pyrus calleryana

Callery Pear

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc

hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli xre7t hionli

drutta Pyrus calleryana is a deciduous Tree growing to 15 m (49ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from April to November, in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. Best used after it has been exposed to frost[177, 183], since this will soften and sweeten the flesh[K]. The fruit is about 25mm in diameter[200].

tcanta Rootstock WoodThis species is widely used as a rootstock[183], especially for cultivars of Pyrus pyrifolia[266]. It is said to induce earlier bearing[160]. The wood of this species is hard and close-grained, and is sometimes used for making furniture and stools[266].

nrakta E. Asia - China, central and southern Japan. ksacta Thickets and streamsides to 1500 metres[109]. Slopes, plains, mixed valley forests and thickets at elevations of 100 - 1800 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold straific cation at  $1^{\circ}c$  and should be sown as early in the year as possible[200]. Temperatures over 15 -  $20^{\circ}c$  induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Landscape Uses:Espalier, Firewood, Screen, Specimen, Street tree. Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Grows well on acid soils[160]. Plants are hardy to about -40°c when they are fully dornant[160]. There are many named forms selected for their ornamental value[200]. The cultivar 'Bradford' is resistant to fireblight[188]. Resists fireblight, collar rot, root aphis, pear psylla and root lesion nematodes[160]. Trees have a short dormancy period and lose their leaves late in the season[160]. Special Features: Not North American native, Naturalizing, Blooms are very showy.

#### 6.2.272 Fagus lucida

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Fagus lucida is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to June, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, large quantities of the seed of many species in this genus are thought to be toxic.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Coffee OilYoung leaves - raw. A very nice mild flavour, but the leaves quickly become tough so only the youngest should be used. New growth is usually produced for 2 periods of 3 weeks each year, one in spring and one in mid-summer. Edible seed raw or cooked 105, 177]. Rich in oil. The seed should not be eaten in large quantities. It can be dried and ground into a powder, then used with cereal flours in making bread, cakes etc. An edible semi-drying oil is obtained from the seed[105. 1771. The roasted seed is a coffee substitute.

nrakta E. Asia - China. ksacta Mixed woods, often in pure stands with F. engleriana[147]. Mixed mesophytic forests on mountain slopes at elevations of 800 - 2000 me-

propta Seed - the seed has a short viability and is best sown as soon as it is ripe in the autumn in a cold frame. Protect the seed from mice. Germination takes place in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seedlings are slow growing for the first few years and are very susceptible to damage by late frosts. The seed can also be sown in an outdoor seedbed in the autumn. The seedlings can be left in the open ground for three years before transplanting, but do best if put into their final positions as soon as possible and given some protection from spring frosts.

nwatta Thrives on a light or medium soil[11], doing well on chalk[1], but ill-adapted for heavy wet soils[1]. Young trees are very shade tolerant, but are subject to frost damage so are best grown in a woodland position which will protect them[200]. Although very cold hardy, this species requires hotter summers than are normally experienced in Britain so is not usually a success here and is very slow growing[200]. Trees have surface-feeding roots and also cast a dense shade. This greatly inhibits the growth of other plants and, especially where a number of the trees are growing together, the ground beneath them is often almost devoid of vegetation.

# 6.2.273 Morus cathayana

Hua Sang

5 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 15 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Morus cathayana is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit - raw or cooked[177]. The fruit is about 25mm in diameter[200]. Leaves - cooked[177]. A tea is made from the leaves[177].

nrakta E. Asia - China, Japan, Korea ksacta Woodlands and sides of streams, 600 - 1300 metres in W. Hupeh[109]. Sunny slopes or valleys, high mountains at elevations of 900 - 1300 metres[266].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive [78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside [78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. Two trees at Kew in mid-July 1994

had reasonable crops of fairly long thin fruits with a pleasant flavour[K]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.274 Bumelia lanuginosa

Chittamwood

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hionli

drutta Bumelia lanuginosa is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime expo-

kcakta Edible Parts: FruitEdible Uses: Gum GumFruit usually pickled[161, 177]. Not very tasty according to one report[61] whilst another says that large quantities can cause stomach upsets[149]. The fruit is between 1 - 2cm in diameter[200]. A clear viscid gum is obtained from the cut wood[82]. It also exudes freely from wounds on the trunk and branches[227]. The dried and ground up bark is used like chicle as a chewing gum[61, 177].

tcanta Gum Gum Shelterbelt WoodWood - heavy, rather soft, not strong, close grained[82, 149]. It weighs about 40lb per cubic foot[227]. Used for tool handles, cabinet making etc[82, 149].

nrakta South-eastern N. America - Florida to Texas and Mexico. ksacta On sandy beaches and in sandy woods, preferring water courses and washes[43, 82, 181].

propta Seed - we have no details on this species but would suggest that if ripe seed can be obtained it should be sown straight away in a cold greenhouse. Stored seed can be sown in late winter or early spring in a greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in a warm sunny site in any freely draining moderately fertile soil[200]. Tolerates salt spray[82]. This species is probably hardy in the milder areas of the country[1, 11]. Another report says that plants are cut back by temperatures below about -15°c but that they can regenerate freely from the base[200]. The flowers are an excellent source of honey[274].

# 6.2.275 Magnolia hypoleuca

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Magnolia hypoleuca is a deciduous Tree growing to 15 m (49ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution

kcakta Edible Parts: LeavesEdible Uses: CondimentThe young leaves and flower buds are boiled and eaten as a yegetable[183]. Older leaves are powdered and sprinkled on food as a flavouring[183]. Whole dried leaves are placed on a barbecue, filled with miso, leeks, daikon and shitake then broiled[183]. The delightful aroma of the leaves permeates the miso mixture which is then served with rice[183].

tcanta WoodWood - soft, fine grained, easily worked. **6.2.277 Celtis jessoensis** Used for furniture, engraving, utensils etc[11, 46, 61, 178].

dwatta Anthelmintic Antiemetic Appetizer Deobstruent Emmenagoque Expectorant Ophthalmic Sedative Stomachic TonicAnthelmintic, antiemetic, appetizer, deobstruent, emmenagogue, expectorant, ophthalmic, sedative, stomachic, tonic[174, 178]. This plant is contra-indicated for pregnant women[174]

nrakta E. Asia - Japan. ksacta Forests in mountains all over Japan[58, 200].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200].

nwatta Landscape Uses:Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Dislikes alkaline soils[202]. Tolerates alkaline soils so long as they are deep and rich in humus[188]. The branches are brittle so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. Hardy to about -20°c[200]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. A very ornamental plant[1]. The flowers are powerfully scented[245]. Cultivated for its medicinal bark in Japan[178]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or bloome

#### 6.2.276 Arbutus arizonica

Arizona Maderone

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flat hpa7tmwatli fyifxre7t hjonli

drutta Arbutus arizonica is an evergreen Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. The fruit is about 8mm in diameter with a thin sweetish flesh[82]. tcanta Charcoal WoodWood - heavy, soft, close-grained, brittle[82]. It produces a fine grade of charcoal[229].

dwatta AstringentThe bitter principles in the bark and leaves can be used as an astringent[229].

nrakta South-western N. America - S. Arizona to New Mexico. ksacta Dry gravelly benches, 1800 - 2400 metres[82]

propta Seed - best surface sown in a cold frame as soon as it is ripe. Stored seed should be soaked for 5 - 6 days in warm water and then surface sown in a shady position in a greenhouse[78]. Do not allow the compost to become dry. 6 weeks cold stratification helps[134]. The seed usually germinates well in 2 - 3 months at 20°c[134]. Seedlings are prone to damp off[184], they are best transplanted to individual pots as soon as they are large enough to handle and should be kept well ventilated. Grow them on in a greenhouse for their first winter and then plant out in late spring after the last expected frosts[K]. Basal cuttings in late winter[200]. Cuttings of mature wood of the current season's growth. November/December in a frame. Poor percentage[78]. Layering of young wood - can take 2 years[1, 200].

nwatta Requires a lime-free nutrient-rich well-drained moisture-retentive soil in sun or semi-shade and shelter from cold drying winds, especially when young[200]. Succeeds in dry soils[82]. Plants are hardy to about -15°c[166, 200]. A slow-growing tree[229].

5 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 15 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Celtis jessoensis is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177]. We have no further information, but the fruit is liable to consist of a thin, sweet, though dry and mealy flesh around a large seed[K].

nrakta E. Asia - China, Japan. ksacta Woods in W. China[109].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cut-

nwatta Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soil[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Established plants are very drought resistant[200]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. Trees can be very long-lived, perhaps to 1000 years[200]. This species is closely related to C. bungeana[11]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.278 Celtis reticulata

Paloblanco, Netleaf hackberry 5 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 12 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t ĥjonli

drutta Celtis reticulata is a deciduous Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 61, 105, 161, 257]. Sweet and fleshy. The fruit can also be made into a jelly or used as a seasoning for savoury foods[183]. It can be dried and stored for winter use[257]. The fruit is about 10mm in diameter[200], it has a thin flesh with a single large seed[K].

tcanta WoodA brown or red dye can be obtained from the leaves and branches[257]. Wood - heavy but soft and weak, it is not commercially important[229]. It can be used as a firewood[257].

dwatta StomachicThe plant has been used in the treatment of indigestion[257].

nrakta South-western N. America - Kansas to Texas, Colorado and California. ksacta On dry hills, often on limestone or basalt, ravine banks, rocky outcrops, and occasionally in sandy soils at elevations of 300 - 2300 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratdrutta Sedum spectabile is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105]. The leaves are very mucilaginous but have a fairly bland flavour[K].

tcanta Plants can be grown as a ground cover when planted about 30cm apart each way[208].

dwatta Antiphlogistic Depurative SialagogueThe plant is antiphlogistic, depurative, sialagogue[147].

nrakta E. Asia - China, Korea, Manchuria. ksacta Valleys, rocky cliffs and damp places along woodlands[147].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings at almost any time in the growing season. Very easy, even a single leaf will produce roots and form a new plant.

nwatta A very easily grown and tolerant plant, it succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Tolerates poor soils[233]. Established plants are drought tolerant[200], they can also tolerate considerable neglect, surviving even in the dense growth of weeds[K]. Plants are hardy to about -20°c[187]. This species has pink flowers[200]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. The flowers have a honey-like smell similar to Buddleias [245]. A very ornamental plant [1], there are some named varieties[187]. The flowers are very attractive to bees and lepidoptera[30]. Plants in this genus seem to be immune to the predations of rabbits[233]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

# 6.2.434 Arisaema jacquemontii

5tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Arisaema jacquemontii is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[177], Used in the same ways as potatoes[272]. The

920

tubers are 12 - 30mm in diameter[266]. The root must be thoroughly cooked or dried before use, see the notes above on toxicity. Leaves - dried[177]. The leaves are fermented before being eaten in Nepal[272]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - Himalayas - Afghanistan to S.E. Tibet. ksacta Shrubberies and rocky slopes in upper forest and lower alpine zones in the drier areas of the Himalayas, 2400 - 4000 metres[51].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame [134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1- 6 months at  $15^{\circ}c[134]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than  $20\mathrm{mm}$  in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Prefers a cool moist peaty soil in the bog, woodland garden or a sheltered border in semi-shade[134, 200]. Prefers a loamy or peaty soil[1] and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too exposed[1, 200]. This is probably the hardiest of the Himalayan species and should succeed outdoors in a suitable position in many parts of the country[90]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants need protection from slugs[200]. Closely related to A. wardii. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year.

#### 6.2.435 Asarum reflexum

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asarum reflexum is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil

pcista Although no reports of toxicity have been found for this plant, at least 3 other members of this genus have reports that the leaves are toxic[7, 19]. Some caution is therefore advised in the use of this plant.

kcakta Edible Parts: Edible Uses: CondimentThe underground stem is a ginger substitute. The root has a pungent, aromatic smell like mild pepper and ginger mixed, but more strongly aromatic[245]. It is usually harvested in the autumn[159, 177] and can be dried for later use[K].

nrakta Eastern N. America - Connecticut and New York to Iowa, Michigan, North Carolina and Kansas. ksacta Rich moist soils in woodlands, along the sides of streams and in river valleys, often forming large patches[43, 159, 235].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Plants are found on alkaline soils in the wild[43]. Plants are hardy to at least -15°c[200]. The flowers are malodorous and are pollinated by flies[200]. Plants often self-sow when growing in a suitable position[200]. nrakta E. Asia - S.E. China, Formosa. Naturalized in south-western England. ksacta Forests.

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings. Rhizome cuttings.

nwatta Prefers a good loamy soil. Succeeds in most soils so long as they do not dry out. Dislikes drought. Prefers a position sheltered from cold north and east winds. Plants are only reliably hardy in the mildest areas of Britain. Another report says that the plants are generally hardy, although severe winters may damage the leaves the plant itself can withstand temperatures down to about -15°c[200]. The square bamboo is cultivated for its edible stems in China and Japan. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rootstock is running but it does not produce many new shoots and is not overly invasive[195]. The plant is rampant in its native range and other warm temperate areas, but it does not spread much in colder areas such as Britain[200]. The shoots are wide spaced and are produced from late May. Canes can be snapped off the plant. A plant at Trebah gardens in Cornwall had new shoots 3 metres long in mid-April 1995[K].

#### 6.2.328 Berberis amurensis

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 3.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis amurensis is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit -cooked. Used in preserves[177]. The oblong fruit is about 10mm long[200]. Leaves[177]. No more details.

tcanta Hedge HedgePlants are very amenable to trimming and can be grown as an almost impenetrable formal or informal hedge[200].

dwatta Åntibacterial Antirheumatic Cancer Dysentery-The root is antirheumatic[218]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric in fections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia. ksacta Thickets, edges of woods and banks of streams in Korea and Manchuria[67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots

and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. This species is closely allied to B. vulgaris, it hybridizes freely with other members of the genus[1]. There are some named forms selected for their ornamental value[200]. Plants can be pruned back quite severely and will resprout well from the base[200].

# 6.2.329 Calycanthus floridus glaucus

Eastern Sweetshrul

5 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calycanthus floridus glaucus is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Some reports say that the fruits are poisonous to sheep[235]. Calycanthus contains calycanthine, an alkaloid similar to strychnine, and it is toxic to humans and livestock[2701.

kcakta Edible Parts: Edible Uses: CondimentThe leaves, root and bark are dried and used as a substitute for cinnamon[177]. Some caution is advised, see reports above on toxicity[270].

dwatta Diuretic Emmenagogue UrinaryEmmenagogue[61]. An infusion of the bark has been used to treat urinary problems[257].

nrakta South-eastern N. America - Pennsylvania to North Carolina, Tennessee, Georgia and Alabama. ksacta Rich woodlands[43]. Deciduous or mixed woodlands, along streams and rivers, margins of woodlands from sea level to 1850 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe. If the seed is harvested 'green' (as soon as it has fully developed but before it has dried on the plant) and sown immediately it can germinate in 3 weeks[113]. Dried seed germinates in 1 - 6 months at 15°c[138]. Stored seed requires between 3 weeks and 3 months cold stratification before sowing in the spring. When large enough to handle, prick out the seedlings into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. They can be difficult[113]. Layering in spring. Sever the new plants in a wet spell of weather about 15 months later and then lift them in the autumn[78]. High percentage [78]. Division of suckers in early spring [11]. Very easy, they can be planted straight out into their permanent positions if required.

nwatta Prefers a light loamy soil that is deep and moist but it succeeds in most fertile soils[11, 182]. Prefers a sunny position but it tolerates shade when grown in warm temperate zones[11, 200]. Requires a sheltered position, protected from cold winds[245]. A very ornamental plant, it is often confused with the closely related C. floridus and is perhaps no more than a sub-species of that species[11]. The leaves smell strongly of cinnamon[245]. The seed only ripens in Britain after a hot summer[11]. Plants in this genus are notably resistant to honey funcus[200].

# 6.2.330 Rubus buergeri

881

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Rubus buergeri is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK cone 6. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pft mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is about 25mm in diameter[200]. tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta E. Asia - China, Japan, Korea. ksacta Broad-leaved forests, mixed forests in mountainous regions at low to medium elevations[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about  $3^\circ c$  and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.331 Orixa japonica

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 3 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Orixa japonica is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[105, 177]. Aromatic with a pleasant spicy odour[11]. tcanta Hedge HedgeThe plant can be grown as a

tcanta Hedge HedgeThe plant can be grown as a hedge[11]. It forms a dense light green barrier within 5 years[200].

dwatta FebrifugeThe plant is febrifuge[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods, scrub and on cliffs, to 1300 metres[184].

propta Seed - one report suggests sowing the seed outdoors in the spring[200]. If seed is in short supply we would recommend sowing it in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[78]. Fair percentage[78]. Root cuttings, 3cm long, December in a greenhouse. High percentage[78]. Removal of self-layered branches at any time in the dormant season[200].

nwatta Succeeds in any fertile soil in sun or part shade[182, 200]. Survives in fairly dry shady conditions[200]. The leaves have a foetid smell[184]. They are distinctly and pleasantly aromatic according to another report[182] whilst another says that they release an orange-like pungency when pressed[245]. Plants are hardy to about-15°c[184]. Dioecious, male and female plants must be grown if seed is remuired[182].

# 6.2.332 Eleutherococcus divaricatus

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Eleutherococcus divaricatus is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves-cooked[105, 177]. They are parboiled, then dried and used as a winter vegetable[183]. The leaves are used as a condiment[183]. The dried leaves are a tea substitute[177, 183].

nrakta E. Asia - Japan. ksacta A rather rare plant, growing in the mountains all over Japan [58, 275].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Succeeds in an open loamy soil[1], preferring a well-drained humus-rich soil in full sun[200]. Tolerates poor soils and atmospheric pollution[200]. Plants are hardy to at least -10 to -15°c if they are sheltered from cold winds[200]. A spineless form, Eleutherococcus divaricatus inermis (Nakai) H. Ohashi, has been reported[275].

# 6.2.333 Rubus species

Hybrid Berries

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Rubus species is a deciduous Shrub growing to 3 m (9ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Fruit - raw or cooked[200].

nrakta A range of garden hybrids. ksacta Not known in the wild.

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. This plant is a cultivar and will not breed true from seed. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200]. Plant them out direct into their permanent positions.

nwatta Easily grown in a good well-drained loamy soil[1, 120]. Succeeds in acid and calcareous soils[186]. Succeeds in sun or semi-shade[1, 11, 200], though it fruits less well in the shade[202]. Established plants are drought resistant[132]. Hardy to about -15°c[202]. This species has biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

report[58] whilst another says that it is a parent of the cultivated chrysanthemum[1]. It has been proposed (1999) to restore this species to Chrysanthemum as C. indicum L. since the plant is so widely known under this name. When bruised, the foliage has a pungent refreshing fragrance that is somewhat lemon-like and reminiscent of chamomile[245].

# 6.2.431 Asclepias pumila

Low Milkweed, Plains milkweed 5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asclepias pumila is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. This species is said to be poisonous to livestock[228].

kcakta Edible Parts: Flowers Leaves Oil Oil Seed SeedpodEdible Uses: Gum Oil Oil SweetenerThe following reports refer to other members of this genus and are possibly also appropriate for this species[K]. Unopened flower buds - cooked. They taste somewhat like peas. They are used like broccoli[183]. Flowers and young flower buds - cooked. Used as a flavouring and a thickener in soups etc[55, 102]. The flower clusters can be boiled down to make a sugary syrup[2, 85]. The flowers are harvested in the early morning with the dew still on them[95]. When boiled up it makes a brown sugar[95]. Young shoots - cooked. An asparagus substitute[2, 4, 43, 55, 62, 95, 183]. They should be used when less than 20cm tall[159]. A slightly bitter taste[159]. Tips of older shoots are cooked like spinach[85, 183]. Young seed pods, 3 - 4 cm long, cooked[2, 43, 55, 85]. They are very appetizing. Best used when about 2 - 4cm long and before the seed floss forms, on older pods remove any seed floss before cooking them[85, 159]. If picked at the right time, the pods resemble okra[183]. The sprouted seeds can be eaten[183]. An edible oil is obtained from the seed[55, 171]. The latex in the stems is made into a chewing gum[46, 61]. It is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112].

tcanta Fibre Gum Latex Oil Oil Pollution Stuffing Wick-The following reports refer to other members of this genus and are possibly also appropriate for this species[K]. A good quality fibre is obtained from the bark, used in making twine, cloth, paper etc[95, 112, 169]. It is of poor quality in wet seasons[112]. It is easily harvested in late autumn after the plant has died down by simply pulling the fibres off the dried stems[169]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[112, 159, 169, 171]. It is a Kapok substitute, used in Life Jackets or as a stuffing material[112]. Very water repellent, it can yield up to 550 kilos per hectare[112]. The floss has also been used to mop up oil spills at sea. Candlewicks can be made from the seed floss[112, 207]. Rubber can be made from latex contained in the leaves and the stems[46, 57, 102, 159]. It is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112]. Pods contain an oil and a wax which are of potential importance. The seed contains up to 20% of an edible semi-drying oil[74, 112]. It is also used in making liquid

dwatta AstringentAn infusion of the leaves is used in the treatment of diarrhoea, the remedy can be given to children[257].

nrakta Western N. America - Iowa to South Dakota, Arkansas, Wyoming, Texas, Colorado and New Mexico. ksacta Sandy, clayey or rocky calcareous or gypseous soils of prairies[228].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Succeeds in any good soil[187]. Prefers a well-drained light rich or peaty soil[1, 200]. Requires a moist peaty soil and a sunny position[111, 134]. A good bee plant[50, 74]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134].

# 6.2.432 Cardamine kitaibelii

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine kitaibelii is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[K]. A mild cabbage flavour with a hint of cress[K]. Flowers - raw[K]. A mild cabbage flavour with a hint of cress[K]

nrakta Europe - southern Switzerland, northern Italy and Yugoslavia, ksacta Not known

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring

nwatta Prefers a moist humus rich soil in shade or semishade[200] but succeeds in most soils that are not dry[1]. This species was seen growing and thriving in well-drained soil in a lightly shaded position at Kew[K].

# 6.2.433 Sedum spectabile

Ice Plant

5 tlin 9 cyuc 2 kcak 3 tcan 1 dwat 0.4 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Bassia scoparia is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in September, and the seeds ripen in October. The flowers are pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Plants contain some saponins and should not be eaten in large quantities. Saponins are a toxin found in many of our daily foods such as many beans. They are usually present in quantities too small to be concerned about and are also very poorly absorbed by the body, tending to pass straight through without causing any problems. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - cooked[105, 177]. A delicious taste, they are used as a vegetable[179]. A nutritional analysis is available[218]. Some caution is advised, see the notes above on toxicity. Seed - dried and ground into a powder then mixed with cereals when making bread, biscuits etc[61, 105, 177]. Very small and fiddly to use, it is also not a very reliable crop in Britain due to its late season of flowering[K]. On a zero moisture basis, the seed contains 20.4 - 27.5% protein, 8.8 - 16% fat and 3.4 - 9.4% ash[218]. In Japan the seeds are used a food garnish called tonburi.

tcanta Broom FodderThe whole plant is used as a broom[61, 151]. The green form is used[1]. An ornamental for its red fall foliage. It has also been useful in erosion control on denuded soils. It has been suggested as an agent of phytoremediation, because it is a hyperaccumulator of chromium, lead, mercury, selenium, silver, zinc, and uranium. Bassia scoparia contains higher levels of protein and oxalate than most grasses and fodder plants, thus it also serves as a good forage crop for livestock. When grown as ornamental plant, it is a good choice as evergreen foliage plant for landscapes.

dwatta Antibacterial Antifungal Antiphlogistic Astringent Cardiotonic Diuretic Dysentery Eczema Skin UrinaryAntibacterial, antifungal[178]. The leaves and fruits are cardiotonic and diuretic[218, 240]. The stems are used in the treatment of dysentery, diarrhoea and dysepesia[218]. The seed is antiphlogistic, astringent and diuretic[176, 218]. It is used to treat skin infections such as eczema ad scabies, and diseases of the urinary tract[176, 218, 279]. The seed contains harmine, which can have adverse effects upon the gastro-intestinal tract and the central nervous system[279].

nrakta Europe to Western N. America. ksacta Roadsides, ditches and wasteland in western N. America[60].

propta Seed - sow spring in a greenhouse and plant out in May. The seed can also be sown in situ in late April or early May.

nwatta An easily grown plant[200], it succeeds in ordinary garden soil[1]. Succeeds in any reasonably fertile light well-drained but moisture retentive soil in a sunny position[200]. A frost tender plant, it is grown as a spring-sown annual in Britain[1]. This species is cultivated in Korea for its use as a broom[151]. The subspecies B. scoparia trichophylla. (Schmeiss.)Schinz. and Thell. is the form most often found in cultivation in Britain[200].

#### 6.2.429 Athamantha turbith

Candy Carrot

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Athamantha turbith is a PERENNIAL growing to  $0.6\,\mathrm{m}$  (2ft) by  $0.3\,\mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

kcakta Edible Parts: RootEdible Uses: Root[2, 105, 177]. No more details are given.

918

nrakta Europe - Carpathian Alps and the Balkan Peninsula. ksacta Limestone screes and crevices[45].

propta Seed - sow spring in a cold frame[1]. Germination usually takes place within 3 - 6 weeks at 13°c[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can also be sown in situ as soon as the soil is workable in the spring[134]. Division in spring, with care[200].

nwatta An easily grown plant, succeeding in most well drained fertile soils in a sunny position[1, 200, 233]. The long tap root is susceptible to rot in wet winters[200].

#### 6.2.430 Dendranthema indicum

Chrysanthemum

5 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dendranthema indicum is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil SeedEdible Uses: Oil TeaThe flower heads are pickled in vinegar[46, 61, 177, 183]. Young leaves - cooked[105, 177, 183]. An aromatic tea is made from the leaves[183]. Seed[183]. No more details are given but it is very small and would be rather fiddly to use.

tcanta OilThe seed contains about 16% of a semi-drying oil, but no information is given as to its uses[240, 283]. The seed is rather small, commercial extraction is probably not viable[Kl.

dwatta Antiphlogistic Aperient Bitter Blood tonic Depurative Eczema Febrifuge Ophthalmic Stomachic VD VulneraryThe whole plant is antiphlogistic, blood tonic, depurative, febrifuge and vulnerary [147, 174, 178]. The plant is used in China to treat eye ailments[218]. In conjunction with black pepper it is used in the treatment of gonorrhoea[240]. The leaves are depurative[240]. They are used in China in the treatment of migraine[240]. The flowers are aperient, bitter, hypotensive, stomachic and vasodilator[176, 240]. They contain the glycoside chrysanthemin that yields glucose and cvanidin on hydrolysis, together with stachydrine and an essential oil[283]. They have an antibacterial action, inhibiting the growth of Staphylococcus, E. coli, streptococcus, C. diphtheriae, Bacillus dysenteriae[176]. The flowers are used in the treatment of furuncle, scrofula, deep-rooted boils, inflammation of the throat, eyes and cervix, eczema, itchiness of the skin and hypertension[176]. They have a rejuvenating effect when used over a long period of time[283]. An essential oil obtained from the plant contains chrysanthenone. this is active on the brain centre affected by Parkinson's dis-

nrakta E. Asia - Eastern China, Central and Southern Japan. ksacta Found wild in most habitats[147]. Grasslands on mountain slopes, thickets, wet places by rivers, fields, roadsides, saline places by seashores, under shrubs 100 - 2900 m. Nearly throughout China[266].

propta Seed - sow spring to early summer in a greenhouse and only just cover the seed[200]. It usually germinates in 10 - 18 days at 15°c but if it does not germinate within 4 weeks then try chilling the seed for 3 weeks in the salad compartment of a fridge[164]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most well-drained fertile soils in a sunny position[1, 200]. Plants tolerate temperatures down to about -10°c and should succeed outdoors in most parts of Britain[260]. This species is closely related to D. x grandiflorum (the cultivated chrysanthemum) according to one

#### 6.2.334 Berberis wallichiana

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Berberis wallichiana is a SHRUB growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Fruit - raw[272].

tcanta A yellow dye is obtained from the root.

dwatta DysenteryThe roots contain the alkaloids berberine, oxyacanthine and umbellantine[283]. They are antibacterial and are used in Vietnam in the treatment of diarrhoea, dysentery, ophthalmia and dyspepsia[283]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas to China. ksacta Open ground at elevations of 2000 - 3400 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Germination averages out at about 90%[98, 113]. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[3, 200].

nwatta Not known

It prefers moist soil.

# 6.2.335 Rubus adenophorus

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rubus adenophorus is a deciduous Shrub growing to 2.5 m (8ft 2ln). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 11, 105]. The fruit is about 12mm in diameter[200].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta E. Asia - C. China. ksacta Mountainous regions, valleys, sparse forests, forest margins and thickets at low to medium elevations[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about  $3^{\circ}c$  and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. This species is a raspberry

with biennial stems[200]. New shoots are produced from the roots each year, these flower and fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.336 Lilium pardalinum

Panther Lily, Leopard lily, Pitkin Marsh lily, Vollmer's lilyShasta lily, Wiggins' lily

5 tlin 9 cyuc 2 kcak 2 tcan 0 dwat 2 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium pardalinum is a BULB growing to 2 m (6ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: RootEdible Uses: Bulb -cooked[143, 257]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

tcanta Landscape Uses: Border, Container, Massing, Seashore, Specimen. Ornamental. Hardy bulb. US native to moist meadows and streambeds.

nrakta South-western N. America - California to Oregon. ksacta Stream banks and springy places to 2000 metres, forming large colonies near the coastal range[47, 71].

propta Seed - autumnal hypogeal germination. Best sown as soon as ripe in a cold frame, it should germinate in spring[163]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division in autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out. Bulbils - gather in late summer when they start to fall off the stems and pot up immediately. Grow on in a greenhouse until large enough to go outside[163].

nwatta Succeeds in almost any soil that is moist but not water-logged[47, 143]. Prefers a wet soil on a slope or a well-drained soil with a high water table[90]. Tolerates lime[47, 90, 163]. Succeeds in full sun but rapidly deteriorates if grown in deep shade[143]. Fairly wind resistant but is best grown in a sheltered position[47, 143]. Very ornamental and easily grown[1], the plant is rhizomatous, forming clumps[47]. The plant increases rapidly by division, each bulb producing 5 new bulbs per year[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. A very variable plant, it is divided into a number of sub-species[270]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. Special Features: North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers. Heat Zone: 8-5.

# 6.2.337 Hydrangea serrata

883

Hydrangea, Mountain Hydrangea, Sawtooth Hydrangea 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli drutta Hydrangea serrata is a deciduous Shrub growing to 2 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and shoots - cooked[105]. These leaves do not become sweet like those of sspp thunbergii or amagiana or those of H. macrophylla[174].

tcanta Hedge HedgeCan be grown as a low hedge[29], it is guite wind tolerant.

nrakta E. Asia - Japan. ksacta Woodland to 1500 metres[184] in the mountains of C. and S. Japan[58].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses:Container, Seashore, Specimen. Tolerates most soil[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Does well on very acid soils with a pH around 4.5[200]. Tolerates alkaline soils, but it may become chlorotic on shallow soils over chalk[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil[200]. Plants are hardy to about -25°c when dormant but the young growth in spring can be killed by late frosts. A very ornamental plant, there are many named varieties[182]. Considerable difficulties exist in the nomenclature for this species and H. microphylla. They are treated here in accordance with "Bean's Manual of Trees and Shrubs", though many botanists view H. serrata as no more than a sub-species of H. macrophylla. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native. Blooms are very showy.

#### 6.2.338 Ribes sanguineum

Flowering Currant, Blood currant 5 tiin 9 cyuc 2 kcak 0 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes sanguineum is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[101, 105, 118, 257]. It does not have a wonderful flavour, but is tolerable raw[K]. It can be harvested when still firm in August and when stored carefully will keep until November, by which time the flavour has improved slightly[K]. The fruit is about 10mm in diameter[200].

tcanta Hedge HedgeTolerates maritime exposure and can be grown as an informal hedge[29, 49]. It provides reasonable shelter when in leaf but is rather bare and gives little protection in winter[K]. Fruit loved by birds. A good ground-

cover shrub for dry shade when planted with shorter ground-covers.

nrakta Western N. America. Occasionally naturalized in Britain. ksacta Open to wooded, moist to rather dry valleys and foothills [60].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and  $5^{\circ}c$  and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood,  $10 \cdot 15 \text{cm}$  with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Grows well in heavy clay soils. Succeeds in full sun, it is also quite tolerant of shade though it does not fruit so well in such a position[11]. Tolerates maritime exposure[49]. Hardy to about -25°c[200]. A very ornamental plant[1], there are a number of named varieties[182]. A plant labelled R. sanguineum carneum (which is probably the cultivar 'Carneum Grandiforum') was seen at Kew with a very good crop of unripe fruit in July 1994[K]. A disease-resistant plant, the species is being used in blackcurrant breeding programmes[119]. Plants can harbour a stage of white pine blister rust, so should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. Heat zone: 8-6.

#### 6.2.339 Rubus bellobatus

Kittatinny Blackberry 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rubus bellobatus is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The oblong fruit is about 30mm long[200].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]

nrakta North-eastern N. America. ksacta Thickets and woodland edges[43].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. This species is a blackberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. A parent of many cultivated forms of blackberry in N. America, the cultivar 'Kitatinny' has been available in Britain[11]. The plant produces apomictic flowers, these produce fruit and viable seed without fertilization, each seedling is a genetic copy of the parent[200] Plants in this genus are notably susceptible to honey fingus[200].

kcakta Edible Parts: Leaves StemEdible Uses: Young shoots - cooked[1, 5, 46, 61]. The young, unexpanded flowering shoots are cooked and served like asparagus[2, 4, 17, 177, 183].

nrakta S. Europe. Naturalized in Britain. ksacta Woods and scrub[17]. Dry stony places[190].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Sow the seed thinly and leave the seedlings undisturbed in the pots for their first dormancy, but apply liquid feed at intervals, especially in their second year of growth. Divide the bulbs at the end of their second year of growth, putting 2 - 3 bulbs in each pot. Grow them on for one more year and them plant them out into their permanent positions whilst they are dormant. The seed can also be sown in a cold frame in early spring. Division of offsets in September/October[200]. The larger bulbs can be replanted immediately into their permanent positions. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in late summer.

nwatta An easily grown plant, succeeding in ordinary garden soil[1, 42], thriving in sun or shade[42]. Succeeds in dry soils and, once established, is drought tolerant[190]. Plants are hardy to about -20°c[200]. Grows well in the wild garden[200]. The flowering shoots used to be sold as a food crop in Bath market[183].

#### 6.2.425 Monarda citriodora

Lemon Bergamot, Lemon beebalm. Lemon Mint 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Monarda citriodora is a ANNUAL/PERENNIAL growing to 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. They are used as a flavouring in salads and cooked foods[46, 105, 161, K] and also as a tea[183]. They have a pleasant lemon flavour[238].

tcanta Essential RepellentAn essential oil in the leaves contains a phenol and a citral[4]. No more information is given, though the oil is likely to have medicinal activity and perhaps be suitable for perfumery etc[K]. The essential oil citronellal, used as an insect repellent and in perfumery, is obtained from this plant[274].

nrakta Central and Southern N. America to Mexico. ksacta Limestone barrens and slopes[43]. Prairies, savannahs and roadsides in Texas[274].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°c. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn.

nwatta Landscape Uses:Border, Massing, Specimen. An easily grown plant, succeeding in ordinary garden soil so long as it is not too dry[1]. Requires a moist soil and a sunny position[1, 200]. Likes some shade. Prefers a sandy rather acidic soil[200]. This species is closely related to M. pectinata[235]. Said to be a perennial in some books and an annual in others, it has acted as an annual with us so far[K]. A good bee plant[200]. Subject to mildew in dry summers[200]. Special Features: Attracts birds, North American native, Edible, Fragrant foliage, Attracts butterflies.

# 6.2.426 Atraphaxis spinosa

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli tcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Atraphaxis spinosa is a deciduous Shrub growing to 0.6 m (2ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: MannaEdible Uses: The plant is a source of a yellowish-white manna-like substance that is eaten as a food or used in making sweetmeats[183].

nrakta S.E. Europe to W. Asia. ksacta Grassy plains in semi-desert or very dry soils[200]. Slopes, deserts (including the Gobi), roadsides, margins of cultivated land at elevations of 400-1800 metres in northern China[266].

propta Seed - sow spring in a greenhouse[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Seedlings are prone to damp off so should be watered with care and kept well ventilated[200]. Cuttings of soft wood in early summer in a frame[200]. Layering in spring[200].

nwatta Requires a sunny position in a light well-drained soil of low to moderate fertility[182, 200]. Succeeds in the rock garden or on a sunny stony bank[200]. Plants are hardy to at least -10°c so long as the soil is not wet over the winter[200]. The tiny flowers have long lasting petals[182]. This species is closely related to A. frutescens[200]. Any pruning should be restricted to the removal of branch tips every second or third year during the spring in order to maintain a neat compact habit[200]. Established specimens resent root disturbance[200].

## 6.2.427 Cakile edentula

Sea Rocket, American searocket, Harper's searocket 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cakile edentula is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Leaves Root StemEdible Uses: Leaves and young stems - raw or cooked[61, 172, 177]. The younger leaves are used in salads whilst older leaves are mixed with milder tasting leaves and used as a potherb[183]. A horseradish flavour[43]. Root - dried and ground into a powder, then mixed with cereal flours and used to make bread[61, 161, 172, 183]. A famine food, only used when all else fails[207].

nrakta N. Europe. Eastern and South-western N. America. ksacta Sandy or gravelly beaches from S. Labrador to S. Carolina and also around the Great Lakes[43].

propta Seed - sow late spring or early autumn in situ. Germination is usually rapid.

nwatta Prefers a light well-drained soil and a sunny position[1, 200]. This species is closely related to C. maritima[50].

# 6.2.428 Bassia scoparia

Summer Cypress, Burningbush 5 tlin 9 cyuc 2 kcak 1 tcan 2 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hionli

summer. Division of runners in spring or late summer. Very roots. Plant out into their permanent positions in late sumeasy, they can be planted out straight into their permanent positions

nwatta Prefers a moist but well-drained soil in a sunny position[175]. Plants are at their best in semi-shade, though they are not too fussy[214] and can succeed in guite dense shade[208, 214]. They also grow well in a rock garden[1]. Plants are hardy to about -20°c[200]. A very ornamental plant[1] but it can be invasive, spreading freely by means of runners[187]. Plants are more or less evergreen, though they can be browned by severe frosts[214]. Plants sometimes self-sow in British gardens[214]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1]. Heat Zone: 8-6.

#### 6.2.422 Panax ginseng

Ginseng, Chinese ginseng 5 tlin 9 cyuc 2 kcak 0 tcan 5 dwat 0.8 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Panax ginseng is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Side effects include inability to fall asleep, increase in heart rate and blood pressure. Overuse or prolonged use may cause over stimulation (diarrhoea, nervousness, skin eruption). Caution with other stimulants needed. Avoid in patients with psychosis and manic disorders. Not recommended during pregnancy and breast feeding [301].

kcakta Edible Parts: RootEdible Uses: TeaRoot chewed. This probably refers to its medicinal uses. A tea is made from the root.

dwatta Adaptogen Antianxiety Anticholesterolemic Appetizer Emetic Expectorant Hypoglycaemic Nervine Tonic-Ginseng has a history of herbal use going back over 5.000 years[238]. It is one of the most highly regarded of herbal medicines in the Orient, where it has gained an almost magical reputation for being able to promote health, general body vigour and also to prolong life[218]. The root is adaptogen, alterative, carminative, demulcent, emetic, expectorant, stimulant and tonic[165, 176, 178, 218]. It both stimulates and relaxes the nervous system, encourages the secretion of hormones, improves stamina, lowers blood sugar and cholesterol levels and increases resistance to disease[238]. It is used internally in the treatment of debility associated with old age or illness, lack of appetite, insomnia, stress, shock and chronic illness[238]. Ginseng is not normally prescribed for pregnant women, or for patients under the age of 40, or those with depression, acute anxiety or acute inflammatory disease[238]. It is normally only taken for a period of 3 weeks[238]. Excess can cause headaches, restlessness, raised blood pressure and other side effects, especially if it is taken with caffeine, alcohol, turnips and bitter or spicy foods[238]. The roots are harvested in the autumn, preferably from plants 6 - 7 years old, and can be used fresh or dried[238]. A dose of 10ug/ml of ginseng saponins has been shown to be significantly radio-protective when it is administered prior to gamma-irradiation[218]. The leaf is emetic and expectorant[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Panax ginseng for lack of stamina (see [302] for critics of commission

nrakta E. Asia - China. Korea. ksacta Mountain forests[165\_178]

propta Seed - sow in a shady position in a cold frame preferably as soon as it is rine otherwise as soon as the seed is obtained. It can be very slow and erratic to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a shady position in the greenhouse or frame for at least their first winter. Make sure the pots are deep enough to accommodate the

mer. Division in spring.

nwatta Requires a moist humus rich soil in a shady position in a woodland[200]. Ginseng is widely cultivated and also collected from the wild in the Orient for its root which is commonly used as a medicine[178]. The root is prepared in a number of different ways, including by steaming it for 4 hours in wicker baskets over boiling water[200].

## 6.2.423 Rheum compactum

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum compactum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: StemEdible Uses: Leaf stem cooked[2, 74]. A tart flavour, it can be used as a rhubarb substitute[105].

nrakta E. Asia - China. ksacta Banks of rivers and brooks, valleys and slopes[74]. Slopes at elevations around 2000 metres in Tibet[266].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semishade[200]. Grows well in heavy clay soils. Hardy to about -20°c[200]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

# 6.2.424 Ornithogalum pyrenaicum

Bath Asparagus, Pyrenees star of Bethlehem 5 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ornithogalum pyrenaicum is a BULB growing to 0.6 m (2ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the bulb can cause dermatitis in sensitive people[65]. Any toxins in this plant are concentrated in the bulb[200].

#### 6.2.340 Ribes inerme

Whitestem Gooseberry, Klamath gooseberry 5 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes inerme is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[101, 105, 161, 257]. A gooseberry[161]. The fruit is about 8mm in diameter[200].

nrakta Western N. America - British Columbia to Montana, south to California. ksacta Moist, often shaded places, 1000 - 3200 metres in California.

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 6 months cold stratification at 0°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11, 200]. Prefers a sunny position[11]. Hardy to about -20°c[200]. Some botanists include this species as part of R. divaricatum as R. divaricatum inerme. (Rydb.)McMinn.[71]. The stems are occasionally thorned or smooth[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

#### 6.2.341 Oemleria cerasiformis

Oso Berry, Indian plum 5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 2.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Oemleria cerasiformis is a deciduous Shrub growing to 2.5 m (8ft) by 4 m (13ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention has been found for this plant, it belongs to a family where the leaves, seed (and sometimes also the fruit) often contain significant amounts of hydrogen cyanide. This is the toxin that gives almonds their characteristic flavour and it should only be eaten in very small quantities. Since the fruit of this species is said to have almond-scented fruit it would be unwise to eat a large quantity of it. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 61, 118, 183]. A poor flavour[106]. The fruit looks like a small plum but is very bitter with an almond flavour[11]. The fully ripe fruit loses most of its bitterness[256]. The fruit only has a thin layer of flesh[200]. The fruit can be dried and stored for winter use[257]. Some caution is advised, see the notes above on toxicity.

dwatta Laxative Poultice TBThe bark is mildly laxative[257]. A decoction has been used in the treatment of

tuberculosis[257]. A poultice of the chewed burned plant, mixed with oil, has been used to treat sore parts of the body[257].

nrakta Western N. America - British Columbia to California. ksacta Rocky valleys and canyons by streams, roadsides and moist to fairly dry open woods[60].

propta The seed requires 4 months stratification at 4°c. It is probably best sown in a cold frame as soon as it is ripe in the autumn. Sow stored seed as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Layering in spring. Takes 6 months[78]. Suckers, taken at any time in the dormant season[188].

nwatta Succeeds in an ordinary well-drained garden soil[11, 200], but becomes chlorotic on shallow soils over chalk[200]. Prefers a well-drained moisture retentive soil in a shady position[200]. Requires a sunny position according to another report[182]. Plants are hardy to about -20°c[184]. This species grows well in a woodland garden or in a damp shady border[200]. The plants often sucker freely and can form dense thickets[188]. Old plants can be rejuvenated by cutting them back hard into the old wood in late winter, they will resprout freely from the base[200]. Growth can be restricted by removing suckers and cutting old shoots back or down to the base in late winter[188]. Some, if not all plants are dioecious. Male and female plants must be grown if seed

## 6.2.342 Gossypium hirsutum

Upland Cotton

5 tlin 10 cyuc 2 kcak 4 tcan 1 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Gossypium hirsutum is a SHRUB growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant is not wind tolerant.

pcista Some forms of this plant contain the toxin gossypol - glandless cultivars are free of this toxin[301].

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed cooked. The seeds contain up to 40% protein, they have a nutty flavour when roasted and can be eaten as a snack[301 l. They are also boiled and used like rice in casseroles and soups[301]. Ground into a powder, they can be added to flour when making bread, cakes etc[301]. They can also be made into a spread similar to peanut butter[301 ]. Some forms of this plant produce seeds containing the toxin gossypol, which needs to be removed before the seed is eaten[301]. The seeds of glandless cultivars do not contain this toxin[301]. An oil obtained from the seed is used for salads, in cooking and to make margarine etc[301, 418 ]. Carbon Farming - Staple Crop: oil.

tcanta OilAgroforestry Uses: Low-grade seed cake, after the oil has been expressed, is used as manure[418]... Other Uses A good quality fibre is obtained from the seed floss[46]. Cotton fibres have a wide range of used including making clothes; rubber-tyre fabrics; stuffing material for pillows, cushions etc; surgical dressings; making twine and ropes; carpets etc[46]. An oil is obtained from the seed. Low-grades of the oil are used in the manufacture of soap, lubricants, sulphonated oils and protective coatings[418]. The seed hulls and the dry stalks are used as fuel[418]. Carbon Farming, Industrial Crop: fiber, Other Systems: strip intercron

dwatta The boiled leaves are applied to skin rashes on children[348].

nrakta Central America, north to southern N. America and the Caribbean. ksacta Not known

propta Seed. In zones 8-10 it can be sown directly after the last frost. In zones 5-7, treat like tomatoes. Seed germinates in 7-21 days at 70 F. Plant 18-30 in. apart in rows 5 ft. apart. Plants start flowering in mid-summer.

nwatta Industrial Crop: Fiber Management: Coppice Management: Standard Other Systems: Strip intercrop Regional Crop Staple Crop: OilSea Island cotton can be grown in the dry to moist tropics and subtropics, where it is found at elevations up to 1,250 metres. For commercial production it requires a climate that has a long, hot growing season with abundant moisture, followed by a drier period for harvesting the seed floss[200]. Low temperature increases the production of vegetative branches and extends the cropping period, while high temperature increases the number of fruiting branches and reduces the cropping period. It grows best in areas where annual daytime temperatures are within the range 22 - 36°c, but can tolerate 15 -42°c[418]. It prefers a mean annual rainfall in the range 750 - 1,200mm, but tolerates 450 - 1,500mm[418]. Prefers a very sunny position in a light, fertile soil[200]. Plants can tolerate a range of well-drained soils, including moderate levels of salt[418]. Prefers a pH in the range 6 - 7.5, tolerating 5 - 9.5[418]. Requires a position sheltered from strong winds[418]. The plant is usually cultivated as an annual, taking 150 - 220 days to mature a crop[418]. Seedcotton yields vary between 0.8 - 3 tonnes/ha, or 0.2 - 1.1 tonnes/ha of fibre[418]. Carbon Farming - Cultivation: regional crop. Management: standard, coppice. Perennial cotton has longer fibres and is considered superior to annual cottons. Perennial cottons are suited to arid and humid conditions while annual cottons were bred for colder climates and for mechanical harvesting. Perennial cottons are cultivated in the tropics on a smaller scale and include Gossypium arboreum burmanicum, Gossypium arboreum indicum, Gossypium arboreum soudanense, Gossypium barbadense braziliense, Gossypium barbadense darwinii, Gossypium herbaceum acerifolium, Gossypium herbaceum africanum, Gossypium hirsutum marie-galante. Gossypium hirsutum punctatum, Gossypium hirsutum taitense. Currently perennial cottons are harvested by hand. Researching perennial cottons varieties and production methods would help develop them as good carbon farming plants and help to alleviate the terrible problems caused by annual cottons.

#### 6.2.343 Rubus thibetanus

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rubus thibetanus is a deciduous Shrub growing to 2.5 m (8ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. The purplish black or dark red fruit is about 16mm in diameter[200].

tcanta DyeA purple to dull blue dye is obtained from the fruit [168].

nrakta E. Asia - W. China. ksacta Thickets, forest margins, roadsides, slopes, ravines and dry places at elevations of 900 - 2100 metres[266].

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month at 3°c if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Spreads by means of suck-ers[182]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.344 Rosa pisocarpa

Cluster Rose, Ahart's cluster rose 5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Rosa pisocarpa is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

poista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit Seed StemEdible Uses: TeaFruit - raw or cooked[118, 183]. It is used to make jams and jellies, it is also used to make a pleasant tasting fruity-flavoured tea[177, 183]. The fruit is about 13mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The shoots can be used to make a tea-like beverage[257]. Young tender shoots - peeled and eaten in the spring[257].

dwatta Astringent Cancer Foot care VD Women's complaintsA decoction of the roots has been used in the treatment of sore throats and syphilis[257]. An infusion of the bark has been taken by a mother just after childbirth[257]. A decoction of the branches, combined with chokecherry (Prunus virginiana) and red willow (Salix bonplandiana), has been used in the treatment of various women's complaints. diarrhoea and vomiting[257]. The leaves have been placed in the shoes as a protection from athletes foot[257]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Western N. America - British Columbia to California. ksacta Shaded slopes below 1500 metres in California.

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey funqus[200]. self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked. An asparagus substitute[105, 177, 183]. Root - cooked. Used as a vegetable or candied and used as a sweetmeat[46, 183]. Easily digested[7, 61].

dwatta Antispasmodic Aromatic Diaphoretic Diuretic Expectorant Galactofuge StimulantThe root is antispasmodic, aromatic, diaphoretic, diuretic, expectorant, galactofuge and stimulant[4, 7]. It should be harvested in the autumn from plants that are at least 2 years old[4]. The root promotes free expectoration and is very useful in the treatment of debility attendant on coughs of chronic standing in the advanced stages of pulmonary consumption[4]. Drunk freely it is used to treat whooping cough, diseases of the liver and kidneys and skin complaints[4, 238].

nrakta Central and southern Europe, including Britain, from N. Germany to N. Africa and Afghanistan. ksacta Dry grassy areas near the coast[17]. A rare plant in Britain.

propta Seed - best sown as soon as it is ripe in early autumn on the surface of a well-drained compost in a cold frame[200]. The seed can also be sown in spring. It usually germinates in 5 - 90 days at 20°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring or autumn. Take care since the plant resents root disturbance[200]. Root cuttings in autumn or winter[200].

nwatta Requires a well-drained soil and a sunny position[1]. Prefers a light sandy soil but tolerates most soil types including lime and poor gravels[200]. The plant has deep and wide-ranging roots, it can spread freely in the garden and become difficult to eradicate[4]. Plants should be put in their final position whilst small since they resent root disturbance[200]. The plant is often used in dried flower arrangements since it retains its colour for a long time[7].

# 6.2.420 Thymus praecox

Mother of thyme, Creeping thyme, Woolly Thyme 5 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.1 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thymus praecox is an evergreen Shrub growing to  $0.1~\mathrm{m}$  (0ft 4in) by  $0.3~\mathrm{m}$  (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe leaves are used as a food flavouring[177, 238]. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200].

tcanta Deodorant Disinfectant EssentialCan be used as a ground cover plant in a sunny position[188]. The essential oil obtained from the leaves is used in perfumery, as a mouth wash, medicinally etc[200].

dwatta Antiseptic Deodorant DisinfectantThe leaves, and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta S. W. and C. Europe. ksacta Stony and rocky mountain slopes. 1000 - 3600 metres in Turkev[93].

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden. Requires a light well-drained preferably calcareous soil in a sunny position[1, 200]. Succeeds in dry soils. Grows well between stepping stones on paths, tolerating light treading[183, 200]. Succeeds on walls. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to about -15°c[238]. The flowers are rich in nectar and are very attractive to honey bees[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[1]. There are some named varieties selected for culinary and ornamental purposes[183, 200]. Special Features: Attractive foliage, Edible, Fragrant foliage.

# 6.2.421 Duchesnea indica

Mock Strawberry, Indian strawberry 5 tlin 11 cyuc 2 kcak 3 tcan 2 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Duchesnea indica is an evergreen Perennial growing to  $0.1 \, \mathrm{m}$  (0ft 4in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw[105, 177]. Dry and insipid[17]. Certainly rather tasteless, but it is not dry[K]. A flavour somewhat like a water melon according to some people, but this is possibly the product of a strained imagination[K]. The fruit contains about 3.4% sugar, 1.5% protein, 1.6% ash[194]. Vitamin C is 6.3mg per 100ml of juice[194]. The fruit is about 10mm in diameter with the appearance and texture of a strawberry but very little flavour[K]. A clump 2.5m² yields about 150g of fruit annually[194]. Leaves - cooked[179].

tcanta A good ground cover plant, spreading quickly[197] by means of runners[214]. It is rather bare in winter though[K] and should not be grown with small plants since it will drown them out[208]. A good cover for bulbous plants[214]. Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, theses are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level groundcovers provide little

dwatta Anticoagulant Antiphlogistic Antiseptic Depurative Eczema Febrifuge Poultice Skin Vitamin CThe whole plant is anticoagulant, antiseptic, depurative and febrifuge[147, 178]. It can be used in decoction or the fresh leaves can be crushed and applied externally as a poultice[147]. It is used in the treatment of boils and abscesses, weeping eczema, ringworm, stomatitis, laryngitis, acute tonsillitis, snake and insect bites and traumatic injuries[147]. A decoction of the leaves is used in the treatment of swellings[147, 178, 218]. An infusion of the flowers is used to activate the blood circulation[218]. The fruit is used to cure skin diseases[218]. A decoction of the plant is used as a poultice for abscesses, boils, burns etc[218].

nrakta E. Asia - China, Japan, Himalayas. An occasional garden escape in Britain[17]. ksacta Shady places in woods, grassy slopes, ravines in low mountains, all over Japan[58].

propta Seed - sow spring in a sunny position in a greenhouse. Germination usually takes place within 1 - 6 weeks or more at 15°c. A period of cold stratification may speed up germination. When large enough to handle, prick the seedlings out into individual pots and plant them out in the

young shoots and leaves in the spring, older leaves are bitter[9]. Flowering stems - cooked[9, 74]. A pleasant, cabbage/radish flavour, they can be used as a broccoli substitute before the flowers open[183]. The stems should be lightly steamed for no more than 5 minutes[9]. The flowers can also be cooked as a vegetable or used as a garnish[183]. Seed ti can be sprouted and eaten raw[12]. A hot flavour, it can be added to salads and sandwiches[183]. The seed can be ground into a powder and used as a food flavouring. It has a hot mustard flavour[4, 9, 46, 115]. An edible oil is obtained from the seed[1.57, 74].

tcanta Oil OilAn edible semi-drying oil is obtained from the seed. It is also used in making soap[74] and burns well so can be used for lighting[4].

dwatta BachThe plant is used in Bach flower remedies - the keywords for prescribing it are 'Black depression', 'Melancholia' and 'Gloom'[209].

nrakta Europe, including Britain, south and east from Norway to N. Africa, Siberia and S.W. Asia. ksacta Cultivated ground, usually on heavy calcareous soils[13, 17]. A serious weed of agriculture, especially in spring sown crops[1, 17].

propta Seed - germinates in spring and autumn in the wild. It should not really need much encouragement.

nwatta Usually found on heavy alkaline soils in the wild[17]. Succeeds on most soils. Dislikes shade. The plant harbours an eelworm that attacks other crops[13]. It is therefore best not to grow it in a garden setting.

#### 6.2.417 Crocus serotinus

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Crocus serotinus is a CORM growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from November to May, in flower from November to December. The species is hermaphrodite (has both male and female organs) and is polinated by Bees, butterflies. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Colouring Condiment-The flowers are used as a saffron substitute in flavouring food and colouring it yellow[177, 183].

tcanta DyeThe yellow dye obtained from the stigmas yields a yellow dye, it is a saffron substitute[177].

nrakta Southern Europe to Northern Africa and Western Asia. ksacta Stony slopes in scrub and open pine woods[90].

propta Seed - best sown as soon as it is ripe in a light sandy soil in pots in a cold frame[1]. The seed can also be sown in a cold frame in early spring[1]. Sow thinly because the seed usually germinates freely[1], within 1 - 6 months at 18°c[164]. Unless the seed has been sown too thickly, do not transplant the seedlings in their first year of growth, but give them regular liquid feeds to make sure they do not become deficient. Divide the small bulbs once the plants have died down, planting 2 - 3 bulbs per 8cm pot. Grow them on for another 2 years in a greenhouse or frame and plant them out into their permanent positions when dormant in late sumner[K]. Plants take 3 - 4 years to flower from seed[200]. Division f the clumps after the leaves die down in spring[1, 200]. The bulbs can be planted out direct into their permanent positions.

nwatta Succeeds in most soils, conditions and positions[1]. Plants grow well in a peaty soil in a bulb frame and should succeed outdoors in a sandy peaty soil[90]. The subspecies C. serotinus austriacus can be naturalized in grass or beneath deep rooting trees on light well-drained soils[200]. Plants tend to move considerably from their original planting place because of their means of vegetative reproduction, it is therefore wise not to grow different species in close proximity[1]. Any planting out is best done in late spring or early summer[245]. Mice are very fond of the corms of this species[1]. Plants take 3 - 4 years to flower from seed[200]. The flowers are only open during the day time, closing at night[245].

## 6.2.418 Podophyllum hexandrum

Himalayan May Apple

5 tlin 9 cyuc 2 kcak 0 tcan 4 dwat 0.5 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hionli

drutta Podophyllum hexandrum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The leaves and the roots are poisonous[2]. Only the root is poisonous, it is more toxic than P. peltatum[19].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. It must only be eaten when it is fully ripe[1, 2, 61, 105]. Juicy but insipid[130]. The fruit is about 5cm long[200]. The leaves are edible according to one report but this must be treated with some caution, see notes on toxicity above[183].

tcanta A medicinal resin is obtained from the plant. It is extracted with alcohol[64].

dwatta Antirheumatic Cancer Cholagogue Cytostatic PurgativeThe whole plant, but especially the root, is cholagogue, cytostatic and purgative. The plant contains podophyllin, which has an antimiotic effect (it interferes with cell division and can thus prevent the growth of cells). It is, therefore, a possible treatment for cancer, and has been used especially in the treatment of ovarian cancer 46, 51, 57, 64, 65, 124, 244]. However, alopecia is said to be a common sideeffect of this treatment[244]. This species contains about twice the quantity of active ingredient than P. peltatum[211]. The roots contain several important anti-cancer lignans, including podophyllin and berberine[218]. The roots are also antirheumatic[218]. The root is harvested in the autumn and either dried for later use or the resin is extracted[238]. This plant is highly poisonous and should only be used under the supervision of a qualified practitioner[238]. It should not be prescribed for pregnant women[238].

nrakta E. Asia - Afghanistan to China. ksacta Scrub forests and alpine meadows[187], usually in humus rich soils, 2000 - 3500 metres in the Himalayas[130, 145]. Very abundant in fir forests in Kashmir[211].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in a cold frame in early spring. The seed germinates in 1 - 4 months at 15°c. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a shady part of the greenhouse for at least 2 growing seasons. Plant them out into their permanent positions in the winter when the plants are dormant. Division in March/April[111].

nwatta Prefers a moist peaty soil and filtered light or shade[111, 187]. Grows well in a moist open woodland[28, 31, 200]. Hardy to about -20°c[187], it takes some years to become established[124] but is very long lived in a suitable habitat[130]. Young leaves may be damaged by late frosts but otherwise the plants are quite hardy[130]. Over collection of the plant from the wild is becoming a cause for concern as local populations are being endangered[272]. Young plants only produce one leaf each year, older plants have 2 or 3 leaves each year[211]. Plants in this genus have excited quite a lot of interest for the compounds found in their roots which have been shown to have anti-cancer activity[124]. There are various research projects under way (as of 1990)[124]. The sub-species P. hexandrum chinense. Wall. has larger flowers and more deeply divided leaves[187].

#### 6.2.419 Eryngium campestre

Field Eryngo

5tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Eryngium campestre is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is

## 6.2.345 Solidago canadensis

Canadian Goldenrod, Shorthair goldenrod, Harger's goldenrod, Rough Canada goldenrod, Common Goldenro 5 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyikfrip hpa7tli flatprikl-

wis hpa7tmwatli fyifxre7t hjonli

drutta Solidago canadensis is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Weak potential for sensitization. Irrigation therapy is contraindicated in cases of oedema due to renal or heart disease. Care needed with chronic kidney disease [301].

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Oil TeaYoung leaves and flowering stems - cooked[172]. Seed[22, 46, 61, 105, 161, 183]. Used as a thickener in soups[172]. The seed is very small[K] and is only used as a survival food when all else fails[222]. A tea can be made from the flowers and/or the leaves [172, 183].

tcanta Dye OilMustard, orange and brown dyes can be obtained from the whole plant[168]. The source of 'Canadian goldenrod' oil[46]. We have no further details, but it is likely to be an essential oil.

dwatta Antiseptic Haemostatic Kidney Salve Styptic UrinaryHaemostatic, styptic[168, 172]. The root is applied as a poultice to burns[168, 172, 222]. An infusion of the dried powdered herb can be used as an antiseptic[168, 172]. The blossoms are analgesic, astringent and febrifuge[257]. They have been chewed and the juice slowly swallowed to treat sore throats[213, 222]. A tea made from the flowers is used in the treatment of diarrhoea, body pains, fevers and snakebites[222, 257]. The plant contains quercitin, a compound that is reportedly useful in the treatment of haemorrhagic nephritis[222]. This plant is said to have similar medicinal properties to S. virgaurea. These are:- Goldenrod is a safe and gentle remedy for a number of disorders. In particular, it is a valuable astringent remedy treating wounds and bleeding, whilst it is particularly useful in the treatment of urinary tract disorders, being used both for serious ailments such as nephritis and for more common problems such as cystitis[254]. The plant contains saponing that are antifungal and act specifically against the Candida fungus which is the cause of vaginal and oral thrush[238, 254]. It also contains rutin which is used to treat capillary fragility, and phenolic glycosides which are anti-inflammatory[238]. The leaves and flowering tops are anthelmintic, anti-inflammatory, antiseptic, aromatic, astringent, carminative, diaphoretic, mildly diuretic, febrifuge and stimulant[4, 7, 9, 21, 147, 165]. A good vulnerary herb, it has also proved of value when used internally in the treatment of urinary infections, chronic catarrh, skin diseases, influenza, whooping cough, bladder and kidney stones etc[4, 238]. Due to its mild action, goldenrod is used to treat gastro-enteritis in children[254]. It makes an excellent mouthwash in the treatment of thrush[7]. The plant is gathered in the summer and dried for later use[7]. The seed is anticoagulant, astringent and carminative[218]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of kidney and bladder disorders, rheumatism and arthritis[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Solidago canadensis for infections of the urinary tract, and kidney and bladder stones (see [302] for critics of commission E).

nrakta Eastern N. America - Newfoundland to Ontario, south to Virginia. Naturalized in Britain[17]. ksacta Dry to damp thickets, roadsides, slopes and clearings, avoiding acid soils

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Container, Foundation, Seashore, Specimen, Woodland garden. Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The flowers attract butterflies and moths[30]. The plant also attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. Special Features: Attractive foliage, North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers.

#### 6.2.346 Juglans microcarpa

Texas Walnut, Little walnut, Stewart's little walnut 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Juglans microcarpa is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness, It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is polinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw. The seed is sweet and oily but it is rather small and has a thick shell[2, 62, 105, 183, 227]. The seed is the smallest of this genus[82]. An edible oil is obtained from the seed, it tends to go rancid quickly.

tcanta Herbicide Oil Rootstock WoodSometimes used as a rootstock[183]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. Wood - heavy, hard, not strong. It makes a beautiful veneer and has been very over-exploited in the wild for this purpose[82]. It is also used in cabinet making, furniture etc[82, 149].

nrakta South-western N. America - Texas to Mexico. ksacta Limestone banks of streams[82], also in valleys and dry rocky ravines[229].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. This species often experiences drought in its native range[229]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11] Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young[1, 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. Closely related to J. major, and hybridizes with that species where their ranges overlap[229].

# 6.2.347 Sambucus melanocarpa

Black Elder, Rocky Mountain elder 5 tlin 9 cyuc 2 koak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sambucus melanocarpa is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit-raw or cooked[105, 161]. Low in pectin, it is best mixed with crab-apples or other pectin-rich fruits if used in making jams, jellies etc[183]. The fruit is about 6mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity. Flowers - raw or cooked.

dwatta Astringent Dysentery Poultice Salve TBThe dried ripe berries have been eaten as a treatment for diarrhoea[257]. A decoction of the roots has been used in the treatment of diarrhoea and dysentery[257]. A poultice of the boiled, mashed roots has been used as a treatment for caked breasts, cuts and wounds[257]. A decoction of the flowers has been used in the treatment of tuberculosis, coughs and colds[257]. It has also been given to children as a spring tonic[257]. A poultice of the crushed leaves has been used to treat bruises and bleeding wounds[257].

nrakta Western N. America. ksacta Moist places in California, 1800 - 3600 metres, and northwards to Canada[71].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered nursery bed, or keep them in their pots in a sheltered nursery bed, or keep them in their pots in a sheltered cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.348 Gastrodia elata

Tien Ma 5 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 1 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gastrodia elata is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or roasted[61, 178]. Large[178].

dwatta Analgesic Antispasmodic Aphrodisiac Carminative Cholagogue Epilepsy Sedative TonicThis species has been used in Chinese herbal medicine for over 1,500 years[238]. The root contains a number of phenolic compounds with medicinal actions[279]. It is a sweet, acrid, herb that is analgesic, anticonvulsive, antispasmodic, carminative, cholagogue, sedative and tonic[147, 174, 176, 238, 279]. It is used internally in the treatment of convulsive illnesses (such as epilepsy and tetanus), rheumatoid arthritis, vertigo and numbness associated with liver disharmony[238]. The root is harvested in the autumn and dried for later use[238]. The stem is aphrodisiac and tonic[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods in the mountains of N. Japan[58].

propta Seed - surface sow, preferably as soon as it is ripe, into the plants natural habitat near existing colonies, or onto a bed of Quercus wood inoculated with the fungus Armillaria mellea (introduce this fungus into your land with extreme caution since it kills trees and there is no known preventative [K]). The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant. Division in autumn. The plant is very intolerant of root disturbance, any moving or dividing should be attempted in the autumn, keep a large ball of soil around the plant[1].

nwatta A saprophytic herb, it is without green parts and is entirely dependant upon a fungus for its nutriment[238]. This makes it very difficult to cultivate outside its native range. As well as its fungal host, it also reguires a damp humus-rich soil in a sheltered woodland position[238]. The plants are very hardy, tolerating temperatures down to at least -15°c[238]. This plant is becoming increasingly rare in the wild, due to over-collection as a medicinal plant[238]. Methods of cultivating it have now been devised in China[238]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

#### 6.2.349 Mentha suaveolens

Round-Leaved Mint, Apple mint, Pineapple Mint 5 tlin 10 cyuc 2 kcak 2 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha suaveolens is a PERENNIAL growing to 1 m (3ft 3in) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked as a potherb[50]. Used as a flavouring in salads or cooked foods[183]. The leaves have a kcakta Edible Parts: Fruit SeedEdible Uses: Seed ground into a powder and added to soups etc[92]. The seed is very small and would be difficult to separate from the fruit. It would be easier to dry the whole fruit, grind this into a powder and use it in soups etc[K]. Fruit[92, 105, 161]. The fruit can be eaten fresh or dried and stored for later use[257]. It can also be pulverised and made into a drink[257].

tcanta DyeA yellowish-brown dye is obtained from the leaves, it does not require a mordant[168]. A good ground-cover plant for steep sandy banks[28, 200]. A carpeting plant, growing quite rapidly and rooting as it spreads[208].

dwatta Astringent SkinThe leaves are used in the treatment of diarrhoea[257]. The whole plant is used as an antidote for poisoning by poison oak, Toxicodendron diversiloba[257]. It was probably applied externally to the skin[K]. nrakta South-western N. America - California. ksacta

Montane areas[60].

propta Seed - best sown in a greenhouse as soon as it is ripe. Pre-soak dried seed in boiling water for 10 - 20 seconds or burn some straw on top of them and then stratify at 2 - 5°c for 2 months[11, 200]. The seed usually germinates in 2 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or greenhouse for at least their first winter. Plant out in late spring or early summer. Cuttings of side shoots of the current season's growth, 5 - 8cm with a heel, August to December in a frame. Takes one year[1, 78]. Division in early spring. Take care because the plant resents root disturbance. Pot the divisions up and keep them in a lightly shaded position in a cold frame or greenhouse until they are growing away actively. Lavering in spring[200].

nwatta Requires a deep moist well-drained light or medium lime-free loam is sun or semi-shade but plants produce less fruit when grown in the shade[200]. Prefers a position in full sun[11]. Grows well in shade[28]. Plants at Kew were growing very well in a shady position on a NE slope in 1990[K]. Grows well in a sandy seashore garden[208]. This species is closely related to A. uva-ursi[11, 60]. Plants resent root disturbance and should be placed in their final positions as soon as possible[134].

## 6.2.414 Calendula arvensis

Field Marigold

5 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 0.3 m hkuc

htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Calendula arvensis is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to November, and the seeds ripen from August to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Young shoots and leaves - raw or cooked[105, 177, 183, 217]. The leaves are very rich in vitamins and minerals, they are similar to Taraxacum officinale (Dandelion) in nutritional value[179]. Flower heads - pickled[177, 183].

dwatta Antiphlogistic Antiseptic Antispasmodic Aperient Astringent Cholagogue Diaphoretic Emmenagogue Homeopathy Skin Stimulant Vulnerary WartsThe leaves are diaphoretic[61, 240]. The flowers are said to be antispasmodic, emmenagogue and stimulant[240]. The plant seems to have similar therapeutic properties to pot marigold, C. officinalis[254]. These properties are:- Pot marigold is one of the best known and versatile herbs in Western herbal medicine and is also a popular domestic remedy[4, 254]. It is, above all, a remedy for skin problems and is applied externally to bites and stings, sprains, wounds, sore eyes, varicose veins etc[4, 254]. It is also a cleansing and detoxifying herb and is taken internally in treating fevers and chronic infections[4, 254]. Only the common deep-orange flowered variety is considered to be of medicinal value[4]. The whole plant, but especially the flowers and the leaves, is antiphlogistic, antiseptic, antispasmodic, aperient, astringent, cholagogue, diaphoretic, emmenagogue, skin, stimulant and vul-

nerary[4, 7, 9, 21, 46, 165, 201]. The leaves can be used fresh or dried, they are best harvested in the morning of a fine sunny day just after the dew has dried from them[4]. The flowers are also used fresh or dried, for drying they are harvested when fully open and need to be dried quickly in the shade[4]. A tea of the petals tones up the circulation and, taken regularly, can ease varicose veins[201]. An application of the crushed stems to corns and warts will soon render them easily removable[7]. The leaves, blossoms and buds are used to make a homeopathic remedy[232]. It is used internally in order to speed the healing of wounds[232].

nrakta Europe. A garden escape in Britain[17]. ksacta Fields, vineyards and waste ground[89].

propta Seed - sow in situ from spring to early summer and again in September. The seed germinates best in darkness and usually within 1 - 2 weeks at 21°c[138].

nwatta An easily grown and very ornamental plant, it succeeds in any well-drained soil[200], though it prefers a good loam and does best in a sunny or at least partially sunny position[4, 15, 200]. The plant flowers best when it is grown in a poor soil. Plants usually self-sow quite freely in the garden

# 6.2.415 Cerastium fontanum

Chickweed, Common mouse-ear chickweed, Big chickweed 5 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Cerastium fontanum is a ANNUAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[177]. Leaves and young stems - cooked[105].

nrakta E. Asia - Himalayas. Ksacta Moist shaded situations, 1700 - 2800 metres in Srinagar[145]. A cosmopolitan weed in China, where it grows at elevations up to 4300 metres[266].

propta Seed - we have no information on this species but suggest sowing the seed in spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in spring might be possible.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The subspecies C. fontanum grandiflorum is an annual, though subspecies C. fontanum vulgare is a shortlived perennial [266]. It is likely to require a moist soil in light shade.

#### **6.2.416** Sinapis arvensis

Charlock, Charlock mustard, Wild mustard 5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.8 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Sinapis arvensis is a ANNUAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from May to August. The species is hernaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The plant is possibly poisonous once the seedpods have formed[76].

kcakta Edible Parts: Flowers Leaves Oil Oil SeedEdible Uses: Condiment Oil OilLeaves - raw or cooked[2, 4, 5, 12, 74]. Somewhat hot, the young leaves are used as a flavouring in salads, where they add a piquant flavour[9, 183]. Older leaves are used as a potherb[183]. It is best to use just the

nrakta Europe. Naturalized in Britain[17]. ksacta Waste land, rocks, old walls etc[4]. Prefers alkaline conditions[268].

propta Seed - sow February to May in situ or as soon as it is ripe in situ and only just cover the seed. Germination is usually rapid. Division in spring. Cuttings, summer, in a cold frame.

nwatta Landscape Uses:Border, Ground cover, Massing, Rock garden, Seashore. Grows well in ordinary moist, well-drained garden soil and on dry walls[1, 111, 200]. Prefers a sunny position[111], though it also succeeds in semi-shade[219]. Thrives on chalk[200], poor soils[188] and in sandy soils[187]. Established plants are drought tolerant[190]. This species is hardy to about -15°c[187. 200]. Plants are generally long-lived and grow especially well in maritime areas, where they are a common feature of hedgerows and walls[219, Kl. A very ornamental plant[1]. it attracts moths and butterflies[30]. The flowers have an unpleasant smell like perspiration[245]. Special Features: Attracts birds, Attractive foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Fragrant flowers. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

#### 6.2.411 Arum italicum

Italian lords and ladies, Italian Arum 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.4 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatoriklwis hpa7tmwatli hionli

drutta Arum italicum is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten, but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water[65].

kcakta Edible Parts: RootEdible Uses: Tuber - cooked and used as a vegetable[2, 177]. An arrowroot can be extracted from the dried root[105]. The root must be thoroughly dried or cooked before being eaten, see the notes above on toxicity.

nrakta Southern Europe, including Britain, to N. Africa. ksacta Stony ground near the sea, hedges and among old walls, often on calcareous soils[17, 90, 200].

propta Seed - best sown in a greenhouse or cold frame as soon as it is ripe[134]. The seed usually germinates in 1 - 6 months at 15°c[134]. Stored seed should be sown in the spring in a greenhouse and can be slow to germinate, sometimes taking a year or more. A period of cold stratification might help to speed up the process. Sow the seed thinly, and allow the seedlings to grow on without disturbance for their first year, giving occasional liquid feeds to ensure that they do not become mineral deficient. When the plants are dormant in the autumn, divide up the small corms, planting 2 - 3 in each pot, and grow them on in light shade in the greenhouse for a further year, planting out when dormant in the autumn. Division of the corms in summer after flowering[200]. Larger corms can be planted out direct into their

permanent positions, though it is best to pot up the smaller corms and grow them on for a year in a cold frame before planting them out.

mwatta Landscape Uses:Border, Container, Rock garden, Woodland garden. Prefers a humus rich soil and abundant water in the growing season[1]. Succeeds in sun or dry shade[90], preferring a shady position[4, 17, 31] and growing well in woodland conditions[1]. A polymorphic species[200], the British form has been separated off by some botanists as A. neglectum[17]. The leaves appear in the autumn, the plant staying green all winter[1, K]. The inflorescence has the remarkable ability to heat itself above the ambient air temperature to such a degree that it is quite noticeable to the touch[4]. This probably protects the flowers from damage by frost, or allows it to penetrate frozen ground. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Naturalizing, All or parts of this plant are poisonous.

# 6.2.412 Cirsium japonicum

No-Azami, Japanese thistle

5 tlin 9 cyuc 2 kcak 2 tcan 2 dwat 0.9 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cirsium japonicum is a BIENNIAL/PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil RootEdible Uses: Oil-Leaves - cooked[61, 105, 177]. Very palatable in the spring, they are used with the young roots[179].

tcanta OilThe seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

dwatta Antiinflammatory Diuretic Haemostatic StypticThe roots are anti-inflammatory, diuretic and haemostatic[61, 147, 176, 178]. A decoction of the dried roots is used in the treatment of boils and carbuncles, acute appendicitis, uterine bleeding, haematuria, nose bleeds, haematemesis and traumatic bleeding[147]. The leaf is haemostatic and diuretic[218]. The stem is haemostatic[218].

nrakta E. Asia - Japan. ksacta Sunny slopes in lowlands and foothills, C. and S. Japan[58, 147].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at  $20^{\circ}c[164]$ . Division in spring or autumn.

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position[200]. Cultivated for cut flowers in Japan[58]. There are some named forms selected for their ornamental value[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

# 6.2.413 Arctostaphylos nevadensis

Pine-Mat Manzanita

5tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli fyifxre7t hjonli

drutta Arctostaphylos nevadensis is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime expo-

similar flavour to spearmint, and are considered to be superior in flavour to that species but are also hairy, which makes them less suitable for garnishing[238]. A herb tea is made from the leaves[183].

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative FebrifugeRound leafed mint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. A tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta S. and W. Europe, north to the Netherlands and east into W. Asia. ksacta Damp ground that often dries out in summer, from sea level to 400 metres in Turkey[93].

propta Seed - sow spring in a cold frame. Germination is usually fairly guick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Landscape Uses:Border, Ground cover, Specimen. A very easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but plants also succeed in partial shade. Often cultivated as a pot herb[50]. There are some named varieties[200]. The flowers have a sickly sweet smell[50]. A very invasive plant, spreading freely at the roots[200]. Unless you have the space to let it roam it needs to be restrained by some means such as planting it in a container that is buried in the soil[K]. It is said to be a good companion for cabbages and tomatoes, its aromatic leaves repelling insect pests, though its aggressive root system also needs to be taken into account here. The whole plant has a mint-like aroma. The flowers are very attractive to bees and butterflies. Members of this genus are rarely if ever troubled by browsing deer[233]. Hybridizes freely with other members of this genus. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Naturalizing. Suitable for cut flowers. Suitable for dried flowers. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

# 6.2.350 Codonopsis pilosula

Dang Shen, Bellflower

5 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 1.7 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Codonopsis pilosula is a PERENNIAL CLIMBER growing to 1.7 m (5ft 7in). See above for USDA hardiness, It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[105, 177].

dwatta Adaptogen Appetizer Digestive Galactogogue Sialagogue Stomachic TonicDang Shun is an important herb in Chinese medicine, it is a gentle tonic that increases energy levels and helps the body adapt to stress[254]. The root contains saponins, triterpenes and steroids[279], it is similar in action to ginseng (Panax species), but it is milder and has a shorter-lasting effect[4, 116, 174, 176, 218, 238, 254]. It is a sweet, warm, soothing herb that is taken as an energy tonic[238]. It acts mainly on the spleen, lungs and stomach, raising secretion of body fluids and blood sugar levels, and stimulating the immune system[238]. Research has shown that it increases haemoglobin and red blood cell levels and lowers the blood pressure. It also helps increase endurance to stress and promotes alertness[254]. The root and the whole plant are adaptogen, appetizer, digestive, galactogogue, sialagogue, stomachic and tonic[116, 147, 174, 176, 238, 254]. It is taken internally in the treatment of low energy, poor appetite and digestion, anaemia, shallow breathing and debility after illness[238, 254]. It is often cooked with rice until it is glutinous and used as a tonic food[238]. The dried root is decocted with other berbs and used to treat a wide range of ailments[218]. The roots of plants at least three years old are harvested in the autumn and can be used fresh or dried[238]

nrakta N.E. Asia - Korea ksacta Dense shrubby thickets, the shade of trees at forest edges, streambanks etc[74].

propta Seed - surface sow in spring to early summer in an ericaceous compost in a greenhouse. Do not allow the compost to dry out. The seed usually germinates in 1 - 6 weeks at 20°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in a greenhouse for their first winter. Plant out in late spring or early summer and protect them from slugs until the plants are well established[K]. Division in spring, with care, since the plant resents root disturbance[200]. We have found it best to take small divisions that are teased out from the sides of the main clump so as to cause the least possible disturbance to the plants and to avoid having to dig up the clump. These small divisions need to be potted up and placed in light shade in a greenhouse until they are rooting well. They can be planted out into their permanent positions in the summer if they are large enough, otherwise in the following spring[K].

nwatta Prefers a well-drained fertile light soil in full sun or semi shade[1, 200]. Plants only succeed in full sun if the soil remains moist during the growing season[200]. Prefers a slightly acid soil[164]. Although quite cold-hardy when dormant, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A climbing plant, supporting itself by twining and scrambling over other plants[219]. The plant resents root disturbance and should be planted out into its permanent position as soon as possible[164]. It is best grown on a high bank in order to give a good view of the flowers[1]. Plants are very susceptible to the ravages of slugs. The young shoots in spring are particularly at risk, though older growth is also eaten[K].

#### 6.2.351 Liriope muscari

Lilyturf, Big blue lilyturf, Border Grass, Blue Lilyturf, Liriope 5 tlin 10 cyuc 2 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Liriope muscari is an evergreen Perennial growing to  $0.3 \, \mathrm{m}$  (1ft) by  $0.5 \, \mathrm{m}$  (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: RootEdible Uses: Root -cooked[105, 177]. Candied and used medicinally[61]. The roots sometimes have a fleshy, tuberous part near their tip[266].

tcanta A good drought tolerant evergreen ground cover plant[200, 208]. Rather slow to spread though, needing weeding for the first year or two[197]. Plants should be spaced about 30cm apart each way[208].

dwatta Antiinflammatory Aphrodisiac Pectoral Stimulant TonicThe root is antiinflammatory, antiallergic, aphrodisiac, pectoral and stimulant[61, 279]. It is used as a tonic in Korea to increase stamina and also as an expectorant[279].

nrakta E. Asia - China, Japan, Korea. ksacta Forests, bamboo forests, scrub, shady and moist places in ravines and on slopes at elevations of 100 - 1400 (occasionally to 2000) metres[266].

upropta Seed - we have no information on this species but suggest sowing it in a cold frame or greenhouse as soon as the seed is ripe if possible, if not then sowing the stored seed in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Very easy, the larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Seashore, Specimen, Woodland garden. Prefers a sandy soil[1]. Succeeds in full sun so long as the soil does not dry out in the summer, otherwise it should be grown in partial shade in any moderately fertile well-drained soil[200]. Requires a sunny position[208]. Established plants are fairly drought tolerant[190. 200], they succeed in dry shade[190]. Hardy to at least -15°c[200]. A very ornamental plant, there are many named varieties[200]. Slow to settle down after being planted but then grows away well[190]. Members of this genus are rarely if ever troubled by browsing deer[233]. There is a lot of confusion between this species and L. graminifolia, most of the plants being grown as L. graminifolia actually being this species[200]. Apart from its use as a ground cover plant, all the entries on this plant's uses actually belong to L. graminifolia but, because of the confusion, it is quite possible that they also apply to this species[K]. This species has thick dark tubers whilst L. graminifolia is rhizomatous[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, Suitable for cut flowers, Inconspicuous flowers or blooms

#### 6.2.352 Lilium henryi

Henry's lily

5 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium henryi is a BULB growing to 1.8 m (6ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[163]. The bulb is about 7cm in diameter[266]. A

rather bitter flavour[K]. Rich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

nrakta E. Asia - C. China in W. Hubeh and Guizhou. ksacta Amongst scrub on limestone cliffs, often in shade on humus-rich soils, up to 1100 metres[90].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]

nwatta Landscape Uses:Border, Foundation, Screen, Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Prefers a limey soil[200]. Succeeds in acid and limey soils according to one report[90], whilst another says that it does not tolerate acid soil conditions[245]. A very ornamental plant[1], it is very easily grown and is one of the most virus-tolerant of lilies[90]. It is also a fast-growing plant, onion-sized flowering bulbs can be obtained in 2 years from seed[K]. The flowers have a pleasant sweet perfume[245]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. The plant should be protected against rabbits and slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. Special Features: Attractive foliage, Not North American native, Suitable for cut flowers, Attractive flowers or blooms.

#### 6.2.353 Salvia sclarea

Clary, Europe sage, Clary Sage 5 tlin 9 cyuc 2 keak 0 tcan 2 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia sclarea is a BIENNIAL/PERENNIAL growing to 1 m (3ft 3in) by  $0.6\,\text{m}$  (2ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

kcakta Edible Parts: Flowers Leaves OilEdible Uses: Condiment OilLeaves - raw or cooked. A strong, warm, aromatic taste and odour[244]. They are used mainly as a flavouring in cooked foods[2, 27, 37, 105], they are similar to sage (S. officinalis)[1]. The leaves can be dipped in batter and cooked to make delicious fritters[183, 244]. Flowers - raw. A pleasant taste, they can be sprinkled on chopped salads[183, 238], or made into a tea[238]. The plant is sometimes used as a hop substitute in flavouring beer, imparting considerable bitterness and intoxicating properties[4] - it either makes people dead drunk or insanely exhilarated[244]. The leaves have also been used to adulterate wine and give it a muscatel flavour[244].

tcanta Essential OilAn essential oil is obtained from the flowering stems. Called 'Muscatel oil', it has an ambergris aroma and is used in soaps, cosmetics, as a fixative in perfumery etc[1,46,74,171,238]. A drying oil is obtained from the seed, it is used in varnishes, paints etc[74].

dwatta Antispasmodic Appetizer Aromatherapy Aromatic Astringent Balsamic Carminative Ophthalmic Pectoral TonicClary has been perceived both as a weaker version of sage (Salvia officinalis) and also as a significant herb in its own right[254]. An antispasmodic and aromatic plant, it is

and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Plants are best grown in a shady position[188]. Grows well in a sunny dry border or on a scree[230]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. A very rare species in Britain, where it is on the verge of extinction, it is rather more common in southern Europe[230]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

# 6.2.408 Vaccinium japonicum

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.7 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Vaccinium japonicum is a deciduous Shrub growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. An acid flavour[105, 177]. The fruit is about 6mm in diameter[200].

nrakta E. Asia - Japan, Korea. ksacta Woods in mountains and hills all over Japan [58].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113]. nwatta Requires a moist but freely-draining lime free sol, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.409 Callirhoe leiocarpa

Tall Poppy-Mallow

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.9 m hkuc htut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Callirhoe leiocarpa is a ANNUAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[2, 22, 46, 61, 105]. Parsnip-shaped[161].

nrakta Southern N. America. ksacta Prairies, plains, woods and mesquite groves [228].

propta Seed - sow outdoors or in a cold frame. Plants resent root disturbance so the seed is best sown in situ in April[138], though the slugs will have a field day if you do not protect the plants[K]. If seed is in short supply then sow it in pots in a cold frame, putting a few seeds in each pot, and plant the pots out in early summer once the plants have put on at least 15cm of growth. Germination usually takes place within 1 - 6 months at 15°c[138].

nwatta Prefers a light rich sandy loam and a sunny position[1]. This species is hardy to about -15°c[200]. A polymorphic species[1]. Plants resent root disturbance and should be planted into their final positions as soon as possible[138]. Slugs are strongly attracted to this plant and can destroy even established plants by eating out all the young shoots in spring[K]

# 6.2.410 Centranthus ruber

Red Valerian, Fox's Brush, Jupiter's Beard 5 tlin 8 cyuc 2 kcak 1 tcan 1 dwat 0.9 m hkuc htut cyutli hgatkyuctcup hwicii hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

druttá Centranthus ruber is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - raw or cooked as greens[2, 5, 52, 115]. Exceedingly good, either in salads or cooked as a vegetable[4]. This differs from our own experience, whilst the leaves can be added to salads they are rather bitter and rather less than desirable[8, 183, K]. Root - cooked[4]. Used in soups[4].

tcanta MiscellanyThe seeds were used in ancient embalming[89, 148].

dwatta Miscellany NervineRed valerian is sometimes confused in herbals and folk tradition with the true valerian (Valeriana officinalis). Whilst true valerian has a very strong action on the nervous system, this species has no known medical properties[244, 268]. The plant is nervine[148]. This report possibly confuses this plant with the true valerian, Valeriana officinalis, which is a very effective nervine.

shoots along their length [1-2]. Bloom Color: Yellow. Bloom Time: May to Sep.

# 6.2.405 Aster tripolium

Saa Actor

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli fyifxre7t hjonli

drutta Aster tripolium is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems - the somewhat fleshy leaves are used to make pickles or are cooked[2, 105, 177]. A sweet taste[179]. The stem contains about 8.4% ash, whilst the leaf is 9% ash - this is mainly sodium chloride[179].

dwatta OphthalmicOphthalmic[100].

nrakta Coastal areas of Europe, including Britain, N. Africa and saline inland areas of Europe and C. Asia. ksacta Salt marshes and maritime cliffs[17].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Succeeds in most good garden soils[1], preferpring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. This species tends to be a short-lived perennial[17]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

# 6.2.406 Plantago lanceolata

Ribwort Plantain, Narrowleaf plantain 5 tlin 9 cyuc 2 kcak 3 tcan 3 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Plantago lanceolata is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to August, and the seeds ripen from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked[12, 46, 61]. They are rather bitter and very tedious to prepare, the fibrous Strands are best removed prior to eating[9, 183]. The very young leaves are somewhat better and are less fibrous[K]. Seed - cooked. Used like sago[177, 183]. The seed can be ground into a powder and added to flours when making bread, cakes or whatever.

tcanta Dye Fibre StarchA good fibre is obtained from the leaves[4], it is said to be suitable for textiles[115]. A mucilage from the seed coats is used as a fabric stiffener[4]. It is obtained by macerating the seed in hot water[100, 115]. Gold and brown dyes are obtained from the whole plant[168]. Dynamic accumulator.

dwatta Antibacterial Antidote Astringent Demulcent Expectorant Haemostatic Laxative Ophthalmic PoulticeRibwort plantain is a safe and effective treatment for bleeding, it quickly staunches blood flow and encourages the repair of damaged tissue[254]. The leaves contain mucilage, tannin and silic acid[244]. An extract of them has antibacterial

properties[240]. They have a bitter flavour and are astringent, demulcent, mildly expectorant, haemostatic and ophthalmic[9, 13, 21, 145, 165, 222, 244, 254]. Internally, they are used in the treatment of a wide range of complaints including diarrhoea, gastritis, peptic ulcers, irritable bowel syndrome, haemorrhage, haemorrhoids, cystitis, bronchitis, catarrh, sinusitis, asthma and hay fever[238, 254]. They are used externally in treating skin inflammations, malignant ulcers, cuts, stings etc[4]. The heated leaves are used as a wet dressing for wounds, swellings etc[213, 222]. The root is a remedy for the bite of rattlesnakes, it is used in equal portions with Marrubium vulgare[207]. The seeds are used in the treatment of parasitic worms[213]. Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238]. A distilled water made from the plant makes an excellent eye lotion[7].

nrakta Europe, including Britain, from Iceland south and east to Spain, northern and central Asia. ksacta Grassland, roadsides etc, a common weed of lawns and cultivated ground, on neutral and basic soils[9, 17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200]. Plants also succeed in very poor land[4]. An important food plant for the caterpillars of many species of butterflies[30]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1].

# 6.2.407 Ophrys holoserica

Late Spider Orchid

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc

hmimhtut cyutli kyuctcup hwicili hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ophrys holoserica is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from October to July, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Central and southern Europe, including Britain, to the Near East. ksacta Very rare and local on chalk downs and field borders in S. E. England[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue

used mainly to treat digestive problems such as wind and indigestion[254]. It is also regarded as a tonic, calming herb that helps relieve period pain and pre-menstrual problems. Owing to its oestrogen-stimulating action, it is most effective when levels of this hormone are low[254]. The whole plant, and especially the leaves, is antispasmodic, appetizer, aromatic, astringent, balsamic, carminative, pectoral and tonic[4]. It is useful in treating disorders of the stomach and kidneys and is a valuable remedy for complaints associated with the menopause, particularly hot flushing[4, 254]. It should not be prescribed for pregnant women[238]. The leaves can be used fresh or dried, for drying they are harvested before the plant comes into flower[238]. The seed forms a thick mucilage when it is soaked for a few minutes in water. This is efficacious in removing small particles of dust from the eyes[4, 238]. The essential oil is used in aromatherapy. Its keyword is 'Euphoric'[210].

nrakta Southern Europe to Syria. ksacta Rocky igneous slopes, mixed deciduous and coniferous woodland, shale banks and roadsides to 2000 metres in Turkey[93].

propta Seed - can be sown in situ during spring[1]. Alternatively seed can be sown in August/September to overwinter, it will then produce larger plants Thinnings can be transplanted[1]. The seed remains viable for 3 years[1].

nwatta Landscape Uses:Border, Seashore. Requires a very well-drained light sandy soil in a sunny position[200]. Thrives on any ground that is not too wet[4]. Plants can be killed by excessive winter wet[200]. Hardy to about -20°c[187]. A biennial or short-lived perennial[187]. The flowers can be air-dried and used as everlasting flowers[200]. A very ornamental plant, it is strongly aromatic and is sometimes cultivated for its essential oil, there are some amed varieties[74, 183]. When bruised, the leaves release a deliciously pungent and refreshing smell of fresh grape-fruit[245]. The flowers are very attractive to bees[245]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

# 6.2.354 Menziesia ferruginea

False Huckleberry, Rusty menziesia 5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Menziesia ferruginea is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit NectarEdible Uses: Fruit fresh or dried[61, 105, 183]. The fruit is about 5 - 7mm in diameter[200]. The nectar has been sucked from the flowers to sweeten the mouth[257].

dwatta Cardiac Poultice StomachicThe leaves are cardiac[257]. They have been chewed to relieve heart pain and treat stomach problems[257]. A poultice of the heated leaves has been applied to sores and swellings[257].

nrakta Western N. America. ksacta Woodland shade below 300 metres in California[71].

propta Seed - best sown in a shady position in a cold frame in the autumn[200] but it can also be sown in late winter [78]. Surface sow and do not allow the compost to become dry. Germination is variable and can take 1 - 2 months at 15°c[78]. Keep the seedlings heavily shaded and prick them out into individual pots when they are 12 months old[78]. Plant them out into their permanent positions in the summer once they are more than 15cm tall. Cuttings of semi-ripe wood, 2 - 5cm with a heel, May/June in a frame. Keep them shaded. The cuttings are very slow to root but usually a good percentage will succeed[78]. Division in early spring just before active growth begins[78]. Layering.

nwatta Requires a lime-free humus-rich moist soil in sun or light shade [182]. Prefers moderate shade, especially on the roots[1, 200], but it can also succeed in full sun[11]. Grows well in a woodland garden [200]. Dormant plants are

hardy to about -20°c[200]. The young growth in spring is susceptible to damage by late frosts but the plants are otherwise of easy cultivation[182]. Flowers are produced on the previous years wood[200]. Plants in this genus are notably resistant to honey fungus[200].

# 6.2.355 Mentha longifolia

Horsemin

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

d'nutta Mentha longifolia is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Peppermint-scented, they are used as a flavouring in salads, chutneys and cooked foods[183, 238]. A herb tea is made from the leaves[183]. An essential oil obtained from the leaves and flowering tops is used as a food flavouring in sweets etc[183]. A peppermint-like taste[183].

tcanta Essential Repellent StrewingThe leaves contain about 0.57% essential oil[240]. It is sometimes used as a substitute for peppermint oil in confectionery[238]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiasthmatic Antiseptic Antispasmodic Carminative StimulantHorsemint, like many other members of this genus, is often used as a domestic herbal remedy, being valued especially for its antiseptic properties and its beneficial effect on the digestion. Like other members of the genus, it is best not used by pregnant women because large doses can cause an abortion. The leaves and flowering stems are antiasthmatic, antispasmodic, carminative and stimulant[4, 148, 240]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Central and southern Europe, including Britain, Mediterranean region, Siberia. ksacta Waste places and damp roadsides[17].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K] Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta An easily grown plant, it succeeds in most soils and situations so long as the soil is not too dry[1, 200]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but the plants also succeed in partial shade. There is some confusion over the name of this plant,

it appears in the British flora[17] but according to Flora Europaea it is not found in Britain[50]. Sometimes cultivated for its leaves, there are some named varieties[183]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a mint-like aroma. The flowers are very attractive to bees and butterflies. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.356 Ephedra distachya

Sea Grape, Jointfir

5 tlin 9 cyuc 2 kcak 0 tcan 4 dwat 1 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ephedra distachya is an evergreen Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Fruit-Edible Uses: Fruit - raw[2, 105, 177]. A sweet but rather insipid flavour[K]. The fruit is about 6mm in diameter[200].

tcanta MiscellanyPlants can be used for ground cover, spaced about 60cm apart each way[208].

dwatta Antiasthmatic Antispasmodic Antitussive Antiviral Diaphoretic Diuretic Febrifuge Miscellany Nervine Tonic Vasoconstrictor Members of this genus contain various medicinally active alkaloids (but notably ephedrine) and they are widely used in preparations for the treatment of asthma and catarrh[238]. The whole plant can be used at much lower concentrations than the isolated constituents - unlike using the isolated ephedrine, using the whole plant rarely gives rise to side-effects[254]. The plant also has antiviral effects, particularly against influenza[238]. The stems are a pungent, bitter, warm herb that dilates the bronchial vessels whilst stimulating the heart and central nervous system[238]. The stems are also antitussive, diuretic, diaphoretic, febrifuge, hypertensive, nervine, tonic and vasoconstrictor[4, 21, 174, 238]. They are used internally in the treatment of asthma, hay fever and allergic complaints[238]. They are also combined with a number of other herbs and used in treating a wide range of complaints238]. This herb should be used with great caution, preferably under the supervision of a qualified practitioner[238]. It should not be prescribed to patients who are taking monoamine oxidase inhibitors, or suffering from high blood pressure, hyperthyroidism or glaucoma[238]. Ephedrine is seen as a performance-boosting herb and, as such, is a forbidden substance in many sporting events such as athletics[K]. The stems can be harvested at any time of the year and are dried for later use[238].

nrakta S. Europe to N. Asia. ksacta Semi-desert and desert regions and on gritty slopes on the Russian steppes[74]. Grasslands, sandy places and rocky mountain slopes below 900 metres in China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse [200]. It can also be sown in spring in a greenhouse in a sandy compost[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse. Plant out in the spring or early summer after the last expected frosts and give some protection in their first winter[K]. Division in spring or autumn[238]. Layering.

nwatta Requires a well-drained loamy soil and a sunny position[11]. Established plants are drought resistant and are also lime tolerant[200]. Plants are hardy to at least -15°c[200]. This species does not flower or fruit well in Britain[11]. Dioecious. Male and female plants must be grown if seed is required.

#### **6.2.357** Carex elata

Tufted Sedge, Golden Variegated Sedge, Tufted Sedge 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Carex elata is an evergreen Perennial growing to 1.2 m (4ft) by 1.5 m (5ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Root SeedEdible Uses: Root -cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe leaves are used for bedding[61]. Plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200].

nrakta Most of Europe, including Britain, south to Algeria and east to the Caucasus. ksacta By fen ditches and in wet places by rivers and lakes in base-rich soils[17, 50].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Landscape Uses: Border, Foundation, Ground cover, Massing, Specimen. Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Wetlands plant, Inconspicuous flowers or blooms.

#### 6.2.358 Lilium species

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium species is a BULB growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Bulb - cooked. Rich in starch, it can be used as a vegetable in similar ways to potatoes. The flavour can range from very mild to very bitter[K]

nrakta A group of garden hybrids of uncertain parentage. ksacta Not known in the wild.

propta Seed. Sow thinly in pots from late winter to early spring in a cold frame. The seed should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Protect against slugs in early spring, if the shoot tip is eaten out the bulb will not grow in that year and will lose between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134].

# 6.2.403 Anacamptis pyramidalis

Pyramidal Orchid

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Anacamptis pyramidalis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: DrinkTuber cooked[2, 4, 61]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starchlike substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[5, 100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Most of Europe, including Britain, south and east to N. Africa and W. Asia. ksacta Grassland, on chalk or limestone and on calcareous dunes[17], mainly in the southern part of Britain[245].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Requires a deep rich soil[1, 135]. Prefers a hot well-drained bank[42], growing well in a sunny dry border or on a scree[230]. Orchids are, in general, shallow-rooting

plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. Plants can be grown in lawns in calcareous soils, they should not be cut down until the leaves are dying down in the summer[230]. During the day the flowers have a pronounced aroma of vanilla in order to attract pollinating butterflies. In the evening, when damp with dew, the smell is more goat-like and this acts as a repellent to moths[245].

## 6.2.404 Oxalis grandis

Great Yellow Woodsorrel

5 tlin 7 cyuc 2 kcak 1 tcan 1 dwat 0.2 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Oxalis grandis is a ANNUAL/PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can augravate their condition[238].

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves are tart [1-2]. Leaves - raw or cooked[2, 7, 12, 37]. A delicious lemony flavour, the leaves make a refreshing, thirst-quenching munch and are also added to salads, soups, sauces etc[183]. This leaf should be used in moderation[4, 5, 9, 76], see the notes above on toxicity. Flowers - raw. A decorative addition to salads[K]. The plant can be toxic and only small amounts should be eaten. Large quantities may cause trembling, cramps, and staggering as in grazing animals.

tcanta The juice of the leaves removes iron mould stains from linen[6, 66, 115]. Plants can be grown as a ground cover in woodland or under the shade of shrubs[208].

dwatta Some Oxalis species have medicinal properties but no information could be found for this species. For example Oxalis acetosella: The fresh or dried leaves are anodyne, antiscorbutic, astringent, diuretic, emmenagogue, expectorant, febrifuge, irritant and stomachic[4, 7, 9, 21]. A decoction is used in the treatment of fevers, both to quench the thirst and allay the fever[4]. Externally, the leaves are crushed and applied locally to dispel boils and abscesses, they also have an astringent affect on wounds[7]. When used internally, some caution is advised due to the oxalic acid content of the leaves[4], the plant is contra-indicated for people suffering from gastritis or a calculus condition[7].

nrakta Native to the eastern United States from Georgia north to Pennsylvania and Wisconsin, west as far as Louisiana. ksacta Sandy woods, alluvial soils; 100-1100 m

propta Seed - best sown as soon as it is ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

emi-shade and a mesic - moist to slightly dry soil. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and

positions whilst young. Basal cuttings in spring[K]. Division in spring - very difficult because the plant dislikes root disturbance[1]...

nwatta Prefers a light rich slightly alkaline soil that is not too dry, and a warm sunny position[1, 200]. Plants are intolerant of root disturbance[1]. The young growth is extremely attractive to slugs, they have been known to destroy even mature plants[K]. There is some confusion over this name. Some reports, especially [105] and [179] refer to A. remotifolia. Mig. We assume that this is a mis-spelling for this species but we could be wrong[K].

#### 6.2.401 Gaultheria x wislevensis

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Gaultheria x wislevensis is an evergreen Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[11]. Not much flavour but reasonably palatable[K]. tcanta A good ground cover for shady situations[197],

the plants spread by suckers and form dense thickets[208]. nrakta A hybrid of garden origin, Gaultheria shallon x G.

mucronata. ksacta Not known in the wild.

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. This is a hybrid species and will not breed true. Cuttings of half-ripe wood 3 - 6cm long. July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring when new growth is about 7cm tall. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a cool moist but not boggy humus rich soil in shade or semi-shade[11, 200]. A peat and moisture loving species, it requires a lime-free soil[11]. This species has not as yet got a valid name, having recently been moved from the genus Gaulnettya[200]. Plants are hardy to about -20°c[184]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.402 Asclepias ovalifolia

Oval-leaf milkweed

prefers dry or moist soil.

5 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asclepias ovalifolia is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. The following report relates to the closely related A. syriaca and is probably also appropriate for this species[K]. The older leaves are poisonous if eaten in large quantities[20, 21].

kcakta Edible Parts: Flowers Leaves Oil Oil Seed SeedpodEdible Uses: Gum Oil Oil SweetenerThe following reports refer to the closely related A. syriaca, and are probably also appropriate for this species[K]. Unopened flower buds - cooked. They taste somewhat like peas. They are used like broccoli[183]. Flowers and young flower buds - cooked. Used as a flavouring and a thickener in soups etc[55, 102]. The flower clusters can be boiled down to make a sugary syrup[2, 85]. The flowers are harvested in the early morning with the dew still on them[95]. When boiled up it makes a brown sugar[95]. Young shoots - cooked. An asparagus substitute[2, 4, 43, 55, 62, 95, 183]. They should be used when less than 20cm tall[159]. A slightly bitter taste[159]. Tips of older shoots are cooked like spinach[85, 183]. Young seed pods, 3 - 4 cm long, cooked[2, 43, 55, 85]. They are very appetizing. Best used when about 2 - 4cm long and before the seed floss forms, on older pods remove any seed floss before cooking them[85, 159]. If picked at the right time, the pods resemble okra[183]. The sprouted seeds can be eaten[183]. An edible oil is obtained from the seed[55, 171]. The latex in the stems is made into a chewing gum[46, 61]. It is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112].

tcanta Fibre Gum Latex Oil Oil Pollution Stuffing Wick-The following reports refer to the closely related A. syriaca. and are probably also appropriate for this species[K]. A good quality fibre is obtained from the bark and is used in making twine, cloth, paper etc[95, 112, 169]. It is of poor quality in wet seasons[112]. It is easily harvested in late autumn after the plant has died down by simply pulling the fibres off the dried stems[169]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[112, 159, 169, 171]. It is a Kapok substitute, used in Life Jackets or as a stuffing material[112]. Very water repellent, it can yield up to 550 kilos per hectare[112]. The floss has also been used to mop up oil spills at sea. Candlewicks can be made from the seed floss[112, 207]. Rubber can be made from latex contained in the leaves and the stems[46, 57, 102, 159]. It is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112]. Pods contain an oil and a wax which are of potential importance. The seed contains up to 20% of an edible semi-drying oil[74, 112]. It is also used in making liquid soap[74].

nrakta Central N. America. ksacta Sandy, gravelly or clayey soils of prairies and woodlands[228].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Succeeds in any good soil[187]. Prefers a welldrained light rich or peaty soil[1, 200]. Requires a moist peaty soil and a sunny position[111, 134]. This species is closely related to A. syriaca[200]. A good bee plant[50, 74]. The flower of many members of this genus can trap insects

vigour[200]. Bulbs are best planted out into their permanent positions in early to mid-autumn in cool temperate zones and up to late autumn in warmer areas, this allows them to become established before new top growth commences in

#### 6.2.359 Leonurus sibiricus

Chinese Motherwort, Honeyweed 5 tlin 9 cvuc 2 kcak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Leonurus sibiricus is a ANNUAL/BIENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista See the notes under medicinal uses.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[105, 177, 183]. A sweetish flavour[179] Root - cooked with other foods[177, 183]. This probably means that it is used as a flavouring[K].

tcanta EssentialYields an essential oil[46]. No more details are given.

dwatta Antibacterial Antispasmodic Astringent Cardiac Depurative Diaphoretic Diuretic Eczema Emmenagogue Hypnotic Nervine Oxytoxic Stimulant Stomachic TonicChinese motherwort is unusual amongst Chinese herbs in that it is often prescribed for use on its own and not in a mixture with other plants[238]. The whole plant is antibacterial, antispasmodic, astringent, cardiac, depurative, diaphoretic, diuretic, emmenagogue, hypnotic, nervine, oxytocic, stomachic, tonic, uterine stimulant[4, 9, 21, 46, 165, 174, 178, 192, 279]. The seeds have a similar action to the plant, but are a less effective diuretic and depurative[238]. The plant is used in the treatment of painful and excessive menstruation. post-partum bleeding, oedema, kidney complaints, kidney stones, eczema and abscesses[238, 240]. A tincture is used in the treatment of rheumatic fever[192]. The plant stimulates uterine contractions and should not therefore be used when in the earlier stages of pregnancy[240]. The plant is harvested when in flower but before the seeds have set, and is dried for later use[238]. The plant contains about 0.05% of an alkaloid called leonurine[240]. This has a curare-like effect on the motor-endings of the nervous system, acting in small doses as a stimulant to the respiratory system but in large doses causing respiratory paralysis[240].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Stony and steppe slopes, pine forests and occasionally as a weed of cultivated land[74]. By the sea shore and along the margins of marshes and pools[178].

propta Seed - sow late spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Prefers a well-drained moist soil in sun or partial shade[238]. Prefers a poor soil[108]. Plants are hardy to at least -15°c[238]. There is some confusion over the correct name for this species, it should guite probably be called L. iaponicus.

#### 6.2.360 Lavandula angustifolia

English Lavender, True Lavender 5 tlin 8 cyuc 2 kcak 5 tcan 3 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Lavandula angustifolia is an evergreen Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can

grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The volatile oil may rarely cause sensitization [301]

kcakta Edible Parts: Edible Uses: Condiment TeaLeaves, petals and flowering tips - raw. Used as a condiment in salads, soups, stews etc[2, 15, 183]. They provide a very aromatic flavour[7] and are too strong to be used in any guantity[K]. The fresh or dried flowers are used as a tea[183]. The fresh flowers are also crystallized or added to jams, icecreams, vinegars etc as a flavouring[238]. An essential oil from the flowers is used as a food flavouring[183].

tcanta Companion Essential Hedge Incense Pot-pourri Repellent The essential oil that is obtained from the flowers is exquisitely scented and has a very wide range of applications, both in the home and commercially. It is commonly used in soap making, in making high quality perfumes (it is also used in 'Eau de Cologne'), it is also used as a detergent and cleaning agent, a food flavouring etc[21, 46, 57, 171, 238] and as an insect repellent[201]. When growing the plant for its essential oil content, it is best to harvest the flowering stems as soon as the flowers have faded[245]. Yields of 0.8 - 1% of the oil are obtained[7]. The aromatic leaves and flowers are used in pot-pourri[238] and as an insect repellent in the linen cupboard etc[14, 18, 20]. They have been used in the past as a strewing herb in order to impart a sweet smell to rooms and to deter insects[244]. The leaves are also added to bath water for their fragrance and therapeutic properties[244]. They are also said to repel mice[20]. The flowering stems, once the flowers have been removed for use in pot-pourri etc, can be tied in small bundles and burnt as incense sticks[245]. Layender can be grown as a low hedge, responding well to trimming[29]. There are several varieties, such as 'Hidcote Variety', 'Loddon Pink' and 'Folgate Blue' that are suitable for using as dwarf hedges 30 - 50cm tall[245].

dwatta Antianxiety Antihalitosis Antiseptic Antispasmodic Appetizer Aromatherapy Aromatic Carminative Cholagoque Diuretic Nervine Sedative Stimulant Stomachic TonicLavender is a commonly used household herb, though it is better known for its sweet-scented aroma than for its medicinal qualities[254]. However, it is an important relaxing herb. having a soothing and relaxing affect upon the nervous system[254]. The flowering spikes can be dried and used internally in a tincture, though the extracted essential oil is more commonly used. The essential oil is much more gentle in its action than most other essential oils and can be safely applied direct to the skin as an antiseptic to help heal wounds, burns etc[254]. An essential oil obtained from the flowers is antihalitosis, powerfully antiseptic, antispasmodic, aromatic, carminative, cholagogue, diuretic, nervine, sedative, stimulant, stomachic and tonic[4, 7, 9, 21, 165, 238]. It is not often used internally though it is a useful carminative and nervine[4]. It is mainly used externally where it is an excellent restorative and tonic - when rubbed into the temples, for example, it can cure a nervous headache, and it is a delightful addition to the bath-water[4]. Its powerful antiseptic properties are able to kill many of the common bacteria such as typhoid, diphtheria, streptococcus and Pneumococcus, as well as being a powerful antidote to some snake venoms[244]. It is very useful in the treatment of burns, sunburn, scalds, bites, vaginal discharge, anal fissure etc, where it also soothes the affected part of the body and can prevent the formation of permanent scar tissue[4, 238]. The essential oil is used in aromatherapy. Its keyword is 'Immune system'[210]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Lavandula angustifolia for loss of appetite, nervousness and insomnia, circulatory disorders, dyspeptic complaints (see [302] for critics of commission E).

nrakta Europe - Mediterranean. ksacta Dry grassy slopes amongst rocks[9], in exposed, usually parched, hot rocky situations often on calcareous soils[200].

propta Seed - sow spring in a greenhouse and only just cover the seed[4]. It usually germinates in 1 - 3 months at 15°c. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings of half-ripe wood 7 - 10cm with a heel, July/August in a frame. Usually very east, a high percentage will root within a few weeks[78] Grow them on in the greenhouse for their first winter and

plant them out in late spring after the last expected frosts. Cuttings 7cm with a heel succeed at almost any time of the year[1]. Layering.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Massing, Rock garden, Seashore, Specimen. Succeeds in almost any soil so long as it is welldrained and not too acid[1, 200]. Prefers a sunny position in a neutral to alkaline soil[1, 4, 14]. Prefers a light warm dry soil[37]. When grown in rich soils the plants tend to produce more leaves but less essential oils[4]. Established plants are drought tolerant[190]. Plants are very tolerant of salt wind exposure[K]. When growing for maximum essential oil content, the plant must be given a very warm sunny position and will do best in a light sandy soil, the fragrance being especially pronounced in a chalky soil[245]. Plants are hardy to between -10 and -15°c[184]. Lavender is a very ornamental plant that is often grown in the herb garden and is also grown commercially for its essential oil[1, 4]. There are several named varieties[182, 183]. Not a very long-lived plant, it can be trimmed to keep it tidy but is probably best replaced every 10 years[200]. Any trimming is best done in spring and should not be done in the autumn since this can encourage new growth that will not be very cold-hardy[200] A good bee plant, also attracting butterflies and moths[7, 24, 30]. Lavender makes a good companion for most plants[54], growing especially well with cabbages[14]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers, Attractive flowers or blooms.

#### 6.2.361 Oxalis magellanica

5 tlin 9 cvuc 2 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Oxalis magellanica is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[173, 177]. A pleasant acid flavour. but the leaves are rather small and they are also a bit chewy[K]. Use in moderation, see notes at top of sheet, Flowers - raw[K]. A pleasant and decorative addition to the salad bowl[K].

nrakta Southern S. America - Falklands to Bolivia. ksacta Walls and stony places[1].

propta Seed - best sown as soon as ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early

nwatta Easily grown in a sandy soil in a warm dry position in sun or light shade[1, 200]. Succeeds in the welldrained interstices of paying stones [200]. Plants can become a pest in the garden[200].

#### 6.2.362 Ferula gummosa

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ferula gummosa is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe gum resin obtained from the root is used as a celery-like food flavouring[177, 238].

tcanta The aromatic gum resin 'Galbanum' is obtained from wounds made in the stem[4]. It is collected by removing soil from around the top of the root and then cutting a slice off the root[64, 238] and can also be obtained from incisions made in the stem[238]. It is used medicinally and is also an ingredient of incense[1, 64, 171, 238]. It was an important ingredient of the incense used by the Israelites[268]

dwatta Antispasmodic Carminative Expectorant StimulantThe whole plant, but especially the root, contains the gum resin 'galbanum'[4]. This is antispasmodic, carminative, expectorant and stimulant[4, 46, 64, 238]. It is used internally in the treatment of chronic bronchitis, asthma and other chest complaints[4, 238]. It is a digestive stimulant and antispasmodic, reducing flatulence, griping pains and colic[254]. Externally it is used as a plaster for inflammatory swellings, ulcers, boils, wounds and skin complaints[4, 2381.

nrakta W. Asia - Central Iran, Turkey and southern Russia. ksacta Herbaceous slopes in steppes[74].

propta Seed - best sown as soon as the seed is ripe in a greenhouse in autumn[1]. Otherwise sow in April in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle. Plant them out into their permanent positions whilst still small because the plants dislike root disturbance[1]. Give the plants a protective mulch for at least their first winter outdoors. Division in autumn. This may be inadvisable due to the plants dislike of root dis-

nwatta Succeeds in most soils[1]. Requires a deep fertile soil in a sunny position[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Another report says that it tolerates temperatures down to at least -15°c and should therefore succeed outdoors in most parts of the country [238]. Plants are intolerant of root disturbance due to their long taproot[200]. They should be planted into their final positions as soon as possible. The flowers have an unpleasant smell[245].

#### 6.2.363 Dendranthema lavandulifolium

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1.5 m hkuc

htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dendranthema lavandulifolium is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta The following uses are for the closely related D. indica. They guite possibly also apply to this species. The flower heads are pickled in vinegar[46, 61, 177, 183]. Young leaves - cooked[105, 177, 183]. An aromatic tea is made from the leaves[183]. Seed[183]. No more details are given but it is very small and would be rather fiddly to use.

tcanta The following uses are for the closely related D. indicum. They quite possibly also apply to this species. The seed contains about 16% of a semi-drying oil, but no information is given as to its uses[240]. The seed is rather small. commercial extraction is probably not viable[K].

dwatta EczemaThe flowers are hypotensive and vasodilator[176]. They have an antibacterial action, inhibitRich in starch, it can be used as a vegetable in similar ways to potatoes (Solanum tuberosum).

nrakta E. Asia - China, Japan, Korea. ksacta Riverside meadows and meadow slopes [74]. Grassy slopes in limestone areas at elevations of 100 - 900 metres in China[266].

propta Seed - immediate epigeal germination[130], Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200]. Bulblets are formed on the stem just below the soil surface. These should be dug up in the autumn and replanted immediately, preferably in a cold frame for growing on until large enough to plant out into the garden[143, 1631.

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Lime tolerant[143, 200]. Plants are guite hardy if they are grown in full sun[143]. Stem rooting, the bulbs should be planted 15cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. Closely allied to L. pumilum[143]. The plant should be protected against slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[2001

#### 6.2.398 Berberis fendleri

Colorado Barberry

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis fendleri is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 177, 257]. The fruits are about 5mm long[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta South-western N. America - Colorado, New Mexico and Utah. ksacta Slopes and canyon bottoms at elevations of 1300 - 2700 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them

in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil but is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back guite severely, they resprout well from the base[200].

#### 6.2.399 Lonicera venulosa

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lonicera venulosa is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The following report is for the closely related L. villosa, it would be worthwhile experimenting with this plant to check on edibility[K], Fruit - raw or preserved[43, 105, 200]. A milder flavour than most edible honeysuckles, they can be eaten raw but are mainly used in making jams, jellies and refreshing drinks[183].

nrakta E. Asia - Japan. ksacta In alpine regions at elevations of 800 - 2800 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 -10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200]. Closely related to L. caerulea[200].

# 6.2.400 Adenophora remotiflora

5 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Adenophora remotiflora is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[105, 177, 179]. Buds - cooked[177]. We do not know if this report refers to the flowers or the leaves[K].

dwatta Antidote Demulcent ExpectorantThe root is antidote, demulcent, expectorant[174, 178, 218]. The root is used in the treatment of poisonous bites and medicinal poisoning[174, 178].

nrakta E. Asia - China, Japan, Korea ksacta Woods in mountains, C. and S. Japan[58]. In meadows or deciduous forests from the lowlands to elevations of 1800 metres[275].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. The seed can also be sown in spring. Surface sow 2 - 3 seeds per pot in the spring in order to avoid transplanting[133]. We have found that if transplanted when very small seedlings grow away without difficulty[K]. Germinates in 1 - 3 months at 10°c[133]. Plant out into their permanent

to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - preserved or pickled[74, 177, 183]. The fruit is about 10mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - China, Japan. ksacta Open stony dry slopes and rocks, open sunny places, solitary or in small groves[74]. Mountain slopes, sides of ravines and thickets at elevations of 800 - 2300 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Plants flower best when grown against a south or west-facing wall[188]. A very ornamental plant[1]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

# 6.2.395 Scorzonera mollis

 $5\ tlin\ 9\ cyuc\ 2\ kcak\ 0\ tcan\ 0\ dwat\ m\ hkuc$ htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scorzonera mollis is a PERENNIAL growing to U.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Root - cooked[105, 177]. Leaves - cooked[105, 177]. Flowers - raw[61, 105, 177]. The flowers have a scent of chocolate/461

nrakta E. Europe to W. Asia. ksacta Rocky places in S. Europe[45]. Meadows and pine forests, 30 - 2650 metres in Turkey[93].

propta Seed - sow spring in the greenhouse. Prick out the seedlings as soon as they are large enough to handle into relatively deep pots to accommodate the tap root. If growth is good, plant out in early summer, other wise grow them on in the greenhouse for their first winter and plant them out in late spring of the following year. Division in autumn or as growth commences in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any soil in sun or light shade[200].

#### 6.2.396 Crithmum maritimum

Rock Samphire

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat m hkuc htut cyutli kyuctcup hwicli hyishras hpa7tli flatpriklwissliphsom hpa7tmwatli fyifxre7t hjonli

drutta Crithmum maritimum is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves SeedpodEdible Uses: Leaves - raw or cooked[2, 4, 5, 7, 12, 27, 37]. Vaguely reminiscent of fennel, but the taste is more bitter and brackish[132]. A powerful salty flavour, it has been described by one person as tasting like 'a mixture of celery and kerosene' [238]. The leaves are used as a flavouring in salads etc[132]. Gathered in spring, the young leaves when sprinkled with salt and boiled make a very good pickle[4]. The leaves are rich in vitamin C[238]. Seed pods[4, 5, 7, 12]. They are used to make a warm aromatic pickle[2].

tcanta EssentialAn essential oil from the plant is used in perfumery[7].

dwatta Carminative Depurative Digestive Diuretic Vitamin CRock samphire is little used in herbal medicine, though it is a good diuretic and holds out potential as a treatment for obesity[254]. It has a high vitamin C and mineral content and is thought to relieve flatulence and to act as a digestive remedy[254]. The young growing tips are carminative, depurative, digestive and diuretic[7, 238]. They are gathered when in active growth in the spring and used fresh[7, 238]. The leaves have the reputation for helping people lose weight and so are used in treating cases of obesity as well kidney complaints and sluggishness[238]. The essential oil is a digestive, a few drops being sprinkled on the food[7].

nrakta Coastal regions of Europe, including Britain, to the Mediterranean and Black Sea. ksacta On cliffs and rocks, or more rarely on shingle or sand, by the sea[17].

propta Seed - best sown as soon as it is ripe in the autumn[1]. Sow in a cold frame and only just cover the seed[164]. Germination usually takes place within 3 - 6 weeks at 15°c[164]. One report says that the seed only has a short viability and should be sown as soon as it is ripe[238], but it has germinated well with us when sown in April in a cold frame[K]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. Division in spring[238].

nwatta Prefers a moist light sandy or gravelly soil, doing very well between stones or by a south-east facing wall[37]. Requires a warm dry well-drained sunny position and shade from the midday sun[1, 200]. Requires saline conditions[200]. Plants are best grown in moist salty soil or a very well-drained poor dry soil. When grown away from the coast, this plant requires a warm sheltered position and some protection in cold winters[238]. At one time this plant was sometimes cultivated in the vegetable garden[2], though it is quite difficult to do this successfully[1, 37]. It is difficult to grow outside its natural habitat1641.

#### 6.2.397 Lilium callosum

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lilium callosum is a BULB growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb -cooked[105, 177]. The bulb is up to 3cm in diameter[266].

ing the growth of Staphylococcus, E. coli, streptococcus, C. diphtheriae, Bacillus dysenteriae[176]. The flowers are used in the treatment of furuncle, scrofula, deep-rooted boils, inflammation of the throat, eyes and cervix, eczema, itchiness of the skin and hypertension[176].

nrakta E. Asia - Northern China, Japan, Korea and Manchuria. ksacta Mountain slopes, rocks, river valleys, river banks, wastelands and hilly lands at elvations of 600-2800 metres[266].

propta Seed - sow spring to early summer in a greenhouse and only just cover the seed[200]. It usually germinates in 10 - 18 days at  $15^{\circ}c$  but if it does not germinate within 4 weeks then try chilling the seed for 3 weeks in the salad compartment of a fridge[164]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most well-drained fertile soils in a sunny position[1, 200]. This species is closely related to D. indicum. When bruised, the foliage has a pungent refreshing fragrance that is somewhat lemon-like and reminiscent of chamomile[245].

# 6.2.364 Cirsium eriophorum

Wooly Thistle

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cirsium eriophorum is a BIENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil StemEdible Uses: OilYoung leaves - raw[4, 183]. Young stems - raw or cooked. An asparagus or rhubarb substitute[4, 12, 183]. The stems are peeled and soaked in water to remove the bit-terness, they are then said to be excellent eating[4, 183]. Flower buds - cooked. A globe artichoke substitute[2, 177, 183] but much smaller and even more fiddly.

tcanta Oil TinderThe seed fluff is used as a tinder[106]. The seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

nrakta Central Europe, from Britain, France and Holland to the Balkans and Upper Volga ksacta Grassland, open scrub and roadsides on calcareous soils[12, 17].

propta Seed - sow early spring or autumn in situ. Germination usually takes place within 2 - 8 weeks at 20°c.

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position[200].

# 6.2.365 Cakile maritima

Sea Rocket, European searocket 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat m hkuc htut cyutli tcup hwicli hyishras hpa7tli flatpriklwis hoa7tmwatli xre7t hionli

drutta Cakile maritima is a ANNUAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves Oil Root Seedpod StemEdible Uses: Condiment OilLeaves, stems, flower buds and immature seedpods - raw or cooked. They are rich in

vitamin C but have a very bitter taste[4, 66]. Used mainly as a flavouring[132]. Very young leaves can be added to salads whilst older leaves can be mixed with milder tasting leaves and used as a potherb[183, K]. Root - dried and ground into a powder, then mixed with cereal flours and used to make bread[2]. A famine food, it is only used in times of scarcity[183]. The seed contains a fatty oil[74]. No more details are given.

nrakta Coastal areas of Europe, including Britain, the Mediterranean, Baltic and Black Seas. ksacta Sandy and shingly places all around the coast[17].

propta Seed - sow late spring or early autumn in situ.

Germination is usually rapid.

nwatta Prefers a light well-drained soil and a sunny position[1, 200]. Plants are easily grown in a garden situation and can self-sow if the ground is disturbed by hoeing etc[K]. This species is closely related to C. edentula, which is native to N. America[17]. The seed is often dispersed by floating in sea water[17].

# 6.2.366 Rheum ribes

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum ribes is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable formedium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: StemEdible Uses: Leaf stem - cooked[2, 93, 105]. Eaten raw by the local people[187].

nrakta W. Asia - Turkey to Iran. ksacta Dry gorges among rocks, 2300 - 2700 metres[93, 187].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semishade[200]. Grows well in heavy clay soils. Best grown in a dry position, where it can be very long-lived[187]. Hardy to about -20°c according to one report[200] whilst another says that plants are somewhat tender in Britain[1]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

#### **6.2.367** Artemisia dracunculoides

Russian Tarragon, Tarragon, French Tarragon 5 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Artemisia dracunculoides is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is

in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves raw or cooked[46, 61, 105, 161]. The N. American Indians would bake the leaves between hot stones and then eat them with salt water[183, 216]. The leaves can also be eaten raw in salads but are inferior to A. dracunculus (Tarragon)[183]. The flavour is said to improve as the plant matures[200, 268]. Seed - raw or cooked. An oily texture[46, 61, 161, 183]. The seed is very small and fiddly to use[K].

tcanta RepellentBoth the growing and the dried plant repels insects[99].

dwatta Antiscorbutic Diuretic Emmenagogue Hypnotic StomachicThe herb is antiscorbutic, diuretic, emmenagogue, hypnotic and stomachic[21, 46, 179]. The fresh herb is eaten to promote the appetite[268].

nrakta N. America. N. Europe. N. Asia - Siberia. ksacta Prairies, plains and dry slopes[43].

propta Seed - surface sow from late winter to early summer in a greenhouse. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be planted out direct into their permanent positions f required. Basal cuttings in late spring. Harvest the shoots when 10 - 15cm long, pot them up in a greenhouse and plant out when well rooted. Very easy.

nwatta Landscape Uses:Container, Seashore. Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Nomenclature is somewhat confused for this species. It is considered by some botanists to be a hardier form of A. dracunculus but with an inferior flavour[4, 200], whilst some consider it to be part of A. glauca[43]. It is very similar to A. dracunculus, but is more vigorous and hardier, Its leaves have a pungent and less pleasant flavour than that species[238]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Edible, Fragrant foliage, Not North American native, Inconspicuous flowers or blooms.

#### 6.2.368 Ouercus michauxii

Swamp Chestnut Oak 5 tlin 9 cyuc 2 kcak 3 tcan 2 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus michauxii is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[2, 46, 161]. The seed is large, up to 35mm long and 30mm wide[82], but contains bitter tannins[183]. Other reports say that the acorns are sweet and edible[82, 235]. The seed can be roasted then dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread[183]. The bitter tannins can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple

taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodAgroforestry Uses: The tree has been used in restoring degraded bottomland hardwood forests of the Southeastern USA[1050 ]. Other Uses: The leaves of most species in this genus are more or less rich in tannins. A mulch of the partially decayed leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc, and these will in time break down to add humus and nutrients to the soil. Fresh leaves should be used with caution, however, since as these decay they utilize some of the nitrogen in the soil and thus can inhibit plant growth[20, K]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff and is also used by many cultures to make ink[4, 331]. The bark of oak trees is also usually rich in tannins and can be used as a dyestuff and for waterproofing rope[331, K]. The wood is heavy, hard, very strong, tough, dense, durable, easy to split[82, 171, 235]. It weighs 50lb per cubic foot[235]. It machines well, but is subject to checking and warping if not dried properly. It i is largely used for flooring, furniture, boxes, barrels, boat making and veneer[229, 1050]. The wood is a favoured fuel - burning well and giving off a lot of heat[331, 229]

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Delaware to Indiana, Missouri, Florida and Texas. ksacta Inundated bottoms, stream borders and swamps[43].

propta Seed - it quickly loses viability if it is allowed to dryou. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Firewood, Pest tolerant, Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Closely related to Q. prinus[11]. This species is often confused with Q. prinus, Q. prinoides and Q. muehlenbergii[200]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance. trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Wetlands plant, Inconspicuous flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 6.2.369 Eremurus spectabilis

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eremurus spectabilis is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light

# 6.2.391 Morus microphylla

Texas Mulberry

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Morus microphylla is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. Small and dry[149, 161, 177]. Sweet and palatable[82, 200]. The fruits can be sweet or sour[227]. The fruit can be dried for later use[257]. It is up to 15mm in diameter[200].

tcanta WoodThe twigs have been split in half lengthways and used to make serviceable baskets[257]. Wood - heavy, hard, elastic, close grained. Used for carpentry[149], but it is too small to be commercially important[229].

nrakta South-western N. America - Texas to Arizona, south to Mexico. ksacta In canyons on dry limestone hills and igneous slopes, usually along streams at elevations of 200 - 2200 metres[270].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10 cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30 cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. Formerly cultivated for its edible fruit by the North American Indians[149]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious, male and female plants must be grown if seed is required[227].

#### 6.2.392 Erodium moschatum

Musk Storksbill

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hionli

drutta Erodium moschatum is a ANNUAL/BIENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in lower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked [161, 177]. Added to salads or used as a potherb [183].

tcanta DyeA green dye can be obtained from the whole plant. It does not require a mordant[168].

dwatta Astringent Dysentery FebrifugeThe plant is febrifuge[240]. A tincture of the plant is used in the treatment of dysentery[240].

nrakta Mediterranean areas and southwestern Europe, including Britain. ksacta Waste places and rocky ground,

mainly near the sea in Britain, mainly near the southern coast[245].

propta Seed - sow in situ as soon as the seed is ripe in the late summer. The seed can also be sown in situ in late spring[1]. It usually germinates readily[200].

nwatta Prefers a sunny well-drained position and a limy soil or at least one that is not acid[1]. The bruised leaves emit a strong scent of musk[245].

## 6.2.393 Osmunda japonica

Zenmai

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Osmunda japonica is a FERN growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminasel 1721.

kcakta Edible Parts: Leaves RootEdible Uses: Young fronds - cooked[105, 177]. An edible starch is obtained from the rhizome[105, 177].

nrakta E. Asia - China, Japan. ksacta Moist places all over Japan[58, 200].

propta Spores - they very quickly lose their viability (within 3 days) and are best sown as soon as they are ripe on the surface of a humus-rich sterilized soil in a lightly shaded place in a greenhouse. Keep the compost moist, preferably by putting a plastic bag over the pot. Plants develop very rapidly, pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old. Cultivars usually come true to type[200]. Division of the rootstock in the dormant season. This is a very strenuous exercise due to the mass of wiry roots[200].

nwatta Likes a soil of swamp mud and loamy or fibrous peat, sand and loam[1]. Succeeds in most moist soils, preferring acid conditions[200]. Requires a constant supply of water, doing well by ponds, streams etc[1]. Plants thrive in full sun so long as there is no shortage of moisture in the soil and also in shady situations beneath shrubs etc[200]. Plants are hardy to at least -20°c, they are evergreen in warm winter areas but deciduous elsewhere[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Closely related to O. regalis[1].

#### 6.2.394 Prunus glandulosa

Korean Cherry, Dwarf Flowering Almond 5 tlin 8 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus glandulosa is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and fenale organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

cista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity

to fireblight[188]. There is considerable confusion over the naming of this species, trees grown under this name have included S. decora., S. matsumurana., S. scopulina. and S. sitchensis[1].

# 6.2.389 Onopordum acanthium

Scotch Thistle, Scotch cottonthistle
5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1.5 m hkuc
hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tlmwatli fvifxre7t hionli

drutta Onopordum acanthium is a BIENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves Oil Oil StemEdible Uses: Colouring Oil OilFlower buds - cooked. A globe artichoke substitute[2, 4, 9, 115, 183], though they are much smaller and very fiddly to use[K]. Stems - cooked. Used as a vegetable, they are a cardoon (Cynara cardunculus) substitute[2, 4]. The stems are cooked in water like asparagus or rhubarb[12]. They are best if the rind is removed[4, 115, 183]. Leaves and young plants - cooked[9, 105]. They are harvested before the flowers develop and the prickles must be removed prior to cooking[9]. The petals are an adulterant for saffron[46, 61, 105, 183], used as a yellow food colouring and flavouring. A good quality edible oil is obtained from the seed[2, 4, 183]. The seed contains about 25% oil[4].

tcanta Oil Oil StuffingThe stem hairs are sometimes collected and used to stuff pillows[4]. An oil obtained from the seed is used as a fuel for lamps[4].

dwatta Astringent Cancer CardiotonicThe flowering plant is cardiotonic[9]. It is used in some proprietary heart medicines[9]. The juice of the plant has been used with good effect in the treatment of cancers and ulcers[4]. A decoction of the root is astringent[4]. It is used to diminish discharges from mucous membranes[4].

nrakta Europe, possibly including Britain, from Scandanavia south and east to Spain and W. Asia. ksacta Waste places and arable land, especially on chalky and sandy soils, avoiding shade[4, 9]. Also found on slightly acid soils[200].

propta Seed - sow spring in situ[200]. The seed can also be sown in situ in autumn[200]. If the seed is in short supply then it can be sown in a pot in the greenhouse in the spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in early summer.

nwatta An easily grown plant, it succeeds in almost any ordinary garden soil[1, 111]. Requires a well-drained soil, preferably in full sun though it tolerates light shade[200]. Prefers a slightly alkaline soil[200]. Grows very well in poor soils, succeeding in hot dry situations and tolerating drought when it is established[190]. A slow-growing plant[188]. Hardy to about -15°c[200]. A very ornamental plant[1], the flowers are very attractive to bees[200]. Plants are prone to the point of nuisance, though the seedlings can easily be hoed out and can also be transplanted if they are moved whilst still small[200].

## 6.2.390 Arum maculatum

Cuckoo Pint

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Arum maculatum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated

by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten, but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water[65].

kcakta Edible Parts: Leaves RootEdible Uses: Tuber-cooked and used as a vegetable[2, 177]. A mild flavour, the root contains about 25% starch[74]. A farina can be extracted from the root[2]. Roots can be harvested at any time of the year, though they are best when the plant is dormant[K]. At one time, the tubers of this plant were commonly harvested and used for food, but they are very rarely used nowadays[268, K]. The root must be thoroughly dried or cooked before being eaten, see the notes above on toxicity. Leaves - must be well cooked[177]. Available from late winter. Caution is advised, see the notes above on toxicity.

tcanta StarchStarch from the root has been used as a laundry starch for stiffening clothes[4, 66, 100]. Its use is said to be very harsh on the skin, producing sores and blisters on the hands of the laundresses who have to use it[66, 100], though another report says that the powdered root makes a good and innocent cosmetic that can be used to remove freckles[4]

dwatta Antirheumatic Diaphoretic Diuretic Expectorant Homeopathy Purgative VermifugeCuckoo pint has been little used in herbal medicine and is generally not recommended for internal use[268]. The shape of the flowering spadix has a distinct sexual symbolism and the plant did have a reputation as an aphrodisiac, though there is no evidence to support this[268]. The root is diaphoretic, diuretic, expectorant, strongly purgative and vermifuge[4, 9, 19, 21]. It should be harvested in the autumn or before the leaves are produced in the spring[4]. It can be stored fresh in a cellar in sand for up to a year or can be dried for later use[4]. The plant should be used with caution[9], see notes above on toxicity. The bruised fresh plant has been applied externally in the treatment of rheumatic pain[268]. A liquid from the boiled bark (of the stem?[K]) has been used in the treatment of diarrhoea[213]. A homeopathic remedy is prepared from the root and leaves[4]. It has been used in the treatment of sore throats[4, 268].

nrakta Most of Europe, south and east of Sweden, including Britain, south to N. Africa. ksacta Hedgerows, woodlands, copses etc, especially on base-rich substrata[9, 17].

propta Seed - best sown in a greenhouse or cold frame as soon as it is ripe[134]. The seed usually germinates in 1 - 6 months at 15°c[134]. Stored seed should be sown in the spring in a greenhouse and can be slow to germinate, sometimes taking a year or more. A period of cold stratification might help to speed up the process. Sow the seed thinly, and allow the seedlings to grow on without disturbance for their first year, giving occasional liquid feeds to ensure that they do not become mineral deficient. When the plants are dormant in the autumn, divide up the small corms, planting 2 - 3 in each pot, and grow them on in light shade in the greenhouse for a further year, planting out when dormant in the autumn. Division of the corms in summer after flowering[200]. Larger corms can be planted out direct into their permanent positions, though it is best to pot up the smaller corms and grow them on for a year in a cold frame before planting them out.

nwatta Prefers a humus rich soil and abundant water in the growing season[1, 13]. Prefers a shady damp calcareous soil[13, 31]. Succeeds in sun or shade[90]. Plants are very shade tolerant[17] and grow well in woodland conditions[1]. The inflorescence has the remarkable ability to heat itself above the ambient air temperature to such a degree that it is quite noticeable to the touch[4]. Temperature rises of 11°c have been recorded[245]. At the same time, the flowers emit a foul and urinous smell in order to attract mildovers emit a foul and urinous smell in order to attract mildovers has been pollinated[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

(sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: GumYoung shoots - cooked[46, 61, 74]. Considered to be a delicacy in Siberia, the flavour is intermediate between purslane and spinach[2]. It is by no means a disagreeable vegetable[2].

tcanta Adhesive Gum SizeThe root contains about 30% gum (an arabinic acid derivative) and this makes a good quality glue[74]. The bulb is dried and powdered and then used for sizing cloth, bookbinding etc[114].

nrakta E. Asia - Siberia. ksacta Stony slopes and steppes[42].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. Sow stored seed in a greenhouse as soon as it is obtained. Germination is slow and could take 1 - 12 months at 15°c. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow on for their first winter in a greenhouse. Plant out into their permanent positions in late spring after the last expected frosts. Do not plant deeply in the soil, the crown of the plant should be slightly exposed[245]. Division after the plant dies down in late summer. Great care must be taken because the plants resent root disturbance[200]. Only divide the plants when it is really necessary, and no more frequently than once every 6 years, being careful not to break the brittle roots[245]. It is probably best to pot up the divisions and grow them on in the greenhouse until they are established.

nwatta Prefers a very well drained, very rich, light sandy loam in a warm sunny sheltered position[90, 200]. A covering of sharp sand helps the plant to survive wet winters. Plants can also be mulched overwinter with organic matter in the autumn in order to give them extra protection. but this mulch must be removed in the spring otherwise it might encourage the new growth to rot[200]. Some protection should be given to the young shoots in spring in areas subject to late frosts[200]. Keep plants dry in summer after they have flowered[90]. A very ornamental plant[1] and a good bee plant[74]. Plants resent root disturbance and so should be placed in their final positions as soon as possible[200]. This species, in part at least, is also known as E. caucasicus Stephen[50]. Tubers should be planted 15cm deep[1]. The edible young shoots are sold in local markets in Siberia[46]. Plants require some cold stratification in winter in order to flower well in the following summer[200]. Slugs are very attracted to this plant so some protection must be

#### 6.2.370 Phlomis tuberosa

Tuberous Jerusalem sage

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phlomis tuberosa is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[2, 105, 177, 183]. Rich in starch[74] but with a somewhat bitter flavour[K]

nrakta E. Europe to Siberia. ksacta Dry rocky ground amongst herbaceous vegetation[45, 50]. Wet grasslands and valleys at elevations of 1200 - 2100 metres in northern China[266].

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed germinates quickly, prick out the seedlings into individual pots when they are large enough to handle and grow them on for their first year in a greenhouse. Plant them out in early summer. Division of the tubers in spring or autumn[200]. Be careful not to damage the tubers[200]. If dividing in the autumn, it is best to store the tubers in a cool but frost-free place over the winter, planting them out in the spring. Spring divisions can be planted out straight away into their permanent positions.

nwatta Requires a well-drained soil in full sun with shelter from cold winds [200]. Hardy to at least -15°c[200], if the top growth is killed back by the cold the plants will usually regrow. Another report says that it is hardy to about -25°c but is totally deciduous in the winter [187].

# 6.2.371 Cardamine macrophylla

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine macrophylla is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - cooked[105, 177].

nrakta E. Asia - China, Himalayas, Siberia. ksacta Forests and streamsides, 2100 - 3600 metres from Pakistan to S.W. China, most common in the west of its range[51].

propta Seed - sow outdoors in a seedbed in a shady position in April. Plant out in autumn or spring. Division in the spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Succeeds in most soils[1]. Prefers a moist humus rich soil in shade or semi-shade[200]. Best grown in cool places by water[1]. A very ornamental plant[1], it is hardy to about -15°c[187].

## 6.2.372 Vaccinium melanocarpum

Georgia Blueberry

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium melanocarpum is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1,3,105,161]. The fruit is about 8 - 10mm in diameter[200].

nrakta South-eastern N. America - Virginia to Missouri and southwards. ksacta Dry woods, thickets and clearings[43].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. This species is closely related to V neglectum[11]. Dislikes root disturbance, plants

are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.373 Fuchsia magellanica

Fuchsia, Hardy fuchsia

5 tlin 7 cvuc 2 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fuchsia magellanica is a deciduous Shrub growing to 3.6 m (11ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime expo-

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. A juicy berry[K], it is not very palatable[105, 177].

tcanta Dye Hedge HedgeA black dye is obtained from the wood[46, 61]. Very resistant of maritime exposure and tolerant of trimming it makes a good informal hedge in mild maritime areas [29, 75, 166]. The variety 'Riccartonii' is commonly used[200]. The cultivar 'Prostrata' forms a carpet of growth and can be used as a ground cover when planted about 60cm apart each way[208].

dwatta Diuretic FebrifugeDiuretic, febrifuge[46].

nrakta S. America. - Peru and south to Tierra Del Fuego. Naturalized in S.W. England. ksacta Forest clearings and margins, especially in mixed evergreen/deciduous

propta Seed - best sown as soon as it is ripe[200] though it can also be sown in the spring[1]. Surface sow the seed in pots in a warm greenhouse and do not allow the compost to dry out[200]. Germination should take place in less than 6 weeks. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Inter-nodal cuttings of greenwood, 5 - 8cm long, May/June in a frame. Quick and easy, a high percentage take[78, K]. Overwinter in the greenhouse for the first year and plant out after the last expected frosts. Inter-nodal cuttings of half-ripe wood, July/August in a frame. Very quick and easy, treat as greenwood cuttings above[K]. Cuttings usually succeed at any time during the growing season[K].

nwatta Landscape Uses:Border, Container, Ground cover, Specimen. Succeeds in any fertile well-drained circum-neutral soil, preferring one that is rich in humus[1, 200]. Grows well in heavy clay soils. Prefers cool moist conditions and some shade[1, 15]. Succeeds in a good loam if leafmold and sand are added[1]. This species is very resistant to maritime exposure, it can be grown right on the coast[75, 166]. The top growth is hardy to about -10°c[184], this can be cut right back to the ground in severe winters but the plants usually recover well, growing away quickly in the late spring and flowering by late summer[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. The sub-species F. magellanica myrtifolia often bears a very large crop of fruit[K]. The cultivar 'Ricartonii' can be hardy fairly well north in Britain. A lovely specimen 3 metres tall was seen growing in dappled shade of trees in the Monastery Gardens in York[K]. A very ornamental plant, it is a parent of most of the hardy ornamental fuchsia varieties[1]. Plants seem to be immune to the predations of rabbits[233]. Plants are pollinated by humming birds in the wild, they are good bee plants in Britain[108]. Special Features: Extended bloom season in Zones 9A and above, Blooms are very showy.

# 6.2.374 Plantago media

5 tlin 9 cyuc 2 kcak 2 tcan 2 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Plantago media is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind, flies, beetles, bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers LeavesEdible Uses: Young leaves - raw or cooked[7]. The very young leaves have a fairly mild flavour but with a slight bitterness[K]. Used in salads before they become tough[7]. The inflorescence is sweet and is sucked by children[177, 183].

tcanta FungicideThe leaves are a cure for blight on fruit trees[14]. An important food plant for the caterpillars of many species of butterflies[30]. The flowers are sweetly scented[245]. Dynamic accumulator.

dwatta Astringent Demulcent Deobstruent Depurative Diuretic Expectorant Haemostatic Laxative Odontalgic Ophthalmic RefrigerantThe leaves, flowering stems and roots are somewhat astringent, deobstruent, depurative, diuretic, expectorant, haemostatic, refrigerant and vulnerary[4, 7]. They are applied externally to skin inflammations, malignant ulcers, cuts etc[4, 7]. A mouthwash made from the leaves helps to relieve toothache and a distilled water is a good eyewash[7]. The seeds are demulcent and laxative[4, 7]. Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238].

nrakta Southern Europe, including Britain, to temperate Asia. ksacta Fields, meadows and lawns[7]. A common weed of lawns and cultivated land, especially on dry or calcareous

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200]. Grows well in the spring meadow[24].

# 6.2.375 Dendranthema x grandiflo-

Chrysanthemum, Cut Mum, Garden Mum, Pot Mum, Florist's Chrysanthemum

5 tlin 10 cvuc 2 kcak 0 tcan 3 dwat 1.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Dendranthema x grandiflorum is a PERENNIAL growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaThe flower heads or petals[46, 116, 179] are parboiled and served as a salad with tofu and seasoned with vinegar or soya sauce[183]. They can also be prepared as tempura, pickled, dried or added to soups[183]. The petals contain about 1.9% protein, 0.9% fat, 5.3% carbohydrate, 0.7% ash[179]. Leaves - cooked[46, 105, 179]. Used as fritters, they are aromatic[183]. Some varieties have been selected for their low bitterness[116]. An aromatic tea is made from the leaves[183]. A tangy aromatic tea is made from the flowers or flower petals[179]. For a sweeter tea only the petals are used[183].

tcanta PollutionPlants have been grown indoors in pots in order to help remove toxins from the atmosphere. It is especially good at removing chemical vapours, especially formaldehyde, benzene and ammonia[259].

wheat flour it adds a richness to biscuits etc[183]. The protein content of this grain is said to rival that of red beans or salmon[183]. (This report seems somewhat surprising, protein levels are not usually anywhere near that high in a ce-

tcanta Fibre Soil stabilization WeavingThe leaves are used for making mats, rope, paper etc[46, 61]. The plants have a very extensive root system and so they are often planted near the coast in order to stabilize sand dunes[190, 200]. They can also be used as a ground cover for sandy open spaces but can be invasive[200, 208].

nrakta Europe, including Britain, from Scandanavia south and east to Spain and Siberia. N. America. ksacta Dunes by the coast, often in association with Ammophila arenaria[17]

propta Seed - sow mid spring in situ and only just cover the seed[162]. Germination should take place within 2 weeks. If the supply of seed is limited, it can also be sown in mid spring in a cold frame. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in summer[K] Division in spring or summer[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Staple Crop: Balanced carb Wild-collected as FoodAn easily grown plant, it succeeds in most soils, preferring a sandy soil[1] and a sunny position[162]. Established plants are very drought tolerant[190]. A very invasive plant, spreading by means of its wide-ranging roots[1, 187]. Cultivated in Japan for making mats etc[46, 61]. The Viking settlers of Iceland cultivated this plant until the beginning of the 20th century for its edible seed[183].

#### 6.2.386 Cardaria draba

Hoary Cress, Whitetop

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardaria draba is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: CondimentYoung leaves and shoots - raw in salads or cooked as a potherb[2, 61, 105, 183]. A report says that the young leaves contain the toxin hydrogen cyanide, though does not give any more details[240]. In small quantities this substance is fairly harmless, and has even been recommended as having health benefits, but caution is suggested if you eat these leaves[K]. The pungent leaves are used as a seasoning[183]. The seed is used as a condiment, it is a pepper substitute[2, 17, 61, 74,

dwatta Antiscorbutic CarminativeThe plant is antiscorbutic[240]. The seeds have been used as a cure for flatulence and fish poison[240]. It is assumed that this report is referring to food poisoning caused by eating suspect fish[K].

nrakta Europe - Mediterranean to W. Asia. Naturalized in Britain[17], ksacta A weed of arable fields, it is spreading rapidly in Britain[17].

propta Seed - sow in situ in spring. There is very little need to encourage this plant, it is a rapidly spreading weed in Britain. Division in spring.

nwatta Succeeds in a sunny position in most soils.

#### 6.2.387 Asphodelus albus

Asphodel, Gamón-blanco

5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Asphodelus albus is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiflower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista The root is poisonous[7].

kcakta Edible Parts: RootEdible Uses: The root was at one time eaten as a food but, since it contains the alkaloid asphodeline, this is not really very advisable[7]

tcanta AlcoholAn alcohol can be obtained from the fermented roots[7].

dwatta Antidermatosic Detergent Emollient Vulnerary-The tubers are antidermatosic, detergent, emollient and vulnerary[7]. They are mainly used externally in the treatment of skin conditions and for lightening freckles[7]. They have also been employed internally as a cough remedy[7]. The tubers are harvested in the spring and dried for later use[7]. Use internally with caution, especially if you are suffering from nephritis or gastritis[7].

nrakta S. Europe. ksacta Ploughed fields, rough ground[7], dry hills and mountain meadows[45, 50].

propta Seed - sow March/April in a greenhouse and only just cover the seed. Germination usually takes place in 1 - 3 months at 15°c[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. When the plants are large enough to handle, plant them out into their permanent positions in late spring or early summer. Division in early spring or autumn[111].

nwatta Succeeds in ordinary garden soil, tolerating partial shade[200]. Requires a well-drained soil and a sheltered position[42]. Prefers a deep rich sandy loamy soil[1, 111]. Prefers a soil that is not too rich and a sunny position[200]. Grows well on hot dry banks and in thin grass[42, 200]. Established plants are drought tolerant[190]. Plants are hardy to about -15°c[187]. Plants seem to be immune to the predations of rabbits[233].

# 6.2.388 Sorbus sambucifolia

Siberian mountain ash

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus sambucifolia is a deciduous Shrub. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161]. Sweet tasting[11].

nrakta E. Asia - Japan. ksacta High mountains, C. and N. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible

ness. It is hardy to UK zone 6 and is not frost tender. It is in

frosts. If you have sufficient seed, it might be worthwhile trying an outdoor sowing in a seed bed in early spring. Grow the plants on in the seedbed for their first year and plant them out the following spring. Division in March or October. Use a sharp spade or knife to divide the rootstock, making sure that each section has at least one growth bud. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta An easily grown plant, succeeding in most soils[1], though preferring a moisture retentive soil in full sun or partial shade[200]. We have found the plants to be very tolerant of drought[K]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. The young growth in spring can be damaged by late frosts. There is sme disagreement over the correct name for this species with some authorities saying that it is no more than a synonym for P. acinosa[266], whilst others give it specific status[200]. There are reports that there is a white flowered plant, which could either be this species or a form of P. acinosa which is said to be non-toxic and to have an edible root[K]. See P. acinosa for more details. Plants seem to be immune to the predations of rabbits[233].

#### 6.2.384 Lavandula x intermedia

Lavender, Lavandin 5 tlin 9 cyuc 2 kcak 5 tcan 2 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Lavandula x intermedia is an evergreen Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Edible Uses: Condiment TeaThe following uses are for L. angustifolia, they should also apply to this hybrid:- Leaves, petals and flowering tips - raw. Used as a condiment in salads, soups, stews etc[2, 15, 183]. They provide a very aromatic flavour[7] and are too strong to be used in any quantity[K]. The fresh or dried flowers are used as a tea[183]. The fresh flowers are also crystallized or added to jams, ice-creams, vinegars etc as a flavouring[238]. An essential oil from the flowers is used as a food flavouring[183].

tcanta Companion Essential Hedge Hedge Incense Potpourri Repellent The following uses are for the closely related L. angustifolia, they should also apply to this hybrid:- The essential oil that is obtained from the flowers is exquisitely scented and has a very wide range of applications, both in the home and commercially. It is commonly used in soan making, in making high quality perfumes (it is also used in 'Eau de Cologne'), it is also used as a detergent and cleaning agent, a food flavouring etc[21, 46, 57, 171, 238] and as an insect repellent[201]. Yields of 0.8 - 1% of the oil are obtained[7]. When growing the plant for its essential oil content it is best to harvest the flowering stems as soon as the flowers have faded[245]. The aromatic leaves and flowers are used in pot-pourri[238] and as an insect repellent in the linen cupboard etc[14, 18, 20]. They are also said to repel mice[20]. The flowering stems, once the flowers have been removed for use in pot-pourri etc, can be tied in small bundles and burnt as incense sticks[245]. Can be grown as a low hedge, responding well to trimming[29].

dwatta Antihalitosis Antiseptic Antispasmodic Aromatherapy Aromatic Carminative Cholagogue Diuretic Nervine Sedative Stimulant Stomachic TonicThe following uses are for L. angustifolia, they should also apply to this hybrid:- Lavender is a commonly used household herbal remedy. An essential oil obtained from the flowers is antihalitosis, antiseptic, antispasmodic, aromatic, carminative,

cholagogue, diuretic, nervine, sedative, stimulant, stomachic and tonic[4, 7, 9, 21, 165, 238]. It is not often used internally, though it is a useful carminative and nervine[4]. It is mainly used externally where it is an excellent restorative and tonic - when rubbed into the temples, for example, it can cure a nervous headache, and it is a delightful addition to the bath-water[4]. Its antiseptic properties also make it useful in the treatment of burns, sunburn, scalds, bites, vaginal discharge, anal fissure etc, where it also soothes the affected part of the body and can prevent the formation of permanent scar tissue[4, 238]. The essential oil is used in aromatherapy. Its keyword is 'Immune system'[210].

nrakta A hybrid species of garden origin, L. angustifolia  $x \ L$ . latifolia. ksacta Not known in the wild,

propta Seed - sow spring in a greenhouse and only just cover the seed[4]. It usually germinates in 1 - 3 months at 15°c. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in late spring after the last expected frosts. This species is a hybrid and will not come true from seed. Cuttings of half-ripe wood 7 - 10cm with a heel, July/August in a frame. Usually very east, a high percentage will root within a few weeks[78]. Grow them on in the greenhouse for their first winter and plant them out in late spring after the last expected frosts. Cuttings 7cm with a heel succeed at almost any time of the year[1]. Layering.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Massing, Rock garden, Seashore, Specimen. Succeeds in almost any soil so long as it is welldrained and not too acid[1, 200]. Prefers a sunny position in a neutral to alkaline soil[1, 4, 14]. Prefers a light warm dry soil[37]. When grown in rich soils the plants tend to produce more leaves but less essential oils[4]. Established plants are drought tolerant[190]. Very tolerant of salt wind exposure[K]. When growing for maximum essential oil content, the plant must be given a very warm sunny position and will do best in a light sandy soil, the fragrance being especially pronounced in a chalky soil[245]. Plants are hardy to between -10 and -15°c[184]. Lavender is a very ornamental plant that is often grown in the herb garden and is also grown commercially for its essential oil[1, 4]. This species is a very variable hybrid between the two main species of lavender, L. angustifolia and L. latifolia[200], There are several named varieties[200, 238]. Not a very long-lived plant, it can be trimmed to keep it tidy but is probably best replaced every 10 years [200]. Any trimming is best done in spring and should not be done in the autumn since this can encourage new growth that will not be very cold-hardy[200]. A good bee plant, also attracting butterflies and moths[7, 24, 30]. Lavender makes a good companion for most plants[54], growing especially well with cabbages[14]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above, Fragrant flowers, Attractive flowers or blooms.

#### 6.2.385 Leymus arenarius

Lyme Grass, Sand ryegrass 5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicii hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Leymus arenarius is a PERENNIAL growing to 1.2 m (4ft) by 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable phr: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked[2, 105]. It can be ground into a flour and used to make bread[13]. A delicious taste[183] but very fiddly to use, the seed is small and hard to extract[K]. When cooked like rice, it can be used as a sweet or savoury dish. Mixed 50/50 with

dwatta Antibacterial Antifungal Carminative Depurative Diaphoretic Febrifuge Ophthalmic Refrigerant SedativeChrysanthemum flowers, known in China as Ju Hua, are a bitter aromatic herb that has been used for thousands of years in Chinese medicine[238, 254]. The flower heads are drunk as a refreshing tisane and are used to improve vision, soothe sore eyes, relieve headaches, counter infections etc[254]. They are antibacterial, antifungal, anti-inflammatory, carminative, depurative, diaphoretic, febrifuge, ophthalmic, refrigerant and sedative[116, 147, 176, 218, 238]. Taken internally they dilate the coronary artery, thus increasing the flow of blood to the heart, and so are used in the treatment of hypertension, coronary heart diseases and angina[238]. The flowers are harvested when fully open in the autumn and are dried for later use[238]. In China they are steamed before being dried to make them less bitter[238]. The leaf juice is smeared onto wounds[218].

nrakta A hybrid of garden origin. ksacta Not known in a truly wild situation.

propta Seed - sow spring to early summer in a greenhouse and only just cover the seed. It usually germinates in 10 - 18 days at 15°c but if it does not germinate within 4 weeks then try chilling the seed for 3 weeks in the salad compartment of a fridge[164]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. This is a hybrid species and so will not breed true from seed. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Foundation. Massing, Specimen. Succeeds in most well-drained fertile soils in a sunny position[1, 200]. This species is not fully hardy in Britain, many of its cultivars requiring greenhouse protection in the colder areas of the country[1]. The chrysanthemum is widely cultivated as an ornamental flowering plant[200], there are many named varieties. It is also occasionally grown in the Orient for its edible leaves, a number of cultivars have been developed with leaves that are low in bitterness[116]. It has been proposed (1999) to restore this species to Chrysanthemum as C. x morifolium Ramat. since the plant is so widely known under this name. Special Features: Attractive foliage, Fragrant foliage, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers. Attractive flowers or blooms. Seldomly reblooms

# 6.2.376 Cornus macrophylla

Large-Leaf Dogwood

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasilutnyikfrip hpa7tli flatprikl-

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl wis hpa7tmwatli xre7t hjonli

drutta Cornus macrophylla is a deciduous Tree growing to 15 m (49ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 146, 158, 200, 218]. The fruit is about 6mm in diameter[200].

tcanta Charcoal WoodWood - hard, close grained, warps badly[158]. It makes a good charcoal[146, 158].

dwatta Anodyne Astringent Dysentery TonicAnodyne, astringent, tonic[178]. The wood is anodyne and a uterosedative[218]. The stem bark is used in the treatment of dysentery[218].

nrakta E. Asia - China, Japan, Himalayas. ksacta Woodlands, 1200 - 1800 metres in W. China[109]. Slopes, by streams, dense forests, mixed woods and margins of woods from sea level to 3600 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed

should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. A very ornamental tree[1]. There is some confusion between this species and C. controversa[11]. Plants usually fruit heavily in Britain[11]. The flowers have a soft sweet perfume[245]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.377 Ephedra americana andina

5 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 1.8 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ephedra americana andina is an evergreen Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[11, 177]. A sweet flavour, but fairly boring[K]. The fruit is about 8 mm in diameter[200].

tcanta Plants can be used for ground cover, spaced about 60cm apart each way[208].

dwatta Depurative DiureticThe stems are depurative and diuretic[46]. The stems of most members of this genus contain the alkaloid ephedrine and are valuable in the treatment of asthma and many other complaints of the respiratory system[K]. The whole plant can be used at much lower concentrations than the isolated constituents - unlike using the isolated ephedrine, using the whole plant rarely gives rise to side-effects[254]. Ephedra does not cure asthma but in many cases it is very effective in treating the symptoms and thus making life somewhat easier for the sufferer. The stems can be used fresh or dried and are usually made into a tea, though they can also be eaten raw[K]. The young stems are best if eating them raw, though older stems can be used if a tea is made[K]. The stems can be harvested at any time of the year and are dried for later use[238].

nrakta S. America - Andes from Ecuador to S. Chile and Argentina. ksacta Stony slopes and gravel terraces[200].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[200]. It can also be sown in spring in a greenhouse in a sandy compost[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse. Plant out in the spring or early summer after the last expected frosts and give some protection in their first winter[K]. Division in spring or autumn[238]. Layering.

nwatta Requires a well-drained loamy soil and a sunny position[11]. Established plants are drought resistant and are also lime tolerant[200]. One report says that this species is frost-tender[200], but this is not our experience[K]. It succeeds outdoors at Cambridge Botanical Gardens and we have been growing it outdoors successfully since 1988[K]. Plants do not flower profusely or regularly in Britain[11]. Our plants have been producing reasonable crops since 1991[K]. Dioecious. Male and female plants must be grown if seed is required.

#### 6.2.378 Ouercus mongolica

Mongolian oak

5tlin8cyuc2kcak0tcan2dwat m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus mongolica is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK Zone 3 and is not frost tender. It is in flower from May to June, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[63, 105]. The seed is about 2cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Charcoal Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood. Used for construction and charcoal[46, 61].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan. ksacta Woods in the cooler areas of Japan[58]. Mixed mesophytic forests at elevations of 200 - 2500 metres in northern and eastern China[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The seed ripens in its first year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Inconspicuous flowers or blooms.

#### 6.2.379 Rosa centifolia

Provence Rose, Cabbage rose 5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Rosa centifolia is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit SeedEdible Uses: TeaFruit - raw or cooked. A pulpy flesh[11]. It is best after it has been softened and sweetened by frost. There is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102]. The blossoms are used for scenting tea[2, 46, 177, 183]. The petals are preserved in sugar and used as a delicacy[183]. They can also be added to fruit pies as a flavouring[183].

tcanta Essential Pot-pourriAn essential oil is obtained from the flowers, it is used in perfumery[57, 61, 171]. The dried petals are used in pot-pourri[4].

dwatta Aromatherapy Astringent Cancer LaxativeThe root is astringent[240]. The petals are laxative[240]. A syrup made from the petals is used to treat constipation in infants[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The essential oil is used in aromatherapy. Its keyword is 'Cleansing' [210].

nrakta A garden hybrid of uncertain origin. ksacta Not known in a truly wild situation.

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate [80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. A very ornamental plant[1], there are many named forms developed for their ornamental value[245]. The flowers are fragrant[245]. The Provence rose is often cultivated for its essential oil in southern France and Morocco[4, 61]. It is closely related to R. damascena and R. gallica[11]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlie planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Plants produce a few suckers[200]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

# 6.2.380 Phalaris canariensis

Canary Grass, Annual canarygrass 5 tlin 9 cyuc 2 koak 0 tcan 0 dwat 1 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phalaris canariensis is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from May to October, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Seed -cooked. Widely grown as a food for caged birds, the seed is rather small but can also be used as a cereal for making porridge etc[2]. It can be ground into a flour and used for making cakes, puddings etc[2, 22, 46, 61, 74, 115]. Leaves -cooked[106]. The young plant is used[177].

nrakta Europe - Mediterranean. ksacta Dry open habitats[50]. A casual of waste places in Britain[17].

propta Seed - sow spring in situ[162].

nwatta An easily grown plant, succeeding in an ordinary garden soil[1]. It is tolerant of most conditions, dry or wet[200]. Cultivated for its seed which is commonly used in wild bird food mixes[1].

# 6.2.381 Berberis sikkimensis

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis sikkimensis is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. A fairly acid flavour, it is acceptable raw in small quantities, and children seem to like it. Generally, though, most people will prefer to cook it[K].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Sikkim. ksacta Found at elevations of 2,100 - 4,200 metres in the Himalayas.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late

autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. This species is closely related to B. chitria[11]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

# 6.2.382 Gavlussacia ursina

Bear Huckleberry

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Gaylussacia ursina is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 61, 183, 257]. Insipid[11].

nrakta South-eastern N. America. ksacta Wooded slopes and summits, often in acid humus[72].

propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 1 month warm stratification followed by 2 months cold[113]. When large enough to handle, prick the seedlings out into individual pots of limefree compost and grow them on in light shade in a greenhouse or cold frame for at least their first winter. Plant out into their permanent positions in late spring or early summer when they are at least 15cm tall. Cuttings of half-ripe wood, July/August in a frame[200]. Layering. Division in spring.

nwatta Requires a lime-free moist peaty soil, thriving in sun or part shade[11, 182].

# 6.2.383 Phytolacca esculenta

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phytolacca esculenta is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves are poisonous[147]. They are said to be alright to eat when young, the toxins developing as they grow older.

kcakta Edible Parts: Leaves RootEdible Uses: Leavesthey must be cooked and are used as a spinach[1, 58, 105, 174, 183]. Only the young leaves should be used since they become toxic with age. Root - cooked[105, 183].

tcanta InkA red ink is obtained from the fruit[57].

dwatta Abortifacient Antiasthmatic Antibacterial Antiurgal Antiinflammatory Antiphlogistic Antitussive Diructic Expectorant Hypotensive PurgativeThe roots contain saponins[279]. They are abortifacient, antiasthmatic, antibacterial, antifungal, antiinflammatory, antiphlogistic, antitussive, diuretic, expectorant, hypotensive and purgative[147, 174, 176, 279]. A decoction is used in the treatment of oedema, beri-beri, lumbago, rheumatism, abdominal distension and numbness of the throat[147, 176, 279]. Use with caution, see the notes above on toxicity[176].

nrakta E. Asia - China. ksacta Valleys, hillsides, forest understories, forest margins and roadsides at elevations of 500 - 3400 metres[266]. It is also found in cultivated land houses, moist fertile lands and as a weed[266].

propta Seed - sow autumn or spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected

into individual pots as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse. Plant out in the spring or early summer after the last expected frosts and give some protection in their first winter[K]. Division in spring or autumn[238]. Layering.

nwatta Requires a well-drained loamy soil and a sunny position[11]. Established plants are drought resistant and are also lime tolerant[146]. Dioecious. Male and female plants must be grown if seed is required. Some forms are monoecious[11].

#### 6.2.546 Spiraea alba

White Meadowsweet

5tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1.5 m h<br/>kuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Spiraea alba is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaAn infusion of the leaves tastes like China tea[207].

dwatta TonicAn infusion of the leaves is esteemed as a restorative tonic[207].

nrakta North-eastern N. America - Ontario to New York, North Carolina, Saskatchewan, Indiana and Missouri. ksacta Moist meadows, marshes, moist open low woodlands, often in sandy soils[228].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. This species is closely related to S. salicifolia and is often treated as no more than a variety of it[11]. Hybridizes freely with other members of this genus[11].

# 6.2.547 Iris pseudacorus

Yellow Flag, Paleyellow iris

5 tlin 8 cyuc 1 kcak 2 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Iris pseudacorus is a PERENNIAL growing to 1.5 m (5ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, hoverflies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water. The plant can tolerates strong winds but not maritime exposure.

pcista The leaves, and especially the rhizomes, of this species contain an irritating resinous substance called irisin. If ingested this can cause severe gastric disturbances[274]. Plants can cause skin irritations and allergies in some peo-

kcakta Edible Parts: Edible Uses: CoffeeThe seed is said to make an excellent coffee substitute as long as it is well roasted[2, 7, 61, 105, 115, 244]. Caution is advised, it might be poisonous[177].

tcanta Dye Essential Ink TanninA beautiful yellow dye is obtained from the flowers[4]. A good black dye is obtained from the root if it is mixed with iron sulphate[4, 115]. It is brown otherwise[141]. The root is a source of tannin[61] and has been used in making ink[4]. A delicately scented essential oil, obtained from the roots, has been used to adulterate the oil of Acorus calamus[245].

dwatta Astringent Cathartic Emetic Emmenagogue OdontalgicThe fresh root is astringent, cathartic, emetic, emenagogue and odontalgic[4, 7, 61]. A slice of the root held against an aching tooth is said to bring immediate relief[244]. It was at one time widely used as a powerful cathartic but is seldom used nowadays because of its extremely acrid nature[4]. It can also cause violent vomiting and diarrhoea[244]. When dried the root loses its acridity and then only acts as an astringent[4].

nrakta Europe, including Britain, from Norway south and east to N. Africa the Caucasus and W. Asia. ksacta Damp marshy areas, swampy woods and in shallow water or wet ground on the edges of rivers and ditches[17]. Often found in shady places[4].

propta Seed - best sown as soon as it is ripe in a cold frame[4]. Stored seed should be sown as early in the year as possible in a cold frame. A period of cold stratification improves germination time and rates. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division in March or October. Early autumn is best[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Container, Specimen, Prefers a humus rich soil[79]. Succeeds in water up to 15cm deep[24]. Requires a moist soil, especially in early summer. Prefers a position in semi-shade[188]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. A delicately scented essential oil is obtained from the dried roots[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Some named forms have been selected for their ornamental value[187]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their

#### 6.2.548 Salix hookeriana

Dune Willow

5 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 1 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikhsom hpa7tmwatli nyanhjen hjonli

drutta Salix hookeriana is a deciduous Shrub growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen in June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils and can grow in saline soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172]. The leaves have been used as a flavouring in cooked foods[257].

tcanta Basketry Fibre Hair Miscellany WoodStems are very flexible and are used in basket making[61, 118]. Tolerates maritime exposure[11, 200]. The plant is usually cop-

# **6.2.436** Bidens tripartita

Burr Marigold, Threelobe beggarticks 5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bidens tripartita is a ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, hover-flies. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves -cooked[105, 177, 183].

tcanta Dye RepellentYields a black dye[178]. The part of the plant that is used is not specified. The burning herb repels insects and flies[268]. The flowers yield a yellow dye of indifferent quality when alum is used as a mordant[4, 115, 268].

dwatta Antiseptic Aperient Astringent Diuretic Emmenagogue Febrifuge Narcotic Sedative StypticBurr marigold is little used as a medicine nowadays, but it was once esteemed for its styptic properties being used to quickly staunch blood flow - it was often used to treat uterine haemorrhage and conditions producing blood in the urine[254]. The whole plant is antiseptic, aperient, astringent, diuretic, emmenagogue, febrifuge, narcotic, sedative, styptic and sudorific[4, 61, 165, 218]. It is an excellent remedy for ruptured blood vessels and bleeding of any kind, and is of benefit to people with consumption[4]. It is used internally to treat bladder and kidney problems, blood in the urine, uterine bleeding, ulcerative colitis and peptic ulcers[238, 254]. Externally, it is used in the treatment of alopecia[238]. It is usually combined with a carminative herb such as ginger when used to treat digestive tract ailments[254]. The plant is harvested as it comes into flower and is dried for later use[238].

nrakta Most of Europe, including Britain, north to 63°, east to W. Asia. ksacta Ditches, pond and lake margins, sides of streams etc[17].

propta Seed - sow in situ during early spring and only just cover the seed. So long as the soil does not dry out, the seed usually germinates in 2 - 3 weeks at 15°c[134].

nwatta Succeeds in any moderately fertile damp to wet soil in full sun[200, 238]. The flowering heads smell like rosin or cedar when they are burnt[4]. The seed coats have reflexed prickles which allow them to adhere to clothing, animal fur etc[4]. When growing on the edge a pond, these seeds have been known to kill goldfish by adhering to their gills[4].

#### 6.2.437 Samolus valerandi

Brookweed, Seaside brookweed 5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Samolus valerandi is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked[46, 61]. A rather bitter flavour[K].

dwatta AntiscorbuticThe leaves are antiscorbutic[46,

nrakta Most regions of the world, including Britain, usually near the sea. ksacta Wet places, especially near the sea[17], also in shallow water, avoiding acid soils and shade[56].

propta Seed - surface sow in a cold frame in the spring, standing the pot in about 3cm of water. Prick out the seedlings when they are large enough to handle and gradually increase the depth of water as the plants grow until it is level with the tops of the pots. Plant out in the summer if

there has been sufficient growth, otherwise plant out in late spring of the following year. Division in spring.

nwatta Succeeds in ordinary garden soil in a wet position or in shallow water[1, 200]. Dislikes shade or acid soils.

#### 6.2.438 Berberis ulcina

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis ulcina is a SHRUB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in lower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[272] tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer Dysentery Ophthalmic StomachicBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - northern India, Nepal and Tibet. ksacta Open windy slopes at elevations of 2500 - 3500 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants can be pruned back quite severely, they resprout well from the base[200]. Hybridizes freely with other members of this genus[1].

#### 6.2.439 Adenophora nikoensis

5tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Adenophora nikoensis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root -cooked[105, 177]. Best if boiled in two lots of water, it then makes excellent eating[179]. Leaves and young shoots -cooked[105, 177, 179].

nrakta E. Asia - northern to central Japan, ksacta Alpine regions, in sandy and stony situations in full sun[58, 200]. Rocky slopes and pebbly grasslands of subalpine to alpine regions at elevations of 1500 - 3000 metres[275].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. The seed can also be sown in spring. Surface sow 2 - 3 seeds per pot in the spring in order to avoid transplanting[133]. We have found that if transplanted when very small seedlings grow away without difficulty[K]. Germinates in 1 - 3 months at 10°c[133]. Plant out into their permanent positions whilst young. Basal cuttings in spring[K]. Division in spring - very difficult because the plant dislikes root disturbance[1]..

nwatta Prefers a light rich slightly alkaline soil that is not too dry, and a warm sunny position[1, 200]. Plants are intolerant of root disturbance[1]. A polymorphic species[58]. Adenophora nikoensis is sometimes separated into two different species, in which the plant with calvx lobes serrate is named A. nipponica and that with entire ones as A. nikoensis. These two forms, however, are often observed in the same place and cannot really be separated[275]. The young growth is extremely attractive to slugs, they have been known to destroy even mature plants[K].

#### 6.2.440 Epimedium sagittatum

5 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 0.5 m hkuc hmim cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli dvatxre7t hionli

drutta Epimedium sagittatum is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to LIK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland). It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant and young leaves - cooked[105]. Soaked and then boiled[177]. (This suggests that the leaves are bitter and need to be soaked in order to remove the bitterness.)

tcanta A good ground cover plant[200].

dwatta Antirheumatic Aphrodisiac Carminative Expectorant Infertility Kidney Ophthalmic Tonic VasodilatorThe whole plant is antirheumatic, aphrodisiac, carminative, expectorant, ophthalmic and vasodilator. Used as a kidney tonic, it also treats sterility and barrenness[147, 178, 238]. It is taken internally in the treatment of asthma, bronchitis, cold or numb extremities, arthritis, lumbago, impotence, involuntary and premature ejaculation, high blood pressure and absentmindedness[238]. It should be used with some caution since in excess it can cause vomiting, dizziness, thirst and nosebleeds[238]. The plant is harvested in the growing season and dried for later use[238].

nrakta E. Asia - China. ksacta Hillsides in damp shady bamboo groves or in cliff crevices[147]. Moist woodlands[238]

propta Seed - best sown in a cold frame as soon as it is ripe in late summer[200, 280]. Sow stored seed as early as possible in the year in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the cold frame or greenhouse for at least their first winter[K]. Plant them out in mid to late summer[K]. Division in July/August according to one report, in late spring according to another[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Cuttings in late summer[200].

nwatta Succeeds in any fertile humus-rich soil[200], preferring a moist but well-drained peaty loam[1, 280]. Grows best in the light dappled shade of a woodland[200, 280]. Plants can succeed in the dry shade of trees[233]. A shallowrooting plant, the rhizomes creeping just below the soil and the finer roots occupying the top 30cm of the soil[280]. Although the plants are hardy to at least -15°c, the young growth in spring can be killed by frosts[238]. Grows well in the rock garden or wild garden[1]. Plants are self-sterile and so more than one clone is required for cross-fertilization in

order for seed to be produced. Plants will often hybridise with other species growing nearby[280]. Cultivated as a medicinal plant in Japan[58]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

#### 6.2.441 Asarum shuttleworthii

Asarabacca, Mottled Wild Ginger 5 tlin 9 cvuc 2 kcak 2 tcan 0 dwat 0.1 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Asarum shuttleworthii is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH- mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been found for this plant, at least 3 other members of this genus have reports that the leaves are toxic[7, 19]. Some caution is therefore advised in the use of this plant.

kcakta Edible Parts: Edible Uses: CondimentThe following note is for the related A. caudatum, it quite possibly also applies to this species[K]. The root can be used as a ginger substitute[183]. The root has a pungent, aromatic smell like mild pepper and ginger mixed, but more strongly aromatic[245]. It can be harvested all year round, but is best in the autumn[K]. It can also be dried for later use[K]. Leaves are a tea substitute[177, 183].

tcanta A useful ground-cover plant for shady positions so long as the soil is not dry[197], spreading by its roots[208].

nrakta South-eastern N. America - West Virginia to Alabama. ksacta Rich mountain woods[235]. Acidic soils, often along creeks beneath Rhododendron maximum, deciduous or mixed deciduous-conifer forests at elevations of 400 -

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Landscape Uses:Border, Ground cover, Rock garden, Woodland garden. Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Plants are hardy to at least -15°c[200]. The flowers are malodorous and are pollinated by flies[200]. Plants often self-sow when growing in a suitable position[200]. Special Features: Attractive foliage, North American native, Fragrant foliage, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

#### 6.2.442 Lamium album

5 tlin 9 cyuc 2 kcak 3 tcan 3 dwat 0.6 m hkuc

skin reactions and severe inflammation, especially on contact about 5cm tall, prick the seedlings out into individual pots with eyes or open cuts. The toxicity can remain high even in dried plant material[200]. Prolonged and regular contact with the sap is inadvisable because of its carcinogenic nature[214]. The seed is also poisonous[76].

kcakta Edible Parts: Oil SeedEdible Uses: OilThe seed has been used as a substitute for capers. It is very acrid and requires long steeping in salt and water, and afterwards in vinegar[2]. Great caution is advised, see the notes above on toxicity

tcanta Biomass Latex Oil RepellentA fine clear oil is obtained from the seed[4, 74]. Yields of 42% have been obtained[240]. The oil rapidly goes rancid and acquires a dangerous acrimony[4]. It is a violent poison, producing violent purging and irritation to the intestines[4]. It can be used medicinally when fresh[4]. A latex in the leaves can be converted into vehicle fuel[160]. Reports suggest potential yields of fuel ranging from 5 to 125 barrels per hectare[218]. The growing plant is said to repel mice and moles, this is said to be most effective in its second year of growth though lots of reports cast doubt on this ability[18, 21, 54, 160]. Dynamic accumulator.

dwatta Abortifacient Antiseptic Cancer Diuretic Emetic Purgative WartsCaper spurge was used in the past as a violent purgative, whilst the rubefacient action of the leaves was employed by beggars to raise unsightly sores on their skins to elicit pity and thereby obtain more money[254]. All parts of the plant are emetic and purgative[4, 7, 21] and the plant is nowadays considered to be far too toxic for it to be used medicinally [238]. The latex in the stems has been used externally as a depilatory and to remove corns, but it is too irritant to be used safely [7, 254]. The seed is diuretic, parasiticide and purgative[176, 218]. It has been used in the treatment of dropsy, oedema, tumours, amenorrhoea, schistosomiasis, scabies and snake bites[176, 240]. The fresh seed has an antitumor action, effective against acute lymphocytic and granulocytic leukaemia[176]. The plant has anticancer activity[218]. It is also antiseptic, cathartic, emetic and purgative[218]. Use the plant with caution[4, 7, 21]. One seed capsule is said to cause catharsis, several to cause an abortion[207].

nrakta Europe. Possibly native to Britain but more common as a garden escape, ksacta Woods, avoiding acid soils[17].

propta Seed - sow spring in situ. Germination usually takes place within 2 - 3 weeks at 20°c.

nwatta Prefers a light well-drained soil in an open position[200]. Prefers a dry soil but grows almost anywhere[1]. Often self-sows freely[1, 17]. Formerly cultivated for its fruit[17] - for the oil contained in the fruit according to another report[74]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. This genus has been singled out as a potential source of latex (for making rubber) for the temperate zone, though no individual species has been singled out[141].

#### 6.2.544 Vaccinium hirtum

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Vaccinium hirtum is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is about 7mm in diameter[200].

nrakta E. Asia - China, Japan, Korea, Russia and N. America, ksacta Thickets and pine woods in hills and at low elevations in mountains all over Japan[58]. Rocky places at mountain summits in China[266]

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame [78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

# 6.2.545 Ephedra intermedia

Zhong Ma Huang

5 tlin 9 cyuc 1 kcak 0 tcan 4 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ephedra intermedia is an evergreen Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is about 7mm in diameter[200].

dwatta Antiasthmatic Antidote Antihydrotic Diaphoretic Diuretic Vasoconstrictor VasodilatorMembers of this genus contain various medicinally active alkaloids (but notably ephedrine) and they are widely used in preparations for the treatment of asthma and catarrh[238]. Ephedrine has a similar effect to adrenaline in the body[176]. It acts promptly to reduce swellings of the mucous membranes and has antispasmodic properties, thus making it valuable in the treatment of asthma[4]. This species contains between 0.7 and 2.33% alkaloids, of which 10% is ephedrine[240]. The whole plant can be used at much lower concentrations than the isolated constituents - unlike using the isolated ephedrine, using the whole plant rarely gives rise to side-effects[254]. The plant also has antiviral effects, particularly against influenza[238]. The stems are a pungent, bitter, warm herb that dilates the bronchial vessels whilst stimulating the heart and central nervous system[238]. The stems are also antidote, diaphoretic. diuretic, vasoconstrictor and vasodilator[176, 238]. They are used internally in the treatment of asthma, hay fever and allergic complaints[238]. They are also combined with a number of other herbs and used in treating a wide range of complaints238]. This herb should be used with great caution, preferably under the supervision of a qualified practitioner[238]. It should not be prescribed to patients who are taking monoamine oxidase inhibitors, or suffering from high blood pressure, hyperthyroidism or glaucoma[238]. Ephedrine is seen as a performance-boosting herb and, as such, is a forbidden substance in many sporting events such as athletics[K]. The stems can be harvested at any time of the year and are dried for later use[238]. The root is antihydrotic, it lowers blood pressure and dilates the peripheral blood vessels[176]. It is used in the treatment of night sweating and spontaneous sweating[176]. nrakta W. Asia - Iran. Turkestan, to the Himalayas and

China. ksacta Gritty mountain slopes at low elevations[74]. Grasslands, deserts, river valleys, floodlands, sandy beaches. cliffs, other dry, sandy or rocky places, 100 - 4600 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[200]. It can also be sown in spring in a greenhouse in a sandy compost[K]. Prick out the seedlings

seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. This species is closely related to V. corymbosum[182] and to V. amoenum[1]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.541 Salix arenaria

5 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 1 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix arenaria is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark -raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172].

tcanta Soil stabilizationThe plant has a spreading root system and is an effective soil binder on sand dunes[200]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta W. Europe. ksacta Not known

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

# 6.2.542 Dryopteris crassirhizoma

Crown Wood-Fern 5 tlin 9 cyuc 1 kcak 0 tcan 4 dwat 1 m hkuc hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hionli drutta Dryopteris crassirhizoma is a FERN growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caution is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised.

kcakta Edible Parts: LeavesEdible Uses: Young fronds[177]. No further details, but we would advise caution. See the notes above on toxicity.

dwatta Analgesic Depurative Haemostatic Resolvent VermifugeThe root stalks are analgesic, antibacterial, antiinflammatory, antiviral, astringent, febrifuge, haemostatic, vermifuge and vulnerary[238, 279]. A decoction of the dried root is depurative and resolvent[218]. The root contains 'filicin', a substance that paralyses tapeworms and other internal parasites and has been used as a worm expellent for humans and also in veterinary medicine[218, 238]. It is one of the most effective treatments known for tapeworms - its use should be immediately followed by a non-oily purgative such as magnesium sulphate in order to expel the worms from the body[238]. An oily purge, such as caster oil, increases the absorption of the fern root and can be dangerous[238]. The root is also taken internally in the treatment of internal haemorrhage, uterine bleeding, mumps and feverish illnesses[238]. The root is harvested in the autumn and can be dried for later use, it should not be stored for longer than 12 months[238]. This remedy should be used with caution and only under the supervision of a qualified practitioner [238]. The root is toxic and the dosage is critical[238]. See also the notes above on toxicity. Externally, the root is used in the treatment of abscesses, boils, carbuncles and sores[238].

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Mountains all over Japan [174]. A terrestrial fern, growing on the humus-rich floor of temperate forests, often in colonies [275].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at 20°c. Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position[175, 200]. Prefers a moist soil[188], but is drought tolerant when well established[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.543 Euphorbia lathyris

Caper Spurge, Moleplant 5 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Euphorbia lathyris is a ANNUAL/BIENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

pcista The sap contains a latex which is toxic on ingestion and highly irritant externally, causing photosensitive

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lamium album is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower from May to December, and the seeds ripen from July to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw or cooked[2, 5, 7, 13, 54]. They can be added to salads or mixed with other leaves and cooked as a potherb[183]. They can also be dried for later use[12]. The leaves are a good source of vitamin A[240]. A pleasant herb tea is made from the flowers[238].

tcanta The plant has a creeping rootstock and makes a good groundcover plant for woodland edges[24].

dwatta Antiflatulent Antispasmodic Astringent Cancer Cholagogue Depurative Diuretic Expectorant Homeopathy Hypnotic Ophthalmic Pectoral Resolvent Sedative Styptic Tonic Vasoconstrictor VulneraryWhite dead nettle is an astringent and demulcent herb that is chiefly used as a uterine tonic, to arrest inter-menstrual bleeding and to reduce excessive menstrual flow. It is a traditional treatment for abnormal vaginal discharge and is sometimes taken to relieve painful periods[254]. The flowering tops are antispasmodic, astringent, cholagogue, depurative, diuretic, expectorant, haemostatic, hypnotic, pectoral, resolvent, sedative, styptic, tonic, vasoconstrictor and vulnerary[4, 7, 9, 13, 21, 46, 61, 165, 238, 2401. An infusion is used in the treatment of kidney and bladder complaints[9], diarrhoea, menstrual problems, bleeding after childbirth, vaginal discharges and prostatitis[238, 254]. Externally, the plant is made into compresses and applied to piles, varicose veins and vaginal discharges[7, 238, 254]. A distilled water from the flowers and leaves makes an excellent and effective eye lotion to relieve ophthalmic conditions[7]. The plant is harvested in the summer and can be dried for later use[9]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of bladder and kidney disorders and amenorrhoea[9].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Himalayas and Japan. ksacta Fields, hedgerows, woodland edges and clearings and moist waste ground[7, 9, 17].

propta Seed - this species usually self sows freely and should not require human intervention. When required it can be sown in situ as soon as it is ripe. Division in spring. Division succeeds at almost any time in the growing season[K]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Ground cover. A very easily grown plant, it tolerates most soils and conditions[200]. Grows well in heavy clay soils. Prefers a sunny position, though it also does well in partial shade[238]. Plants are hardy to about -25°c[187]. The white dead nettle is too weedy to be grown in the flower garden, but it does well in the wild garden and self-sows when well sited[200]. Plants seem to be immune to the predations of rabbits[233]. A good bee plant[4, 24] and a good companion plant, helping any vegetables growing nearby[14, 18]. Special Features: Attractive foliage, Invasive, Suitable for cut flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

# 6.2.443 Potentilla nepalensis

Nepal Cinquefoil, Cinquefoil 5 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli drutta Potentilla nepalensis is a PERENNIAL growing to  $0.6\ m$  (2ft) by  $0.6\ m$  (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. Starchy[177].

dwatta DepurativeThe root is depurative[240]. The ashes are mixed with oil and applied to burns[240].

nrakta E. Asia - W. Himalayas. ksacta Grazing grounds and cultivated areas, 2100 - 2700 metres from Pakistan to C. Nepal[51].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Rock garden, Specimen. A very tolerant and easily grown plant, surviving considerable neglect[K]. It grows best in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. There are many named forms selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Suitable for cut flowers.

# 6.2.444 Ribes ambiguum

5tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes ambiguum is a deciduous Shrub growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 177]. An acid flavour[105], they are commonly eaten in areas where they grow wild[2]. A reasonable size, the green fruit can be 12mm in diameter[2, 266].

nrakta E. Asia - China, Japan. ksacta Most commonly found growing as an epiphyte in moist moss on the branches of trees[11, 58, 182].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 0 - 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Quite tolerant of shade though not fruiting so well in such a position[11]. Prefers a cool sheltered position in a leafy soil[11]. Hardy to about -20°c[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

## 6.2.445 Tanacetum parthenium

Feverfew, Matricaria

5 tlin 8 cvuc 2 kcak 2 tcan 5 dwat 0.6 m hkuc

htut cyuʻlli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Tanacetum parthenium is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Do not use during pregnancy or with coagulation problems. Oral ulcers (aphothous ulcers in 5-15%) and/or gastrointestinal disturbances. Discontinuation may lead to rebound headaches, anxiety and insomnia [301].

kcakta Edible Parts: Edible Uses: Condiment TeaThe dried flowers are used as a flavouring in cooking certain pastries[177, 183]. The plant is used in cooking to impart a deliciously aromatic bitter taste to certain foods[7]. A tea is made from the dried flowers[183].

tcanta Essential RepellentThe dried flower buds are a source of an insecticide. They are said to have the same properties as pyrethrum (obtained mainly from T. cinerari-ifolia)[61, 100, 201]. Steep 1 cupful of the dried flowers in one litre of hot soapy water for an hour. Strain, then allow to cool slightly before use[201]. An essential oil from the plant is used in perfumery[7].

dwatta Antiecchymotic Antiinflammatory Antirheumatic Antispasmodic Aperient Bitter Carminative Emmenagogue Sedative Stimulant Stings Stomachic Vasodilator Vermifuge-Feverfew has gained a good reputation as a medicinal herb and extensive research since 1970 has proved it to be of special benefit in the treatment of certain types of migraine headaches and rheumatism[238, K]. It is also thought of as a herb for treating arthritis and rheumatism[254]. The leaves and flowering heads are anti-inflammatory, antispasmodic, aperient, bitter, carminative, emmenagogue, sedative, stimulant, stings, stomachic, vasodilator and vermifuge[4, 7, 21, 36, 46, 53, 100, 165]. The plant is gathered as it comes into flower and can be dried for later use[7]. Use with caution[165], the fresh leaves can cause dermatitis and mouth ulcers if consumed[238]. This remedy should not be prescribed for pregnant women[238]. A tea made from the whole plant is used in the treatment of arthritis, colds, fevers etc. It is said to be sedative and to regulate menses[222, 238]. An infusion is used to bathe swollen feet[257]. Applied externally as a tincture, the plant is used in the treatment of bruises etc[7]. Chewing 1 - 4 leaves per day has proven to be effective in the treatment of some migraine headaches[222].

nrakta S.E. Europe to Asia. Naturalized in Britain[17]. ksacta Mountain scrub, rocky slopes, walls, waste places and a weed of gardens, avoiding acid soils[9].

propta Seed - sow spring in a greenhouse. Only just cover the seed and do not allow the pot to dry out. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer, after the last expected frosts. If you have sufficient seed it can be sown outdoors in situ during the spring. Plants usually self-sow freely and so, once you have the plant, further sowing is usually unnecessary[K]. Division in spring. Since the plants are quite short-lived, this method is not really very serviceable[K].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden. A very easily grown plant, it succeeds in an ordinary garden soil[1]. Thrives in any kind of soil[7], plants can even be grown in walls[219]. Often grown in the flower garden, feverfew is a short lived perennial but usually self-sows prolifically[7, K]. There are many named varieties selected for their ornamental value[238]. The cultivar 'Golden' (syn 'Yellow') has yellow tinted leaves[183]. The leaves have a refreshing aromatic aroma[245]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant, root structure con-

siderations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 6.2.446 Matthiola incana

Stock, Tenweeks stock, Gillyflower, Brompton Stock 5 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli fyifxre7t hionli

drutta Matthiola incana is a ANNUAL/PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves SeedpodEdible Uses: Flowers - eaten as a vegetable or used as a garnish, especially with sweet desserts[183]. Highly fragrant[183]. Seedpods[105, 183]. Used as a famine food when all else fails[177].

tcanta DyeA dark blue or purple dye is obtained from the flowers [168].

dwatta Antidote Aphrodisiac Bitter Diuretic Expectorant Stimulant Stomachic TonicThe seeds are aphrodisiac, bitter, timretic, expectorant, stimulant, stomachic and tonic[240]. An infusion has been used in the treatment of cancer and when mixed with wine it has been used as an antidote to poisonous bites[240].

nrakta S. Europe. Possibly native to S. England. ksacta Sea cliffs and as an escape from cultivation, avoiding acid soils[17]. Rocky and sandy places by the sea[260].

propta Seed - sow early spring in a greenhouse[1]. Germination usually takes place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown outdoors in situ in mid to late spring.

nwatta Landscape Uses:Border, Container, Foundation, Massing. Succeeds in ordinary garden soil[1]. Prefers a fertile neutral or slightly alkaline soil in full sun[200]. Plants grow best in a sandy soil in a warm, sheltered position[260]. A very ornamental plant[1], it is also a good butterfly plant[17]. Plants are usually biennial or short-lived perenials and are normally grown as annuals in the garden[188]. The wild plant is a perennial with an almost shrubby nature. Garden forms have been bred to have annual or biennial characteristics[260]. The flowers have a strong sweet scent[245]. Special Features: Suitable for cut flowers, Fragrant flowers.

#### 6.2.447 Ophrys sphegodes

Early Spider Orchid

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Ophrys sphegodes is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

drutta Eremurus stenophyllus aurantiacus is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105, 177].

nrakta W. Asia - Turkestan. ksacta Dry stony heavily grazed hillsides[90].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. Sow stored seed in a greenhouse as soon as it is obtained. Germination is slow and could take 1-12 months at 15°c. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow on for their first winter in a greenhouse. Plant out into their permanent positions in late spring after the last expected frosts. Do not plant deeply in the soil, the crown of the plant should be slightly exposed[245]. Division after the plant dies down in late summer. Great care must be taken because the plants resent root disturbance[200]. Only divide the plants when it is really necessary, and no more frequently than once every 6 years, being careful not to break the brittle roots[245]. It is probably best to pot up the divisions and grow them on in the greenhouse until they are established.

nwatta Landscape Uses:Border, Seashore, Specimen, Prefers a very well drained, very rich, light sandy loam in a warm sunny sheltered position[90, 200]. A covering of sharp sand helps the plant to survive wet winters[90]. Plants can also be mulched overwinter with organic matter in the autumn in order to give them extra protection, but this mulch must be removed in the spring otherwise it might encourage the new growth to rot[200]. Some protection should be given to the young shoots in spring in areas subject to late frosts[200]. Keep plants dry in summer after they have flowered[90]. A very ornamental plant[233], it is said to be an important food source in Afghanistan[177]. Plants resent root disturbance and so should be placed in their final positions as soon as possible[200]. Plants require some cold stratification in winter in order to flower well in the following summer[200]. Slugs are very attracted to this plant so some protection must be given[90]. Special Features: Suitable for cut flowers, Attractive flowers or blooms.

#### 6.2.538 Crinum bulbispermum

Hardy swamplily

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Crinum bulbispermum is a BULB growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista One report says that the plant is toxic to mammals, but gives no indication as to the degree of toxicity.

kcakta Edible Parts: RootEdible Uses: Root?? A number of species in this genus have edible bulbs. Although no records have been seen for this species, it is fairly hardy in Britain and the root can be as large as a football. It is worthy of investigation[K].

nrakta S. Africa - S. Transvaal and N. Natal. ksacta Seasonal pools, marshes and the banks of rivers[90].

propta Seed - best sown as soon as it is ripe, placing 2 - 3 seeds in individual pots in a greenhouse. Do not cover the seed. Sow stored seed April/May in a warm greenhouse. Once they have germinated, you can thin each pot to just one plant if required, though we have not found this to be necessary. Give an occasional liquid feed to ensure that the plants do not suffer nutritional deficiencies. Grow them on in the greenhouse for at least their first 2 years, planting them out into their permanent positions in the spring. Division of offsets in April/May or in September. When divided in the

spring, the bulbs can be planted out direct into their permanent positions, if done in September, however, they should be potted up and overwintered in the greenhouse.

nwatta Easily grown in a moist soil or the garden border[90]. Requires a rich well-drained soil in a warm sheltered sunny position[188]. Plants are only hardy in the milder areas of the country, tolerating temperatures down to about -10°c[90]. It is probable that the plants may require winter protection with dry leaves or bracken[90]. Bulbs are sensitive to transplanting and may take several years to establish[200]. After this, they will usually reproduce rapidly from offsets to produce the overcrowded conditions that stimulate them to flower freely[200]. The bulbs should be planted with their necks above soil level[233]. This conflicts with another report which says that they should be planted quite deeply in the soil[1]. Only plant out good sized bulbs and do so at the end of May[1]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The flowers emit a sweet, somewhat spicy odour which is especially pronounced at nightfall[245].

## 6.2.539 Rhamnus leptophyllus

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rhamnus leptophyllus is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been found for this species, there is the suggestion that some members of this genus could be mildly poisonous[65].

kcakta Edible Parts: Edible Uses:  $\overline{\text{TeaA}}$  tea is made from the leaves[177].

nrakta E. Asia - C. and W. China. ksacta Thickets or forest margins in valleys, along the sides of roads and on slopes at elevations of 1700 - 2600 metres[266].

propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at about  $5^\circ$  and should be sown as early in the year as possible in a cold frame or outdoor seedbed(200). Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[41].

nwatta Succeeds in any reasonably good soil[11]. Closely related to R. parvifolius[109]. The species in this genus are notably resistant to honey fungus[200].

#### 6.2.540 Vaccinium virgatum

Rabbit-Eye Blueberry, Smallflower blueberry 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Vaccinium virgatum is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers point soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105,177]. The fruit is about 5mm in diameter[200].

nrakta Eastern and South-eastern N. America - New York to Florida and Louisiana, ksacta Swamps[235]

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored supervision of a qualified practitioner[238]. The herb acts as a synergist when used with liquorice (Glycyrrhiza spp)[218]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - China in Yunnan and Likiang. ks-acta Shady, moist areas of pine forests, in forest clearings and among scrub at altitudes of between 3,050 - 3,650 metres[250]

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K].

nwatta An easily grown and undemanding plant[250], it prefers a deep rich soil, preferably neutral or slightly alkaline[1], doing guite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Grows well in heavy clay soils and on chalk[184]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Hardy to about -20°c[184]. plants do better in the north of Britain than they do in the south and are generally best if given an open northerly aspect[11]. A very ornamental and long-lived plant[1], it grows rapidly and produces lots of lateral shoots[250]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. This species comes into growth early in the year but unlike P. suffruticosa it does not seem to be subject to damage by late frosts[11]. It is probably best still given a position sheltered from the early morning sun. The branches are brittle and very subject to wind damage, especially when young[200]. This species is closely related to P. lutea[11]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually selffertile, though they will also hybridise with other species if these flower nearby at the same time[250]. This species will often self-sow freely when well sited[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Cultivated in China as a medicinal plant[214].

#### 6.2.535 Rumex hydrolapathum

Great Water Dock

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Rumex hydrolapathum is a PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

pcista Plants can contain quite high levels of oxalic acid, which is what gives the leaves of many members of this genus an acid-lemon flavour. Perfectly alright in small quantities,

the leaves should not be eaten in large amounts since the oxalic acid can lock-up other nutrients in the food, especially calcium, thus causing mineral deficiencies. The oxalic acid content will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - cooked[2, 105, 183]. Seed - raw or cooked. It can be ground into a powder and used as a flour[102]. The seed is small and rather fiddly to harvest.

tcanta Dye Tannin TeethThe roots contain tannin. In cultivated plants, those grown on dry land contained 6 - 8% tannin whilst those grown in water contained 12.4 - 21.6%[223]. The dried and powdered root makes a good tooth cleaner[4]. Dark green to brown and dark grey dyes can be obtained from the roots of many species in this genus, They do not need a mordant[168].

dwatta Antiscorbutic Astringent OphthalmicThe root is antiscorbutic and strongly astringent[4]. It is harvested in early spring and dried for later use[4]. The green leaves are said to be an excellent application for ulcers of the eves[4].

nrakta Western Europe, including Britain, from Scandanavia south and east to Spain, Italy and S. Russia. ksacta Near ponds and streams, also in shallow water, avoiding acid conditions! 171.

propta Seed - sow spring in situ. Division in spring.

nwatta Requires a moist or wet soil, also succeeding in shallow water. Avoids acid conditions in the wild. A very important food plant for the caterpillars of many species of butterfly[30].

#### 6.2.536 Aster yomena

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Aster yomena is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young plants - cooked[105, 116, 177].

nrakta E. Asia - Japan ksacta Lowlands, where the soil is moist, especially paddy fields, C. and S. Japan[58].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

# 6.2.537 Eremurus stenophyllus aurantiacus

Foxtail Lily 5 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Central and southern Europe, including Britain, to N. Africa. ksacta Grassy slopes, banks and field borders on chalk or limestone[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Plants prefer a shady position[188]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Plants are rather sparingly visited by bees, setting seed only if visited[17]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

#### 6.2.448 Mimulus guttatus

Yellow Monkey Flower, Seep monkeyflower 5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Mimulus guttatus is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[94, 105, 155, 172]. A slightly bitter flavour, they are added to salads[161, 183]. The leaves are used as a lettuce substitute[257].

dwatta Astringent Bach Poultice VulneraryThe plant is astringent, poultice and vulnerary[94, 172, 257]. A decoction of the leaves and stems has been used as a herbal steam bath for chest and back soreness[257]. A poultice of the crushed leaves has been applied to wounds, rope burns etc[257]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Fear or anxiety of a known origin'[209].

nrakta Western N. America - Alaska to Mexico. Naturalized in Britain. ksacta Streams and wet places below 3000 metres[187]. Banks of streams in Britain, where it appears quite native[17].

propta Seed - sow spring in a greenhouse and only lightly cover the seed[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can also be sown in situ in late spring after the last expected frosts[200]. Division in spring[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of softwood, 5cm long in spring or summer[200].

nwatta Prefers rather moist places such as damp borders, margins of streams and boggy spots[1, 111]. Grows well in heavy clay soils. Thrives in full sun so long as the soil does not dry out[200], otherwise it is best grown in partial shade[187]. Grows well in shallow water, but it can be invasive[200]. Hardy to at least-20°c[187]. There is some confusion over the naming of this plant, the entry on edibility may refer to M. luteus, which is closely related to this species.

# 6.2.449 Mentha satureioides

Native Pennyroyal

5 tlin 9 cvuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha satureioides is a PERENNIAL growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. Used as a flavouring in salads or cooked foods. A herb tea is made from the leaves.

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. It has a scent intermediate between pennyroyal and peppermint[238]. The plant is used as an insect repellent[154]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Abortifacient Alterative Antiseptic Antispasmodic Blood purifier Carminative Digestive Emmenagogue TonicThe leaves and flowering plant are alterative, antispasmodic, blood purifier, digestive, emmenagogue and tonic[152, 154, 238]. A tea made from the leaves has traditionally been used in the treatment of fevers, coughs, colds, headaches, digestive disorders, menstrual complaints and various minor ailments[152, 222, 238]. It can be used as a substitute for both pennyroyal (Mentha pulegium) and peppermint (Mentha x piperita)[238]. Like those species, it should not be prescribed for pregnant women since it can procure an abortion[238]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222] and can cause abortions[152, 154].

nrakta Australia - New South Wales, Queensland, Victoria. ksacta Banks of rivers and creeks, open forests and pastures, especially on shale[152].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it also succeeds in partial shade. Plants are hardy to about -15°c[238]. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The whole plant has a mint-like aroma. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near cabbages and tomatoes, helping to keep them free of insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.450 Calamintha grandiflora

Large-Flowered Calamint

5 tlin 8 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calamintha grandiflora is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: Condiment TeaA sweet and aromatic herb tea is made from the leaves[183]. Very refreshing. The leaves are harvested as the plant comes into flower and are dried for later use[244]. Leaves - used as a flavouring. A pleasant mint-like fragrance and flavourf183].

tcanta Plants can be used for ground cover, planted about 45cm apart each way they form spreading clumps[208].

dwatta Aromatic Diaphoretic ExpectorantThe leaves are aromatic, diaphoretic and expectorant[244]. An infusion is used in the treatment of jaundice, nervous complaints, convulsions and cramps[244]. A warm poultice of the leaves may help soothe bruises and rheumatic pains[244].

nrakta S. Europe. ksacta Damp woods and scrub, often on limestone[187].

propta Seed - sow spring in a greenhouse. Only just cover the seed. Germination usually takes place within 2 weeks at 21°c. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse. Plant them out into their permanent positions in the summer if they are large enough, otherwise plant them out the following spring. The seed can also be sown outdoors in a dry soil in April[244]. Division in spring or autumn[244]. Very easy, larger clumps can be planted direct into their permanent positions. It is best to pot up smaller clumps and grow them on in a cold frame until they are well rooted before planting them out in the summer. Basal cuttings in May or

June[244]. They should be rooted in a sandy compost[245]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Ground cover, Rock garden, Woodland garden. Prefers a well-drained soil and a sunny position[208]. Succeeds in any good soil in sun or partial shade[187]. Established plants are drought tolerant[190], preferring a soil on the dry side[208]. The plant is pleasantly fragrant when bruised[187]. The flowers have a delicious minty scent[245]. Plants often self-sow in gardens if they are well-sited[208]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native, Invasive, Suitable for dried flowers.

#### 6.2.451 Salvia verbenaca

Wild Clary

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hionli

drutta Salvia verbenaca is a PERENNIAL growing to  $0.6\,\mathrm{m}$  (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Flowers LeavesEdible Uses: Condiment TeaLeaves-raw or cooked. They are most often used as a flavouring in cooked foods. They are aromatic. The young leaves can be eaten fried or candied[183]. A herb tea is made from the leaves, it is said to improve the digestion. Flowers -raw. A flavouring in salads[177, 183].

dwatta OphthalmicThe seed forms a thick mucilage when it is soaked for a few minutes in water. This is efficacious in removing small particles of dust from the eyes[4].

nrakta Mediterranean region to Spain, France and Britain. ksacta In Britain it is found wild in sand dunes at Vazon Bay in Guernsey and in Jersey. In Europe it is found in dry grassland, avoiding acid soils and shade.

propta Seed - sow March/April in a greenhouse. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Division in spring.

nwatta Requires a very well-drained light sandy soil in sunny position[200]. Prefers a rich soil[1]. Plants can be killed by excessive winter wet[200]. This species is well suited to the wild garden, growing well in the summer meadow[200]. A good bee plant[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 6.2.452 Gaylussacia brachycera

Box Huckleberry

5 tlin 9 cyuc 2 kcak 2 tcan 0 dwat 0.5 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Gaylussacia brachycera is an evergreen Shrub growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or meast soil.

says that this plant does not contain the toxic alkaloid aconitine, and so is not poisonous[4]. It does, however, still contain an intensely bitter alkaloid[4].

kcakta Edible Parts: Leaves RootEdible Uses: Leaves and root - cooked[177]. This report should be treated with great distrust due to the poisonous nature of the genus, but see the notes above on known hazards[K].

dwatta Analgesic Antiinflammatory Antiperiodic Aphrodisiac Astringent Cholagogue Febrifuge TonicThe dried root is analgesic, anti-inflammatory, antiperiodic, aphrodisiac, astringent, cholagogue, febrifuge and tonic[4, 240]. It is used in India in the treatment of dyspepsia, diarrhoea and coughs[240, 243]. It is also used in Tibetan medicine, where it is said to have a bitter taste and a cooling potency[241]. It is used to treat poisoning from scorpion or snake bites, the fevers of contagious diseases and inflammation of the intestines[241]. The root is best harvested in the autumn as soon as the plant dies down and is dried for later use[4]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner

nrakta E. Asia - W. Himalayas. ksacta Usually found on humus-rich soils in the alpine and subalpine zones, and in forests, 2300 - 2900 metres[145, 243].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. The roots of this plant are extensively collected from the wild for medicinal use and the species is becoming much rarer in many areas of its range[272]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

#### 6.2.532 Lonicera gracilipes glabra

5tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lonicera gracilipes glabra is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177, 179]. It should be eaten with caution because is possibly cathartic and emetic[179]. The fruit is about 10mm in diameter[200].

dwatta Cathartic EmeticCathartic, emetic[179].

nrakta E. Asia - Japan. ksacta Forests and clearings all over Japan.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15-20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200].

# 6.2.533 Thalictrum aquilegiifolium

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thalictrum aquilegiifolium is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is poisonous, particularly the root[13].

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or roasted[22, 46, 61]. Caution is advised, there is one report that suggests that the root is particularly poisonous[13]. Young leaves - cooked[105]. Caution is advised, they are possibly poisonous.

dwatta CytostaticCytostatic[65].

nrakta E. and C. Europe to Asia. ksacta Damp woods, hedges and rich upland meadows of the lower Alps, often in stony places near glaciers[13].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[K]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seedbed in spring[111]. Plant them into their permanent positions the following spring. Division in spring as new growth commences or in the autumn[111]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Succeeds in most fairly good soils in sun or semishade[1, 111]. Prefers a humus rich soil[111]. A very ornamental plant[1], it is hardy to about -25°c[187]. Grows well on a woodland edge[188]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 6.2.534 Paeonia delavayi

Tree Peony, Dian mu dan

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 1.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Paeonia delavayi is a deciduous Shrub growing to 1.6 m (5ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: The following use is for P. suffruticosa. It quite probably also applies to this closely-related species.[K - see 214]. Flowers - cooked[46, 61, 177]. The fallen flower petals are parboiled and sweetened for a teatime delicacy, or can be cooked in various dishes[183].

dwatta Analgesic Antibacterial Antiinflammatory Antispasmodic Cholera DysenteryThe bark obtained from the root has an antimicrobial effect upon various bacteria, including Escherichia coli, typhoid, cholera, Staphylococcus aureus, streptococcus hemolyticus and Pneumococci[250]. The root is also anti-inflammatory and has been used with success in the treatment of arthritic joint swelling[250]. The root is also analgesic, sedative and anticonvulsant, it has a high success rate in the treatment of dysentery and can also be used to treat allergic rhinitis[250]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastro-intestinal infections[238]. This remedy should only be used under the

kcakta Edible Parts: Edible Uses: TeaA tea is made by boiling the stems, leaves and flowers[161, 183, 257].

dwatta TonicA decoction of the plant has been drunk as a tonic[257].

nrakta Western N. America - British Columbia to Oregon. ksacta Streambanks and moist to dry slopes[204].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta An easily grown plant, it tolerates most soils [200], but prefers a good loamy soil, abundant moisture and full sunlight [11, 200]. This species is probably a natural hybrid, S. betulifolia x S. douglasii menziesii [11, 204]. It hybridizes freely with other members of this genus [11].

# 6.2.529 Lolium perenne

Perennial Ryegrass, Italian ryegrass, Darnel, Lyme Grass, Terrell Grass, English Ryegrass, Strand Wh 5 tlin 7 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc

htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli frusflatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Lolium perenne is an evergreen Perennial growing to 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid, very alkaline and saline soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. Used as a cereal[177]. The seed has a nutritional value similar to oats (Avena sativa) and contain gluten[269]. An emergency food, it is only used when all else fails[177]. The seed is rather small and fiddly to use[K]. Yields of 1 tonne per hectare have been achieved, though around 500kg is a more common yield[269].

tcanta BiomassThe plant has the potential to be used as a source of biomass. Yields of up to 25 tonnes per hectare have been reported from Europe. In the absence of definitive yield information an average yield of 17.5 tonnes of dry matter per hectare per year and an energy content of 17.5 GJ per metric tonne are assumed[269].

dwatta Astringent Cancer MalariaThe plant has occasionally been used in the treatment of cancer, diarrhoea, haemorrhages and malaria[269].

nrakta Europe to E. Asia. ksacta Meadows and weedy places[74].

propta Seed - sow in situ in the spring. It is also possible to sow the seed in situ in the autumn in most parts of Britain. This will give larger plants and heavier yields.

nwatta Landscape Uses:Erosion control, Ground cover. Adapted to mild, humid temperate climates, this species grows best on rather heavy, rich, moist soils, but also does well on well-manured lighter soils with sufficient moisture[269]. It dislikes shade and requires a well-drained soil[200]. It prefers a pH in the range 6 - 7, though it can tolerate a range from 4.5 - 8.2[269]. Plants are moderately drought resistant, they tolerate atmspheric pollution and salt in the soil, and can also succeed when planted on mine-spoil[269]. They prefer an annual precipitation in the range of 21 - 176cm[269]. Many cultivars have been developed by selection of individual plants, clones and families for specific purposes, such as for lawns, pastures and hay[269]. A fast growing plant, it combines particularly well with white clover

(Trifolium repens)[269]. Special Features: Not North American native, Naturalizing.

#### 6.2.530 Clematis brachyura

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Clematis brachyura is a deciduous Climber growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - Korea. ksacta Open woodland and shrubberies at elevations around 200 metres[273].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade and its shoots growing up to the light[164]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[11]. Succeeds in acid as well as alkaline soils[200]. A twining plant[182], the stems will often die right back in the winter[273]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Flowers are formed from lateral buds produced the previous season. Any pruning should consist of removing any dead or weak growth in early spring and reducing the remainder down to the strongest pair of lateral buds[273]. Plants in this genus are notably resistant to honey fungus[200]. When planting out, in order to avoid the disease 'clematis wilt', it. is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

# 6.2.531 Aconitum heterophyllum

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Aconitum heterophyllum is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from September to October. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1]. One report

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 62]. Not highly regarded[183]. Tasteless[177, 200]. The fruit is about 12mm in diameter[200].

tcanta A good ground cover plant[200]. Spreading quite freely, it should be spaced about 30cm apart each way[208].

nrakta Eastern N. America - Delaware and Pennsylvania to Virginia. ksacta On slopes and in dry sandy woods[43] on dry acidic sandy soils[200].

propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 1 month warm stratification followed by 2 months cold[113]. When large enough to handle, prick the seedlings out into individual pots of lime-free compost and grow them on in light shade in a greenhouse or cold frame for at least their first winter. Plant out into their permanent positions in late spring or early summer when they are at least 15cm tall. Cuttings of half-ripe wood, July/August in a frame[200]. Layering. Division in spring.

nwatta Requires a lime-free moist peaty soil, thriving in sun or part shade[182, 200]. Prefers a position in partial or full shade[208]. Plants are hardy to about -15°c[200]. This species rarely sets viable seed[200]. There is a colony in New Jersey that covers 3.8 hectares of land, it is estimated to be 10,000 years old and to have originated vegetatively from one single mother plant[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2].

# 6.2.453 Fragaria nubicola

Indian Strawberry 5 tin 9 cyuc 2 kcak 0 tcan 1 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fragaria nubicola is a PERENNIAL growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[272]. A very pleasant strawberry flavour[K].

dwatta AstringentThe juice of the plant is used in the treatment of profuse menstruation[272]. The unripe fruit is chewed to treat blemishes on the tongue[272].

nrakta E. Asia - Himalayas from Kashmir to western China. ksacta Open grassland at elevations of 1600 - 4000 metres in Nepal[272]. Meadows on mountain slopes, forests in valleys and forest edge at elevations of 2500 - 3900 metres[266].

propta Seed - sow early spring in a greenhouse. The seed can take 4 weeks or more to germinate. The seedlings are very small and slow-growing at first, but then grow rapidly. Prick them out into individual pots when they are large enough to handle and plant them out during the summer. Division of runners, preferably done in July/August in order to allow the plants to become established for the following years crop[200]. They can also be moved in the following spring if required, though should not then be allowed to fruit in their first year. The runners can be planted out direct into their permanent positions.

nwatta We have very little information on this species and do not know if it will be hardy in Britain. However, judging by its native range, it is likely to succeed outdoors in many areas of the country. The following notes are based on the general needs of the genus. Prefers a fertile, well-drained, moisture retentive soil in a sunny position[200]. Tolerates semi-shade though fruit production will be reduced[38]. Likes a mulch of pine or spruce leaves[18, 241]

#### 6.2.454 Cardamine rotundifolia

American Water Cress, American bittercress 5 tin 9 cyuc 2 koak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cardamine rotundifolia is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to August, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Buterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105. 161, 177]. A hot water-cress like flavour[2,

nrakta Eastern N. America - New York to Ohio, Missouri, North Carolina and Kentucky. ksacta Cold springs and brooksides[43, 235].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils so long as they are not dry[1]. Grows wild in shallow water[235]. Prefers a moist humus rich soil in shade or semi-shade[200]. A mat-forming stoloniferous species[200].

# 6.2.455 Gaultheria pyroliifolia

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Gaultheria pyroliifolia is an evergreen Shrub growing to 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is about 8mm in diameter[200].

nrakta E. Asia - eastern Himalayas in Sikkim, Bhutan, Nepal, India ad China. ksacta Alpine windswept moorlands, thickets and grasslands at elevations of 3600 - 4000 metres[266]

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow

them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a moist but not boggy humus rich soil in shade or semi-shade[11, 182]. A peat and moisture loving species, it requires a lime-free soil[11, 182]. Plants in this genus are notably resistant to honey fungus[200]. This species has been confused in the past with G. pyroloides, a distinct species from Japan[266].

# 6.2.456 Ophrys insectifera

Fly Orchic

5 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ophrys insectifera is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Üses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the polant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, from Norway south and east to the Mediterranean. ksacta Woods, copses, field borders, spoil slopes, banks and grassy hillsides on chalk or limestone and in fens[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in

continue in growth and flower normally[230].

the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Plants are rather sparingly visited by bees and flies, setting seed only if visited[17]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

## 6.2.457 Physalis alkekengi franchetii

Winter Cherry

5 tlin 9 cyuc Ž kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Physalis alkekengi franchetii is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant, except the ripe fruit, are poisonous[19, 65, 238].

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked[1, 2, 4, 7, 105]. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten[34, 65]. Rich in vitamins[100], with twice the vitamin C of lemons[179], but not much taste[178]. We have found them to be bitter and rather unpleasant[K]. Young leaves - cooked[105, 170, 179]. Caution is advised, the leaves are almost certainly poisonous, at least when raw.

tcanta Plants spread rapidly by their roots and can be grown as a ground cover[208]. They are best spaced about 1 metre apart each way[208].

dwatta Aperient Diuretic Expectorant Febrifuge Malaria Vitamin CThe plant has a long history of herbal use, and an interesting chemistry, but it is seldom used in modern practice[238]. The whole plant is antiphlogistic, antipyretic, antitussive and expectorant[9, 61, 147, 178, 218]. An overdose of the plant is said to easily precipitate an abortion[218]. The fruit is aperient, strongly diuretic and lithontripic[4, 7, 9, 218]. It is used internally in the treatment of gravel, suppression of urine etc and is highly recommended in fevers and in gout[4, 238]. The fruit is harvested when fully ripe and can be used fresh, juiced or dried[238]. The calvx should be removed[238]. The leaves and stems are febrifuge and slightly tonic[4]. They are used in the treatment of the malaise that follows malaria, and for weak or anaemic people[4]. The fresh leaves have been used externally in the treatment of skin inflammations[238]. The seed is used to promote early labour[218]. A homeopathic remedy is made from the fruit. It is used in the treatment of kidney and bladder disorders[9].

nrakta Asia - Caucasus to China. Occasionally naturalized in Britain, ksacta Cultivated ground and vineyards[147]

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out in early summer. Diurnal temperature fluctuations assist germination[170]. Division in spring[111]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in early summer[111]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade

Lowers blood sugar. The herb is contraindicated in pregnancy and nursing and children under 12. Recommended only for external use. Do not appy to broken skin [301].

nrakta Europe to W. Asia. ksacta Damp places, 800 - 1800 metres in Turkey[93].

propta Seed - sow spring in a greenhouse and only just cover the seed. Make sure the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer if they have grown sufficiently. Otherwise, grow them on in the greenhouse or cold frame for their first winter and plant them out the following year after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta Succeeds in a sunny position in most well-drained moderately fertile soils[200]. The sub-species S. nemorensis fuchsii. (Gmel.)Celak. is the form used for food in Asia[177]

# 6.2.525 Equisetum telmateia

Giant Horsetail

5 tlin 9 cyuc 1 kcak 3 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Equisetum telmateia is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in March, and the seeds ripen in April. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Large quantities of the plant can be toxic. This is because it contains the enzyme thiaminase[172], a substance that can rob the body of the vitamin B complex[65]. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. The plant also contains equisetic acidese the notes on medicinal uses for more information[213].

kcakta Edible Parts: StemEdible Uses: Strobil (the fertile shoots in spring) - raw or cooked[256]. The tough outer fibres are peeled off, or can be chewed and then discarded[256]. The vegetative shoots, produced from late spring onwards, were occasionally cleaned of their leaves, sheathing and branches and then eaten by native North American Indians, but only when very young and tightly compacted[256]. Root - cooked[257].

tcanta Basketry Fungicide Hair Liquid feed Polish SandpaperThe stems are very rich in silica[4]. They are used for scouring and polishing metal[1, 4, 46, 61, 99, 257] and as a fine sandpaper[54, 99, 257]. The stems are first bleached by repeated wetting and drying in the sun[74]. They can also be used as a polish for wooden floors and furniture[46, 178]. The infused stem is an effective fungicide against mildew, mint rust and blackspot on roses[14]. It also makes a good liquid feed[54]. Used as a hair rinse it can eliminate fleas, lice and mites[213]. The black roots have been used for imbrication on coiled baskets[257].

dwatta Astringent Diuretic PoulticeThe plant is astringent and diuretic[257]. A decoction has been used to treat 'stoppage of urine'[257]. A poultice of the rough leaves and stems is applied to cuts and sores[257].

nrakta Europe, including Britain, from Sweden south and east to N. Africa and W. Asia, N.W. N. America. ksacta Damp shady banks etc, to 350 metres[17].

propta Spores - best collected as soon as they are ripe in the spring and surface-sown immediately on a sterile compost. Keep moist and pot up as soon as the plants are large enough to handle. Very difficult[200]. Division. The plants usually spread very freely when well sited and should not really need any assistance.

nwatta Prefers a moist soil with a pH between 6.5 and 7.5[200]. Plants are hardy to about -30°c[200]. Plants have a deep and penetrating root system and can be invasive. If grown in the garden they are best kept in bounds by planting them in a large container which can be sunk into the ground[200].

# 6.2.526 Lonicera gracilipes

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lonicera gracilipes is a deciduous Shrub growing to 1.8~m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177, 179]. It should be eaten with caution because is possibly cathartic and emetic[179]. The fruit is about 10mm in diameter[200].

dwatta Cathartic EmeticCathartic, emetic[179].

nrakta E. Asia - Japan. ksacta Forests and clearings all over Japan.  $\,$ 

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel, November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Grows best in a good moist soil in a sunny position, it does not fruit so well in the shade[200].

## 6.2.527 Sabatia angularis

Bitter Bloom, Rosepink

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Sabatia angularis is a ANNUAL/BIENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: Edible Uses: TeaA tonic tea is obtained from the plant[4, 61]. The part of the plant is not specified.

dwatta Antiperiodic TonicAntiperiodic, tonic[4, 61]. Used as a bitter stomachic, similar in its action to Gentiana lutea[207]. An infusion of the plant has been used to treat period pains[257].

nrakta Eastern N. America - New York to Ontario, south to Florida and Louisiana. ksacta Rich soils[235] in open woods, clearings, fields and prairies[43].

propta Seed - best sown as soon as it is ripe in late summer or early autumn. Sow in a peaty soil in a moist shady border or sow in pots in a shady part of the cold frame and keep the soil moist by standing the pot in 2 - 3cm of water[1].

nwatta Requires a moist soil[200]. This species provides an excellent cut flower[200].

# 6.2.528 Spiraea pyramidata

pirea

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Spiraea pyramidata is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

growing on clay take longer to become established but produce better blooms[250]. Hardy to about -20°c[184], plants do better in the north of Britain than they do in the south and are generally best if given an open northerly aspect[11]. Plants come into growth early in the year and are then subject to damage by late frosts, they are therefore best sited in a position that is shaded from the early morning sun[11]. The branches are brittle and very subject to wind damage, especially when young[200]. There is some confusion over the name of this species, Chinese botanists believing that it was based on a cultivar. They do not recognise this name, instead raising to specific status two of its sub-species as P. rockii (Haw. and Lauener.) Hong. and Li. and P. jishanensis Hong, and W.Z.Zhao (syn P. spontanea (Rehder.) Hong, and W.Z.Zhao.)[214]. Most modern treatments no longer recognise this as a separate species, though some people use the name to house the large number of garden forms of tree peonies that have been developed over the centuries[250]. A very ornamental plant[1], there are many named varieties[182]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. The flowers of some forms of this species are pleasantly scented[245]. Scented forms include 'Flora', 'Fragrans Maxima', 'Kimpai' and 'Kokuho'[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Cultivated in China as a medicinal plant[214]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers

## 6.2.522 Sorbus gracilis

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus gracilis is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The fruit is up to 1cm across[200].

nrakta E. Asia - Japan. ksacta Mountains, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Prefers an acid soil[121]. Toler-

ates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188].

## 6.2.523 Viburnum phlebotrichum

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum phlebotrichum is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The ovoid fruit is about 9mm long and contains a single large seed[200].

nrakta E. Asia - Japan. ksacta Mountains in C. and S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible. July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78]

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200].

#### 6.2.524 Senecio nemorensis

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Senecio nemorensis is a PERENNIAL growing to 2 m (6ft 7im). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, it belongs to a genus that contains a number of plants with a cumulative poisonous effect on the liver[65]. Some caution is advised.

kcakta Edible Parts: StemEdible Uses: Young stems-pickled[177]. Some caution is advised, see the notes above on toxicity.

dwatta Hypoglycaemic UrinaryUninary tract infections, gout, rheumatism and stone formation in the urinary tract.

in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any well-drained soil in full sun or light shade[111, 200]. The fully dormant plant is hardy in most of Britain, though the young growth in spring can be damaged by late frosts. A very ornamental plant[1] though it can be invasive[200]. This sub-species, which is sometimes treated as a separate species, is a more vigorous form of P. alkekengi with larger fruits[200]. Slugs are very fond of the new growth in spring and can destroy even quite large clumps[K].

## 6.2.458 Lycoris sanguinea

Spider Lily

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lycoris sanguinea is a BULB growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The bulb contains toxins and must be leached before it is used for food[105].

kcakta Edible Parts: RootEdible Uses: Bulb - cooked. It is used as a source of starch[105, 177]. The bulb is 2.5cm in diameter[200]. Caution is advised, see the notes above on toxicity.

nrakta E. Asia - China, Japan. ksacta Sparsely wooded hills and low mountains all over Japan[58, 200].

propta The seed is best sown as soon as it is ripe in a greenhouse and should germinate in the spring[200]. Sow the seed thinly so that it does not need to be disturbed for its first year of growth. Give an occasional liquid feed during the growing season to ensure the plants do not become nutrient deficient. Pot up the small bulbs when the plants become dormant, placing 2 bulbs in each pot. Grow them on for another 2 years in the greenhouse before planting them out when they are dormant. Division of offsets in the dormant season[200].

nwatta Requires a deep well-drained sandy soil rich in organic matter in full sun[200]. This species is hardy to at least -15°c[200]. Other reports say that the bulb tolerates soil temperatures down to about -5°c[214, 260]. This is a difficult plant to grow outdoors in temperate areas, the plant comes into growth in late summer, flowers in the autumn and the leaves then persist until the following summer when the plant will have a short period of dormancy. These leaves can be killed by hard frosts and, should this happen often, the bulb will be weakened and killed[200, 260]. Plants therefore require a sheltered position to avoid damage to the growing leaves in the winter[200]. Plants need a warm period in late summer in order to ripen the bulbs and induce flowering in the following year[188]. Plants are attractive to slugs and need to be protected from them[200]. Very sensitive to root disturbance, the bulbs can take some years to become well established[200].

#### 6.2.459 Hyssopus officinalis

Hysson

5 tlin 10 cyuc 2 kcak 5 tcan 3 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hionli

drutta Hyssopus officinalis is an evergreen Shrub growing to 0.6 m (2ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Volatile oil can cause convulsions. Avoid with epilepsy of fits. Diarrhoea and indigestion rare [301].

kcakta Edible Parts: Flowers Leaves Oil ShootsEdible Uses: Condiment OilLeaves and young shoot tips - raw or used as a flavouring in soups, salads etc[4, 14, 183]. A strongly aromatic flavour, somewhat like a cross between sage and mint, it has fallen out of favour in recent years[4, 238]. It can be used fresh or dried[21]. Flowers - raw. Added to salads[183]. An essential oil from the plant is used as a food flavourind[183].

tcanta Essential Fungicide Hedge Hedge Oil Pot-pourri Repellent StrewingHyssop can be grown as a dwarf hedge, it responds well to trimming in the spring[14, 52, 182]. The growing plant attracts cabbage white butterflies away from brassicas[14, 18, 20]. Another report says that hysson attracts cabbage white butterflies and should not be grown near cabbages[201]. An essential oil from the leaves is antiseptic and also used in perfumery and as a food flavouring[200, 201]. It has a particularly fine odour and is much valued by perfumers[4]. Average yields of the oil are about 0.6%[7]. Yields from the blue-flowered variety are 1 - 1.5% essential oil, the red-flowered variety yields about 0.8%, whilst the white-flowered form yields 0.5% essential oil[240]. The plant was formerly used as a strewing herb[4, 200] and is also used in pot-pourri[245]. A tea made from the leaves is useful for controlling bacterial plant diseases[201]. Plants can be grown for ground cover when spaced about 45cm apart each way[208].

dwatta Antiseptic Aromatherapy Astringent Carminative Diaphoretic Emmenagogue Expectorant Pectoral Stimulant Stomachic Tonic Vasodilator Hyssop has a long history of medicinal use and was so highly esteemed in the past that it was considered to be a virtual cure-all[254]. Currently an undervalued herb, it is often used as a household remedy, particularly as an expectorant and stomach tonic[4, 254]. It has a positive effect when used to treat bronchitis and respiratory infections, especially where there is excessive mucous production[254]. Hyssop can irritate the mucous membranes, so it is best given after an infection has peaked, when the herb's tonic action encourages a general recovery[254]. The plant should not be used by pregnant women, however, since in large quantities it can induce a miscarriage[7]. The leaves and flowering tops are antiseptic, antitussive, astringent, carminative, diaphoretic, emmenagogue, expectorant, pectoral, sedative, stimulant, stomachic, tonic and vasodilator[4, 7, 9, 21, 165, 238]. The plant can be harvested when in full flower and dried for later use[4]. A tea made from the leaves is used in the treatment of flatulence, stomachaches, upper respiratory tract infections, coughs in children etc[222, 238]. A poultice made from the fresh herb is used to heal wounds[4, 238]. The essential oil is used in aromatherapy. Its keyword is 'Stability'[210]. This oil should not be used on people who are highly strung as it can cause epileptic symptoms[7, 254]. The essential oil should not be used internally except under professional supervision[254]. nrakta Europe - Mediterranean, Naturalized in Britain,

nrakta Europe - Mediterranean. Naturalized in Britain. ksacta Old walls and buildings, stony places[9, 17]. Dry hills and rock ledges to 2200 metres in Turkey[187].

propta Šeed - sow spring in a cold frame and only just cover the seed. Very easy, the seed germinates quickly. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 7 cm with a heel, June/July in a frame[11, 78]. Fairly easy, the cuttings root quite quickly. Grow on the plants in the greenhouse for their first winter and plant out in late spring. Cuttings of greenwood, 5 - 7 cm with a heel, April/May in a frame[1], Plant out in the summer. Division in spring or autumn[1, 4].

nwatta Landscape Uses:Border, Specimen. Prefers a light, dry calcareous soil and a sunny position[1, 14, 37, 52]. A very cold-hardy plant, when dormant it can tolerate temperatures down to about -25°c[187]. Hyssop has very aromatic leaves and is commonly grown in the herb garden where it makes a good edging plant to a border[4]. There are some named varieties[183]. The plant needs to be trimmed regularly to keep it in shape, untrimmed plants will soon degenerate. Spring is the best time to trim the plants[238]. It is probably best to replace the plants every few years. The flowers have a rich aromatic fragrance[245]. Hyssop is a very good plant for attracting bees and butterflies to the gar-

den[4, 20]. It is a good companion plant to grow with grapes, but it grows badly with radishes[14, 18, 20]. Special Features:Edible, Fragrant foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fibrous dividing into a large number of fine roots [2-1].

## 6.2.460 Adenophora lamarkii

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Adenophora lamarkii is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. A sweet flavour[74].

nrakta E. Europe. ksacta Found in broad-leaved and open forests, forest edges[74].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. The seed can also be sown in spring. Surface sow 2 - 3 seeds per pot in the spring in order to avoid transplanting[133]. We have found that if transplanted when very small seedlings grow away without difficulty[K]. Germinates in 1 - 3 months at 10°c[133]. Plant out into their permanent positions whilst young. Basal cuttings in spring[K]. Division in spring - very difficult because the plant dislikes root disturbance[1].

nwatta Prefers a light rich slightly alkaline soil that is not too dry, and a warm sunny position[1, 200]. Intolerant of root disturbance[1]. The young growth is extremely attractive to slugs, they have been known to destroy even mature plants[K].

## 6.2.461 Oxalis enneaphylla

Scurvy Grass

5 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Oxalis enneaphylla is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw or cooked[2, 177]. Use in moderation, see notes at top of sheet. Flowers - raw or cooked[K]. Root[105]. No further details are given.

nrakta Southern S. America - Falklands and S. Chile. ksacta Coastal sands, open grassland, open scrub, screes and rock crevices[69]

propta Seed - best sown as soon as ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have

found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained humus rich sandy soil in a warm dry sunny position[1, 200]. Requires a sheltered position[1]. A very ornamental plant, it does well in the rock garden[1]. The flowers have a delicious almond-like perfume[245].

## 6.2.462 Thuja plicata

Western Red Cedar, Giant Arborvitae, Giant Cedar, Incense Cedar, Western Red Cedar

5 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 60 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Thuja plicata is an evergreen Tree growing to 60 m (196ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Inner barkEdible Uses: GumInner bark - fresh or dried[2, 105, 161]. The inner bark can be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread. A pitch obtained from the trunk has been used as a chewing gum[257].

tcanta Baby care Basketry Brush Dye Fibre Fuel Fungicide Gum Hair Hedge Hedge Insulation Paper Roofing Scourer Shelterbelt Stuffing Thatching Tinder Wick Wood-Tolerant of light trimming and of reasonable exposure, this species can be grown as a hedge or as part of a shelterbelt[75]. An infusion of the boughs can be used as a hair wash to treat dandruff and scalp germs[257]. The fibrous inner bark can be pounded until it is soft and then used as a sponge for scouring dishes etc, or can be used for making rough clothing, blankets, mats, ropes, sanitary towels, a padding in a baby's cradle, nappies etc. Waterproof hats, capes, trousers, skirts etc can be made from the inner bark[257]. It is also used in thatching and as a stuffing material for mattresses[46, 61, 82, 99, 118, 171, 226, 257]. Inner bark strips have been used as a roofing material [257]. The bark has also been used to make paint brushes[257]. The inner bark has been used to make a wick for oil lamps[257]. The inner bark has been used for making baskets[257]. The roots are used in basket making, making nets etc[99]. The roots have been used in coiled and imbricated baskets[257]. The roots have been peeled, split and used to make coiled watertight baskets that can be used for boiling water[257]. The roots are harvested in the spring or early autumn when it is easier to remove the bark. The outer strips of the roots are used to make the bottom of the basket, the centre core is used in the coils and the root bark, because of its toughness, is used to make the edges[257]. The fibrous bark is used for roofing and the sides of shelters. It is also used as an insulation[61, 99]. A fibre obtained from the bark is used in making paper. The fibre is about 3.8mm long (this refers to the heartwood fibre, the inner bark fibre is probably longer)[189]. Branches can be harvested at any time of the year, they are cut into usable pieces and pre-soaked in clear water prior to cooking. They are then cooked for six hours or more with lye. It is difficult to rinse it to clear water because it seems to be a dve material[189]. The fibre is then hand pounded with mallets, or put through a blender or a ball mill for six hours. It is difficult to hydrate properly. The resulting paper is a rich deep brown/red[189]. The slender pliable branches are used as a high quality rope[257]. They are gathered in spring, peeled and, if thick, are split into halves or quarters. They are then twisted and worked until soft and pliable and finally woven together to make the rope[99]. A green dye can be obtained from the leaves and twigs[257]. The inner bark can be used as a tinder[257]. Wood - aromatic, light, soft, straightdrutta Berberis sherriffii is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked.

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Southeast Tibet. ksacta Lower subalpine to montane zone

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils but disliking waterlogged soils[11, 200]. Grows well in heavy clay soils. Plants can be pruned back quite severely, they resprouts well from the base[200]. Hybridizes freely with other members of this genus[1]. This species is closely related to B. gyalaica[11, 200].

## 6.2.520 Mahoberberis aguisargentii

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 2 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahoberberis aquisargentii is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from January to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The fruit is almost certainly edible, but we do not know what its quality is[K]

tcanta Hedge HedgeThe plant has viciously spiny leaves and makes a good boundary shrub[200].

dwatta Antibacterial Antitumor DysenteryBerberine, universally present in rhizomes of Berberis and Mahonia species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta A bi-generic hybrid of garden origin, Mahonia aquifolia x Berberis sargentii. ksacta Not known in the wild.

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed

should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°C. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. This species is a bi-generic hybrid and, if seed is produced, it is very unlikely to breed true. Wounded nodal semi-ripe cuttings in late summer or early autumn[200].

nwatta Succeeds in most soils in sun or shade[182, 200]. Prefers a fertile well-drained soil[188]. Plants only flower and fruit after a long warm growing season[200]. Plants are reputedly immune to rust[200].

#### 6.2.521 Paeonia suffruticosa

Moutan, Moutan peony, Tree Peony, Japanese Tree Peony 5 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Paeonia suffruticosa is a deciduous Shrub growing to 2 m (6ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers - cooked[46, 61, 177]. The fallen flower petals are parboiled and sweetened for a teatime delicacy, or cooked in various dishes[183].

tcanta FuelThe stems are used as firewood[11]. The plant is quite slow growing so could not really be seen as a source of fuel[K].

dwatta Analgesic Antibacterial Antiinflammatory Antipyretic Antispasmodic Emmenagogue Sedative Styptic TonicThe root and root bark is analgesic, antibacterial, antiinflammatory, antipyretic, antispasmodic, emmenagogue, sedative, styptic and tonic[46, 61, 174, 176, 178, 218, 279] An extract of the plant has antibacterial activity, inhibiting the growth of Staphylococcus, Bacillus dysenteriae, Typhoid bacillus, Paratyphoid bacillus, Proteus, Pseudomonas, E. coli, Haemophilus pertussis and Streptococcus[176, 218]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastrointestinal infections[238]. This remedy should only be used under the supervision of a qualified practitioner[238]. The herb acts as a synergist when used with liquorice (Glycyrrhiza spp)[218]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - China to the Himalayas. ksacta Scrub in mountains[184]. Cliffs at elevations around 300 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K].

nwatta Landscape Uses:Border, Foundation, Seashore, Specimen. Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those

large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Softwood basal cuttings, 10 - 12cm long, in a sandy soil in a cold frame in early summer[200]. Cuttings of halfripe wood, 8 - 10 cm with a heel, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth. 20 cm long, November in a sheltered outdoor nursery bed[200].

nwatta An easily grown plant, succeeding in most ferile soils[11, 200]. Prefers a moist well-drained soil in sun or partial shade[200]. Tolerates atmospheric pollution[200]. Plants are very hardy, tolerating temperatures down to about -23°c[200]. Plants are very floriferous and can exhaust themselves, literally flowering themselves to death. The flowers are borne in the leaf nodes of the previous years growth and any pruning is therefore best done as soon as the plant has finished flowering[182]. Closely related to W. coraeensis[11]. There are a number of named forms, selected for their ornamental value[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.516 Callicarpa japonica

Beautyberry, Japanese callicarpa, Japanese Beautyberry 5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Callicarpa japonica is a deciduous Shrub growing to 2 m (6ft 7in) at a medium rate. It is in flower in August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade

(light woodland) or no shade. It prefers moist soil. kcakta Edible Parts: Edible Uses: TeaThe leaves are a tea substitute[177, 183].

nrakta E. Asia - China, Japan, Manchuria.. ksacta A pioneer species of cut-over lands[58]. Mixed forests on mountain slopes or in valleys at elevations of 200 - 900 meteor[366].

propta Seed - sow February in a greenhouse[78]. Only just cover the seed[138]. Germination usually takes place within 1 - 3 months at 18°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10cm long, July/August in a frame. High percentage[78]. Cuttings of mature wood of the current season's growth with a heel[78] taken in early spring[200].

nwatta Landscape Uses:Border, Cascades, Container, Erosion control, Massing, Standard, Specimen. Requires a sunny position or light dappled shade[11, 200]. Prefers a highly fertile well-drained loamy soil[11, 200]. This species is only really hardy in the milder parts of Britain, requiring a warm sunny corner[11, 182], though some forms should prove to be hardier. A very ornamental[1] and polymorphic species[58]. Requires cross-pollination for good fruit production[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Fragrant foliage, Not North American native, Inconspicuous flowers or blooms.

#### 6.2.517 Senecio nemorensis fuchsii

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Senecio nemorensis fuchsii is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, it belongs to a genus that contains a number of plants with a cumulative poisonous effect on the liver[65]. Some caution is advised.

kcakta Edible Parts: StemEdible Uses: Young stems - pickled[177]. Some caution is advised, see the notes above on toxicity.

nrakta Europe to E. Asia. ksacta Not known

propta Seed - sow spring in a greenhouse and only just cover the seed. Make sure the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer if they have grown sufficiently. Otherwise, grow them on in the greenhouse or cold frame for their first winter and plant them out the following year after the last expected frosts. Division in spring[200]. Root cuttings in early spring[200].

nwatta Succeeds in a sunny position in most well-drained moderately fertile soils[200]. This sub-species is the form that is used for food in Asia[177].

## 6.2.518 Rhododendron indicum

Rhododendron

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Rhododendron indicum is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it belongs to a genus where many members have poisonous leaves. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities [183].

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers[105, 177, 183]. No further details are given but some caution is advised, see the notes above on toxicity. Leaves[105, 177, 183]. No further details are given but some caution is advised, see the notes above on toxicity. The galls on the leaves are also said to be edible[177]. The report does not say if the galls are eaten before or after the insect has left. Caution is advised, see notes above on toxicity.

tcanta Plants can be grown as ground cover when spaced about 1 metre apart each way[208].

nrakta E. Asia - Japan. ksacta Rocks in ravines, C. and S. Japan[58].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in a most humus-rich lime-free soils except those of a dry arid nature or those that are heavy or clavey[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires[200]. A pH between 4.5 and 5.5 is ideal[1]. Plants do not succeed in all parts of Britain, they are hardy by the coast and succeed in warmer gardens inland[1]. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. Plants form a root ball and are very tolerant of being transplanted, even when guite large, so long as the root ball is kept intact[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 6.2.519 Berberis sherriffii

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli grained, not strong, very resistant to decay. This resistance to decay is probably due to the existence of powerful fungicides in the wood[226]. The wood from fallen trees remains sound for at least 100 years[226]. It is pale to dark red in colour[226]. The wood was widely utilized by many native North American Indian tribes who used it for making a wide range of items including canoes, houses, totem poles, bowls, spoons, ladles and tools[226, 257]. It is currently used in making greenhouses[1, 11, 82, 171]. The wood is not of such good quality when grown in mild humid areas[1]. It makes a good fuel, burning with very little smoke, though it burns quickly[99].

dwatta Abortifacient Analgesic Antidandruff Antirheumatic Astringent Emmenagogue Febrifuge Kidney Odontalgic Pectoral Poultice Skin Stomachic TB VDWestern red cedar was employed medicinally by a number of native North American Indian tribes, who used it to treat a wide range of complaints[257]. It is seldom, if ever, used in modern herbalism. An infusion of the leaves has been used in the treatment of stomach pains and diarrhoea[257]. A decoction of the leaves has been used in the treatment of colds[257]. A decoction of the powdered leaves has been used externally to treat various internal pains, including rheumatism[257]. The leaf buds have been chewed in the treatment of toothaches and sore lungs[257]. A decoction of the buds has been used as a gargle[257]. A decoction of the small branches has been used in the treatment of coughs, colds and tuberculosis[257]. A weak infusion has been drunk in the treatment of painful joints caused by rheumatism or arthritis[257]. A poultice of the crushed bough tips and oil has been applied to the back and chest in the treatment of bronchitis, rheumatism, stomach pains and swollen neck[257]. An infusion of the twigs has been used as a wash in the treatment of venereal disease sores[257]. A decoction of the boughs has been used as an antidandruff shampoo[257]. A decoction of the stem tips and the roots has been used in the treatment of colds[257]. An infusion of the bark and twigs has been used in the treatment of kidney complaints[257]. An infusion of the seeds and twigs has been used in the treatment of fevers[257]. The chewed bark, or a decoction of the bark, has been drunk to induce menstruation[257]. A moxa of the inner bark has been used as a counter-irritant for the skin[257]. A poultice of the inner bark has been applied to carbuncles[257]. The bark has been pounded until it is as soft as cotton and then used to rub the face[257]. The very soft bark has been used to bind wounds and cover dressings[257]. The shredded bark has been used to cauterize sores and swellings[257].

nrakta Western N. America - British Columbia to California. ksacta Grows singly and in small groves in moist to swampy soils, usually in shady forests, from sea-level to 1350 metres[60, 82, 99].

propta Seed - best sown when ripe in the autumn in a cold frame[113]. Stored seed germinates best if given a short cold stratification[113]. It can be sown in a cold frame in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If growing large quantities of plants, the seed can be sown in an outdoor seed bed in mid spring[78]. Grow the plants on for two years and then plant them out into their permanent positions in late autumn or early spring Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a shaded frame. Forms roots by the end of September but it should be overwintered in a frame[78]. Cuttings of almost ripe wood, 5 - 10cm with a heel, September in a cold frame. Forms roots in the following summer. Plant out in autumn or spring[78].

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Prefers a moist loamy soil[1,81]. Dislikes dry soils[11]. Not suitable for light sandy soils because it is shallow rooting[75], but it succeeds on most other soil types, even on waterlogged soils and heavy clays[81, 200]. Succeeds in chalky soils[200]. Prefers some shelter from the wind according to some reports[1,81] whilst others say that it is fairly wind resistant[11,75]. Trees tolerate salt winds[75] but not severe maritime exposure[K]. The wood and foliage are highly aromatic[226]. The foliage has a strong fruity smell, like pear-drops or crushed apples[185]. A fast growing tree, it often puts out new growth of 1 metre a year and can average 60cm a year for the first 40 years. Increase in girth can also be rapid, 5cm a year for the first 60 years

has been recorded[185]. Sometimes planted for forestry in Britain[17], it is at its best in the moister western half of the country[11, 185]. There are many named varieties selected for their ornamental value[188]. Tolerant of light trimming, so long as this is not back into old wood, plants also retain their lower branches unless these are shaded out by neighbouring plants[11]. The foliage turns bronze in cold weather[81]. Trees are notably susceptible to honey fungus[81, 200]. Special Features: North American native, Inconspicuous flowers or blooms.

#### 6.2.463 Tsuga chinensis

Chinese Hemlock

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 45 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Tsuga chinensis is an evergreen Tree growing to 45 m (147ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower in April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pft: mildly acid. neutral

kcakta Edible Parts: Inner barkEdible Uses: TeaInner bark-raw or dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[2, 46, 161]. A herbal tea is made from the young shoot tips[2, 62, 95, 159, 183]. These tips are also an ingredient of 'spruce beer'[183].

and basic (mildly alkaline) soils and can grow in very acid

soils. It can grow in full shade (deep woodland) semi-shade

(light woodland) or no shade. It prefers moist soil.

tcanta Dye Hedge Hedge Resin Tannin WoodApart from the report about the use of the wood, all the other uses listed below are based on the uses that T canadensis is put to and a note in [46] that this species has similar uses. Yields a resin similar to Abies balsamea, it is gathered by incisions in the trunk or by boiling the wood[46, 61, 64]. The bark contains 8 - 14% tannin[46, 171]. The inner bark is used according to one report[82]. A brown dye is obtained from the bark[21, 46]. A pitch (called hemlock pitch), is obtained by distillation of the young branches[46]. Tolerant of light trimming, plants can be grown as a hedge[81]. This species does not make a good hedge in Britain[200]. Wood - soft, durable. Used for shingles[82]. The timber is used for construction, aircraft, furniture, and in mines[266].

dwatta Astringent Diaphoretic DiureticThe bark is astringent, diaphoretic and diuretic[21]. A tea made from the inner bark or twigs is helpful in the treatment of kidney or bladder problems, and also makes a good enema for treating diarrhoea[21]. It can also be used as a gargle or mouthwash for mouth and throat problems or externally to wash sores and ulcers[21]. The powdered bark can be put into shoes for tender or sweaty feet or for foot odour[21].

nrakta E. Ásia - C. and W. China. ksacta Forests, especially on steep cliffs, 2300 - 3000 metres[109]. Mountains, mixed forests, valleys and river basins at elevations of 1000 - 3500 metres[266].

propta Seed - it germinates better if given a short cold stratification[80, 113] and so is best sown in a cold frame in autumn to late winter. It can also be sown in early spring, though it might not germinate until after the next winter. If there is sufficient seed, an outdoor sowing can be made in spring[78]. Pot-grown seedlings are best potted up into individual pots once they are large enough to handle - grow them on in a cold frame and plant them out in early summer of the following year. Trees transplant well when they are up to 80cm tall, but they are best put in their final positions when they are about 5 - 8 years old[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

nwatta An easily grown plant, it thrives best when growing in a deep well-drained soil in the western parts of Britain where it appreciates the higher rainfall[11]. However, it succeeds in most soils and positions, being especially good on acidic sandy soils[81] but also tolerating some lime[11] so long as there is plenty of humus in the soil[208]. Plants are

very shade tolerant when young, but need more sunlight as they grow older[81, 200]. Plants are thin and poor when grown in dry or exposed places[200]. A very slow growing tree in most of Britain but probably faster in the far west and in Ireland[185]. Plants require hot humid summers and do not usually thrive in Britain[200]. Plants are very liable to injury by late frosts[1], they are often shrubby in cultivation[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.464 Ulmus wallichiana

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 35 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ulmus wallichiana is a deciduous Tree growing to 35 m (114ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked.

tcanta Dye Fibre String WoodA strong fibre is obtained from the inner bark. It is used for cordage, slow matches and sandals[146, 158]. The young shoots are used to make strong ropes[145]. A dye is obtained from the ashes of the burnt twigs[145]. The colour is not given. Wood - fairly hard, somewhat scented, fine grained, takes a good polish. Used for furniture[146, 158].

dwatta SkinSkin[145].

nrakta E. Asia - Himalayas from Afghanistan to W. Nepal. ksacta Broad-leaved forests and moist ravines, 1800 - 3000 metres[51].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very quickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or copniced shoots[200].

nwatta Prefers a fertile soil in full sun[188], but is easily grown in any soil of at least moderate quality so long as it is well drained[1]. Susceptible to 'Dutch elm disease' according to one report[200], whilst another says that it might be resistant[11]. This disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200].

## 6.2.465 Pterocarya rhoifolia

Japanese Wingnut

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 30 m hkuc htut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Pterocarya rhoifolia is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils.

Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed[105]. No more details are given but the seed is very small and would be very fiddly to use.

tcanta WoodWood - light, soft, not easily cracked. Used for clogs, chopsticks etc.

nrakta E. Asia - China, Japan. ksacta Valleys and mountains all over Japan[58]. Wet areas along riverbanks and mountain streams in eastern Shandong, China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[80, 113]. Pre-soak stored seed for 24 hours in warm water[80] then cold stratify for 2 - 3 months[98, 113]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenouse for their first winter. Plant them out in late spring or early summer of the following year[240]. Cuttings of halfripe wood, July/August in a frame[113]. Cuttings of mature shoots, November in a frame. Only use vigorous shoots[113]. Layering, Division of suckers in the dormant season[188].

nwatta Prefers a sunny position in a rich strong loam with abundant moisture at the roots[11, 200]. Succeeds in areas that do not experience prolonged winter temperatures below about -12°c[200], but young plants and the young shoots of older trees can be cut back by winter frosts[11]. The leaves are aromatic when bruised[245]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.466 Cedrus libani

Cedar Of Lebanon

5 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 30 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

d'rutta Cedrus libani is an evergreen Tree growing to 30 m (98th) by 15 m (49th) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from October to November, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: MannaEdible Uses: A manna is obtained from the tree[2, 105]. No more details were given in the report.

tcanta Essential Resin WoodAn oil similar to turpentine is obtained from the wood[46, 61]. An essential oil from the wood is used in perfumery[61]. Wood - moderately hard, durable. Used for construction[1, 46, 61]. The wood is extremely durable and retains its delightful fragrance for many years[245].

dwatta Antiseptic ExpectorantThe leaves and the wood are antiseptic and expectorant. They act to disinfect the respiratory tract[254].

nrakta N. Africa to W. Asia - Lebanon, Syria and Turkey. ksacta Forms forests at 1200 - 2000 metres[11].

propta Seed - collect the cones in winter and keep in a warm room until they open[1]. Sow immediately in a cold frame[78]. One report says that a short cold stratification of one month improves germination rates[113]. Keep the seed pot moist, but be careful because the young seedlings are very prone to damp off, keep them well ventilated[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a cold frame for their first winter and plant them out into their permanent positions in late spring or early summer. Give them some protection from winter cold for their first winter or two outdoors[K]. Cuttings of terminal shoots can be tried in a frame in November but they are very difficult[113].

nwatta Landscape Uses:Espalier, Pest tolerant, Specimen. Thrives on most soils, being very tolerant of chalk, dry sites and of drought when it is established[11, 81, 200]. Prefers a rich loam or a sandy clay in full sun[1]. Succeeds in warm dry areas with less than 40cm of rain a year, but also in areas with cool summers and up to 200cm of rain[200]. Very intolerant of atmospheric pollution[11, 81]. Small trees

to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk. Succeeds in acid as well as alkaline soils[200]. A twining plant[182]. The leafstalks wran themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants flower on the current season's new shoots. They can usually be left unpruned, though weak or dead shoots can be removed and main shoots can be cut back by up to two thirds of their length if they are outgrowing their allotted area[273]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes [54].

## 6.2.513 Rubus coreanus

Korean Bramble

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rubus coreanus is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105. 177]. Small with a poor flavour[11]. The dark red or purplish black fruit is 5-8 mm in diameter[266].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

dwatta Aphrodisiac Astringent Ophthalmic Restorative Tonic UrinaryThe fruit is aphrodisiac, astringent, restorative and tonic[176, 218, 238]. It is taken internally in the treatment of complaints associated with disturbed liver and kidney functions, such as back pain, urinary dysfunction, premature greying, blurred vision, infertility, impotence and premature ejaculation[238, 279]. The fruit is harvested when fully ripe and can be used fresh or dried[238]. The juice of the bruised leaves or a decoction of the root are used in the treatment of ophthalmia[218]. The seed is astringent and tonic[2181.

nrakta E. Asia - China, Japan, Korea. ksacta 300 - 900 metres in W. Hupeh[109]. Thickets on slopes, montane valleys, riverbanks and roadsides at elevations of 100 - 3100 metres[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about  $3^{\circ}\mathrm{c}$  and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Division of the suckers in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Plants are rarely cultivated for their edible fruit in Japan[58]. This species is a raspberry with biennial stems, it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. Plants in this genus are notably susceptible to honey fungus[200].

## 6.2.514 Bryonia dioica

Red Bryony, Cretan bryony 5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli nyanhjen hjonli

drutta Bryonia dioica is a PERENNIAL CLIMBER growing to 3.5 m (11ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[7, 65]. One report says it is very toxic[10], another says it is of very low toxicity[76]. The fresh root is a severe skin irritant[238].

kcakta Edible Parts: LeavesEdible Uses: Young shoots must be cooked[2, 105]. They are eaten in spring. Caution is advised in the use of this plant, see the notes above regarding toxicity.

dwatta Cathartic Cytotoxic Diaphoretic Expectorant Hydrogogue Irritant Pectoral Purgative VermifugeA powerful cathartic and purgative, bryony is used with great caution in present-day herbalism[254]. It is primarily prescribed for painful rheumatic conditions[254]. The root is cathartic, cytotoxic, diaphoretic, expectorant, hydrogogue, irritant, pectoral, purgative and vermifuge[4, 9, 19, 21, 46, 165]. It is used in small quantities internally in the treatment of various inflammatory conditions, bronchial complaints, asthma, intestinal ulcers, hypertension and arthritis[238]. Externally, it is applied as a rubefacient to muscular and joint pains and pleurisy[238]. The root, which can be 75cm long and 75mm thick[268], can be used fresh at any time of the year[7], it can also be harvested in the autumn and be dried for later use[4]. This plant should be used with great caution and only under the supervision of a qualified practitioner. See the notes above on toxicity. The whole herb has an antiviral effect[254].

nrakta Central and southern Europe, including Britain, to N. Africa and W. Asia. ksacta Scrub and woodland, especially on well-drained soils, avoiding acid soils[7, 17].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring.

nwatta A rapid grower, it is of easy cultivation succeeding in most soils that are well drained[1], avoiding acid soils in the wild[17]. Prefers a sunny position[238]. A very deeprooted climbing plant[7], attaching itself to other plants by means of tendrils[4]. The plant is not eaten by rabbits[17]. Plants can be easily encouraged by scattering ripe seed along the base of hedgerows[200]. Dioecious, male and female plants must be grown if seed is required[200].

## 6.2.515 Weigela floribunda

Crimson weigela

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Weigela floribunda is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177]. A famine food, they are only used when all else

nrakta E. Asia - Japan. ksacta In open places at elevations of 150 - 1700 metres[275].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter or early spring. Prick out the seedlings into individual pots when they are

(has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit. No more details are given[177]. The fruit is about 10mm in diame-

tcanta WoodThe wood is hard and heavy, suitable for making furniture and other small articles [266].

nrakta E. Asia - China in Hupeh. ksacta Thickets in W. Hupeh[109]. Hills, mountain valleys, rocky slopes, fields, forests and thickets at elevations of 300 - 2500 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn. Stored seed will probably require stratification and should be sown as early in the year as possible[78]. Germination is usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in a frame[200]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[11, 78]. They take about 2 months to root and should be overwintered in a greenhouse, planting out in late spring[78]. Fair to good percentage [78]. Cuttings of almost ripe side shoots, 7 - 12cm with a heel, October/November in a cold frame[78]. Lift the following autumn and plant in their permanent positions[78]. Layering in autumn. Partially sever the layer about 12 months later and lift in the following spring. High percentage[200].

nwatta Requires a well-drained fertile soil in a sheltered position in sun or light shade[1, 200]. Prefers a warm soil that is not too heavy or close[11]. Dislikes calcareous soils[11, 182, 200]. Plants are susceptible to fireblight[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.510 Spiraea henryi

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Spiraea henryi is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA tea is made from

nrakta E. Asia - C. and W. China. ksacta Thickets, 1700 - 2700 metres in W. Hupeh[109]. Rocky slopes, foothills and mountain forests at elevations of 1500 - 3000 metres[266].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent posi-

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Hybridizes freely with other members of this genus[11]. A very ornamental plant[1], it is closely related to S. wilsonii.[182] and to S. canescens[11].

# 6.2.511 Eleutherococcus gracylisty-

Wu Jia Pi

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eleutherococcus gracylistylus is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: FlowersEdible Uses: Flowers[177]. No more details are given.

dwatta Antibacterial Antirheumatic Diuretic MiscellanyThe leafy shoots are tonic and are also believed to alleviate internal injuries by dispelling blood[218]. The root bark is antibacterial, antirheumatic and diuretic[176]. It is used in the treatment of arthritis, backache and a host of other ailments. A medicinal wine made from it is commonly on sale in China[218]. A decoction of the stem bark or the roots is used in the treatment of rheumatoid arthritis, aches and pains in the back and legs, open sores on the scrotum, beriberi and traumatic injuries[147]. The plant is aphrodisiac, nutritive and tonic[218]

nrakta E. Asia - China, ksacta Wasted slopes or shrub thickets[147].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200].

nwatta Succeeds in an open loamy soil[1], preferring a well-drained humus-rich soil in full sun[200]. Tolerates poor soils and atmospheric pollution[200]. Plants are hardy to at least -10 to -15°c if they are sheltered from cold winds[200]. This species is closely related to E. sieboldianus[200].

## 6.2.512 Clematis pierotii

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Clematis pierotii is a deciduous Climber growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - Japan, Korea. ksacta Woods and shrubberies[273].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft

less than 50cm tall establish much guicker and better than taller trees, those more than 2 metres tall are difficult to establish[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Fairly slow growing, trees rarely average more than 30cm increase in height per year[185]. Trees can be very long lived, to 300 years or more[185]. There are several named varieties selected for their ornamental value[188]. Small male cones are formed on the lower branches of trees, whilst the larger female cones are formed on higher branches[238]. These female cones persist on the tree for 2 - 3 years before breaking up[238]. Trees are notably susceptible to honey fungus[81, 200]. The trees have a broad canopy and tend to hold any falling snow. This can lead to branches being broken by the weight of snow[81]. Special Features: Not North American native, Inconspicuous flowers or blooms.

## 6.2.467 Fraxinus angustifolia

Narrow-Leaved Ash

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 25 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Fraxinus angustifolia is a deciduous Tree growing to 25 m (82ft) by 12 m (39ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: Edible Uses: CondimentThe fruit is used as a condiment[177, 183].

nrakta S. Europe, N. Africa, W. Asia, ksacta Mostly dryish rocky places in macchie, deciduous scrub or in pine and mixed forest, 650 - 1700 metres in Turkev[93].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. Quite cold-hardy when dormant, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species is closely related to F. excelsior[11]. A very ornamental tree[1], there are several named forms, selected for their ornamental value[200]. This species might be dioecious, in which case male and female plants must be grown if seed is required.

## 6.2.468 Ailanthus altissima

Tree Of Heaven

5 tlin 8 cyuc 1 kcak 5 tcan 3 dwat 25 m hkuc hmimhtut cyutli hgatkyuctcuphja7n hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ailanthus altissima is a deciduous Tree growing to 25 m (82ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any

one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant is not wind tolerant. It can tolerate atmospheric pollution.

pcista The plant is possibly poisonous[7, 20]. Male flowers have potentially allergenic pollen[200]. The leaves are toxic to domestic animals[269]. Gardeners who fell the tree may suffer rashes [269]. The odour of the foliage is intensely disagreeable and can cause headache and nausea, rhinitis and conjunctivitis[269]. The pollen can cause hay fever[269].

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked[105]. Used as an emergency food in times of scarcity, they have an offensive odour[2, 177, 178]. Some caution is advised, see the notes above on toxicity.

tcanta Dye Hedge Herbicide Insecticide Repellent Soil reclamation Soil stabilization Tannin WoodA yellow dve is obtained from the leaves[7]. The leaves contain 12% tannin, quercetin, as well as isoquercetin, and the alkaloid linuthine[218, 269]. The leaves and wood are high in cellulose and are used in paper-making[7, 74]. The crushed leaves and flowers are insect-repellent[14]. The plant parts, when steeped in water, are said to yield an insecticidal solution[218, 269]. An agueous extract of the leaves contains a substance that is toxic to other tree seedlings[240]. When plants are put into marshy areas they drain the soil and thereby remove mosquito breeding sites[254]. The plants have extensive root systems and sucker freely, they can be used in soil-stabilization programmes[149]. Since the plant is tolerant of soil pollution it can also be used in land reclamation schemes on old mine tips etc[200]. Plants can be grown as a tall hedge[14]. Wood - fairly hard, heavy, difficult to split, not durable, coarse grained. Though little used, except in poorer countries, the wood is suitable for cabinetry, cellulose manufacture, furniture, lumber, pulp, and woodwork. It is difficult to split but easy to work and polish. The wood is also used locally for charcoal and firewood[4, 46, 149, 178, 269]. Yields of 20 cubic metres per hectare is possible for this light wood[269].

dwatta Anthelmintic Antibacterial Anticonvulsant Antidiarrhoeal Antispasmodic Astringent Bitter Cardiac Deobstruent Diuretic Dysentery Emetic Emmenagogue Epilepsy Febrifuge Malaria RubefacientThe tree of heaven is not often used in Western herbal medicine, though it is more popular in the Orient. Various parts of the plant are used, though the bark is the part most commonly used - however, it contains a glycoside that has not been fully researched and so should be used with caution[7]. The root and stem bark are antispasmodic, astringent, bitter, cardiac depressant, diuretic, emetic, febrifuge, rubefacient and vermifuge[4, 61, 147, 176, 178, 218, 238]. The vermifuge properties do not act on round worms or earthworms[269]. A nauseatingly bitter herb, it is used internally to treat malaria and fevers, it also slows the heart rate and relaxes spasms[238]. It needs to be used under the supervision of a qualified practitioner since the bark readily causes vomiting[238]. In China, the bark is a popular remedy for dysentery and other complaints of the bowels[4]. In one clinical trial, 81 out of 82 patients were cured of dysentery when they were given this herb[254]. A tincture of the root-bark has been used successfully in the treatment of cardiac palpitations, asthma and epilepsy[4]. Treeof-heaven is a folk remedy for asthma, cancer, diarrhoea, dysentery, dysmenorrhoea, dysuria, ejaculation (premature), epilepsy, eruption, fever, gonorrhoea, haematochezia, leucorrhoea, malaria, metrorrhagia, sores, spasms, spermatorrhoea, stomachic, tumours of the breast (China), and wet dreams[269] The bark is harvested in the spring and dried for later use[7]. The leaves, bark of the trunk, and roots are put into a wash to treat parasitic ulcers, itch, and eruptions[269]. In Korea, the root bark is used in the treatment of coughs, gastric and intestinal upsets[269]. The stembark is emmenagogue[218]. The leaves are anthelmintic, astringent and deobstruent[218]. The fruit is used in the treatment of bloody stools and dysentery[218, 269]. They have also been used to treat ophthalmic diseases[269]. Extracts from the plant are bactericidal[218]. The tree is used in homeopathic remedies for cancer[269]. A resin extracted from the roots and leaves is a revulsive or vesicant[269].

nrakta E. Asia - China. Naturalized in Britain[17]. ks-

acta Uplands[147].

propta Seed - best sown outdoors as soon as it is ripe[78]. If you only have a small quantity of seed it will probably be better to sow it in a cold frame. The germination can be poor[80], averaging about 56%[98], though one kilo of seed will normally produce in the region of 6,500 usable plants[269]. The seed germinates best if given a short cold stratification of 8 weeks[80, 113]. The seed is not usually produced in Britain[80]. Prick out the seedlings into individual pots when they are large enough to handle, keep them in a cold frame for their first winter and plant them out in late spring[K]. Root cuttings in December[113]. Suckers, planted out in late winter.

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible. A very tough and easily grown tree, succeeding under most conditions, the Tree of Heaven is resistant to most diseases and is also reported to be tolerant of alkalinity, drought, frost, heat, high pH, hydrogen fluoride, low pH, pollution, SO2, poor, dry or wet soils, heavily polluted soils and industrial pollution[200, 269]. The plant prefers a light moist soil and a sheltered position[1, 133]. Prefers a position in full sun or partial shade[238]. The tree is estimated to tolerate an annual precipitation of 30 to 250cm (tolerating a dry season up to 8 months), an annual average temperature of 10° to 20°C, and a pH of 5.5 to 8.0. Growing on the smallest of city plots and rubbish heaps, this species obviously can tolerate a wide array of soils, from acid to alkaline, sand to light clay, well-drained to swampy, poor to rich. It is said to do poorly on chalky soils or compact clay[269]. Plants are hardy to at least -15°c[200]. A very ornamental tree, it has a somewhat tropical appearance and is fast growing when young[1, 7, 14], though it is rather shortlived[229]. The trees send up suckers freely and soon form dense thickets[7, 200, 229]. The plant has become a noxious weed in parts of Australia and is rather weed-like in many other countries[238, 269]. The roots are rather aggressive and can cause damage to drainage systems[226]. The plants thrive even when growing in very polluted cities[11, 229] and so have been used as street trees and as shade-trees in parks[268], they do not do well in the north of Britain, however[98]. Male flowers are malodorous and have potentially allergenic pollen[80, 200]. The crushed leaves are also malodorous[226]. The large leaves have glandular teeth near their base and these release a pungent aroma when pressed[245]. The disagreeable odour of the plant may cause some people to feel sleepy[269]. This tree is occasionally cultivated for its wood[149]. This is brittle however, and branches are very liable to break off in the wind[200]. Trees coppice readily[200]. The leaves were once used as a food for silkworms[2], but were found to be unsuitable[7]. This species is notably resistant to honey fungus[88, 200]. Dioecious. Male and female plants must be grown if seed is required[269]. Special Features: Not North American native, Invasive Attractive flowers or blooms

#### 6.2.469 Zelkova serrata

Japanese Zelkova, Saw Leaf Zelkova 5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Zelkova serrata is a deciduous Tree growing to 25 m (82ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105, 171].

tcanta WoodWood - tough, hard, beautifully grained. Used for tool handles, construction, furniture etc[46, 61, 151].

nrakta E. Asia - E. China, Japan. ksacta Lowlands and mountains of C. and S. Japan[58]. Valleys, beside streams at elevations of 500 - 2000 metres in China[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Stored seed requires stratification and should be sown as early in the year as possible[78, 200]. Germination rates are variable[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Landscape Uses:Pest tolerant, Aggressive surface roots possible, Specimen, Street tree. An easily grown plant, it succeeds in almost any good soil, acid or alkaline, preferring a deep well-drained moist loam[11, 200]. Prefers a moderately sheltered position[11]. Relatively shade tolerant[200]. A fast growing tree[200]. Dormant plants are very cold-tolerant, but they are sometimes damaged by late spring frosts when they are young[11]. Plants are susceptible to Dutch Elm Disease, but the beetle that is the vector of this disease rarely feeds on Zelkova so infestation is rare[11, 200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Inconspicuous flowers or blooms.

### 6.2.470 Carva aquatica

Water Hickory

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 20 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Carya aquatica is a deciduous Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from June to October, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked. Astringent[177]. The seed is up to 35mm long, it is produced in clusters of 3 - 4 and has a thin shell, but he kernel is very bitter[11, 82, 229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K].

tcanta Fuel Wood Wood - heavy and close grained but soft and brittle, which limits its use[229, 235]. It weighs 46lb per cubic foot and is used mainly in fencing and as a fuel, where it yields considerably more heat than most woods[229, 235].

nrakta South-eastern N. America - Florida to Texas, north to Illinois. ksacta Bottomlands and swamps, in ground that is often inundated for at least part of the year[43]. The best specimens grow on deep well-drained alluvial soils[229].

propta Seed - requires a period of cold stratification. It is best sown in a cold frame as soon as it is ripe[78]. Stored seed should be kept moist (but not wet) prior to sowing and should be sown in a cold frame as soon as possible[78]. Where possible, sow 1 or 2 seeds only in each deep pot and thin to the best seedling. If you need to transplant the seedlings, then do this as soon as they are large enough to handle, once more using deep pots to accommodate the tap root. Put the plants into their permanent positions as soon as possible, preferably in their first summer, and give them some protection from the cold for at least the first winter[78, K]. Seed can also be sown in situ so long as protection is given from mice etc and the seed is given some protection from cold[200] (a plastic bottle with the top and bottom removed and a wire mesh top fitted to keep the mice out is ideal)

nwatta Prefers a deep moisture-retentive loam in a sunny sheltered position, requiring a good summer for best development[1, 63, 137, 200]. A slow growing tree[200], it does not begin bearing seed until more than 20 years old[229]. Most species in this genus have quite a wide range of distribution and, in order to find trees more suited to this country, seed from the most appropriate provenances should be sought[137]. Most trees growing in Britain at present tend to only produce good seed after hot summers[137]. Carya aquatica hybridizes with C. illinoinensis (C. × lecontei Little) and is reported to hybridize with the tetraploid C. texana [C. × ludoviciana (Ashe) Little][270]. Plants are strongly tap-rooted and should be planted in their permanent

#### 6.2.506 Viburnum furcatum

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli dvatxre7t hionli

drutta Viburnum furcatum is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177].

nrakta E. Asia - Japan, Korea. ksacta Damp woods and scrub in mountains all over Japan[58, 184].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It requires a lime-free soil, preferring a deep rich loamy soil in a shady position[1, 11]. Requires woodland conditions but without competition from other plants[11]. Best if given shade from the early morning sun in spring[200]. A very hardy plant, tolerating temperatures down to about -25°c[184]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. This species is closely related to V lantanoides[11, 184].

## 6.2.507 Eremurus robustus

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eremurus robustus is a PERENNIAL growing to 3 m (9ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: RootEdible Uses: Young root -boiled[74].

tcanta AdhesiveA glue is made from the roots[74]. nrakta W. Asia - Turkestan. ksacta Mountain meadows on dry stony heavily graved hillsides[74, 90].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. Sow stored seed in a greenhouse as soon as it is obtained. Germination is slow and could take 1 - 12 months at 15°c. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow on for their first winter in a greenhouse. Plant out into their permanent positions in late spring after the last expected frosts. Do not plant deeply in the soil, the crown of the plant should be slightly exposed[245]. Division after the plant dies down in late summer. Great care must be taken because the plants resent root disturbance[200]. Only divide the plants when it is really necessary, and no more frequently than once every 6 years, being careful not to break the brittle roots[245]. It is probably best to pot up the divisions and grow them on in the greenhouse until they are established.

nwatta Prefers a very well drained, very rich, light sandy loam in a warm sunny sheltered position[90, 200]. A covering of sharp sand helps the plant to survive wet winters. Plants can also be mulched overwinter with organic matter in the autumn in order to give them extra protection, but this mulch must be removed in the spring otherwise it might encourage the new growth to rot[200]. Some protection should be given to the young shoots in spring in areas subject to late frosts[200]. Keep plants dry in summer after they have flowered[90]. A very ornamental plant[1] and a good bee plant[74]. Plants resent root disturbance and so should be placed in their final positions as soon as possible[200]. Plants require some cold stratification in winter in order to flower well in the following summer[200]. Slugs are very attracted to this plant so some protection must be given.

## 6.2.508 Euonymus sachalinensis

Euonymus

5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 3.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euonymus sachalinensis is a deciduous Shrub growing to 3.5 m (11ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It brefers dry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - boiled[105, 177]. Some caution is advised, see the notes above regarding possible toxicity.

tcanta WeavingThe white inner bark is used in making string shoes[151].

nrakta E. Asia - Japan, Korea, Sakhalin. ksacta Woods and thickets in Korea[151].

propta Seed - best sown as soon as it is ripe in a cold frame[121]. Stored seed requires 3 months cold stratification, so should be sown as early in the year as possible in a cold frame[113]. The seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 7cm long taken at a node or with a heel, July/August in a frame. Very easy[2001]

nwatta Landscape Uses:Massing, Screen. Thriving in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[11]. A plant in an open position at Cambridge Botanical Gardens was 2 metres tall and laden with fruit in September 1989[K]. This species is often confused with E. planipes[121]. Special Features:Not North American native, Inconspicuous flowers or blooms.

## 6.2.509 Photinia parvifolia

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Photinia parvifolia is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite

it can be grown on a woodland edge[184]. Tolerates a limey soil[11]. Dormant plants are hardy to about -20°c[184]. The young growth, however, is subject to damage by late frosts and so a suitable position with shelter from early morning spring sunshine is best. A very ornamental plant[1], it is the best and most reliable species in this genus for growing in Britain[11]. A number of cultivars have been developed for their ornamental value[182]. Flowering can be increased by thinning the old shoots after flowering[188]. A very polymorphic plant[58]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Blooms are very showy.

## 6.2.503 Grewia biloba parviflora

5tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Grewia biloba parviflora is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: FruitEdible Uses: Fruit. No more details. The fruit is about 10mm in diameter[200].

nrakta E. Asia - E. China, Korea. ksacta Rocky places by roadsides[109].

propta Seed - we have no information for this species but suggest sowing the seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering.

nwatta Succeeds in most soils[200]. One report says that this species is not very hardy in Britain, preferring hotter summers than are usually experienced here[11]. Another report, however, says that it is hardy to about -30°c[200].

#### 6.2.504 Cotoneaster franchetii

Orange cotoneaster

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc

pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cotoneaster franchetii is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta The fruit has a mild flavour though it is very mealy and full of seeds[K].

tcanta Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. The plant can be grown as an informal windbreak hedge in all but the most exposed situations[29, 75, 200]. Tolerates trimmind[75].

nrakta E. Asia - W. China to Tibet. ksacta Thickets in rocky sunny mountain regions, open hillsides at elevations of 1600 - 2900 metres[266].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at  $15^\circ {\rm c}$  and then 3 months cold stratification at  $4^\circ {\rm c}[164]$ . The seed usually germinates

within 1 - 18 months at  $15^{\circ}$ c but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Plants also succeed in deep shade[219]. Tolerates atmospheric pollution[200]. Fairly tolerant of maritime exposure[75, 200]. Plants are hardy to about -15°c[184]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Trees are notably susceptible to honey fungus[200].

## 6.2.505 Clematis serratifolia

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Clematis serratifolia is a deciduous Climber growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[105, 177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - N.E. China, N. Japan, Korea. ksacta Hedgerows, usually on calcareous soils. Dry forests, slopes, gravelly river banks at around 400 metres in hina[266].

propta Seed - best sown as soon as it is ripe in a cold frame [164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible [164]. A period of cold stratification is beneficial [164]. The seed germinates in 1- 9 months or more at  $20^{\circ} \text{c} (164]$ . Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame [200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Flowers are produced on the current season's growth, any pruning is best carried out in spring[219]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

positions as soon as possible[1, 137]. Sowing in situ would be the best method so long as the seed could be protected from mice[1, 200]. Trees are late coming into leaf (usually late May to June) and lose their leaves early in the autumn (usually in October)[137]. During this time they cast a heavy shade. These factors combine to make the trees eminently suitable for a mixed woodland planting with shrubs and other trees beneath them[137]. Plants in this genus are notably resistant to honey fungus[200]. Trees are self-fertile but larger crops of better quality seeds are produced if cross-pollination takes place[229].

## 6.2.471 Sorbus japonica

5tlin 9 cyuc 1 kcak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus japonica is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is up to 13mm across[200] and is produced in bunches which makes harvesting easier[K].

nrakta E. Asia - Japan, Korea. ksacta Hills and mountains, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188].

#### 6.2.472 Thuia orientalis

Biota

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 15 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Thuja orientalis is an evergreen Tree growing to 15 m (49ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The leaves are toxic if eaten[238]. The plant can also cause skin allergies in sensitive people[238].

kcakta Edible Parts: SeedEdible Uses: Seed - after removing the bitterness[105, 179]. No more details are given, but the bitterness in seeds is usually removed either by leaching them in water or by thoroughly cooking them[K].

tcanta Dye Hedge Hedge Parasiticide WoodTolerant of regular trimming, though not into old wood, it can be grown as a dense hedge[149]. A yellow dye is obtained from the young branches[4]. Wood - durable in the soil, moderately hard, close grained, rather coarse grained, light, soft, brittle. Used for construction, cabinet making, cooperage[4, 146, 149, 2271.

dwatta Antiasthmatic Antibacterial Antipyretic Antitussive Aperient Astringent Diuretic Dysentery Emmenagoque Emollient Expectorant Haemostatic Lenitive Parasiticide Sedative Skin StomachicThis plant is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. Both the leaves and the seeds contain an essential oil consisting of borneol, bornyl acetate, thujone, camphor and sesquiterpenes[283]. The leaves also contain rhodoxanthin, amentoflavone, quercetin, myricetin, carotene, xanthophyll and ascorbic acid[283]. The leaves are antibacterial, antipyretic, antitussive, astringent, diuretic, emmenagogue, emollient, expectorant, febrifuge, haemostatic, refrigerant and stomachic[147, 176, 218, 238]. Their use is said to improve the growth of hair[147, 176, 238]. They are used internally in the treatment of coughs, haemorrhages, excessive menstruation, bronchitis, asthma, skin infections, mumps, bacterial dysentery, arthritic pain and premature baldness[238]. The leaves are harvested for use as required and can be used fresh or dried[238]. This remedy should not be prescribed to pregnant women[238]. The seed is aperient, lenitive and sedative[147, 176, 218]. It is used internally in the treatment of palpitations, insomnia. nervous disorders and constipation in the elderly[238]. The root bark is used in the treatment of burns and scalds[218]. The stems are used in the treatment of coughs, colds, dysentery, rheumatism and parasitic skin diseases[218].

nrakta E. Asia - W. China, N. Korea. A small wild population is also found in N.E. Iran. ksacta Steep dry rocky valley slopes[11, 200].

propta Seed - best sown when ripe in the autumn in a cold frame. Stored seed germinates best if given a short cold stratification. It can then be sown in a cold frame in late winter. Plants make very little growth in their first year[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If there is sufficient seed it is worthwhile trying a sowing in an outdoor seed bed in April[78]. Grow the plants on for at least two years before planting them out in the winter. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a shaded frame. Forms roots by the end of September but should be overwintered in a frame[78]. Cuttings of almost ripe wood, 5 - 10cm with a heel, September in a cold frame. Forms roots in the following summer. Plant out in autumn or spring[78].

nwatta Prefers a moist loamy soil[149]. Grows best on dry freely draining sites, often alkaline in reaction[200]. Does well over old building rubble[200]. Tolerant of dry dusty sites and of atmospheric pollution in towns[81]. Prefers a sunny sheltered position[238]. Easily transplanted[149]. There are many named varieties selected for their ornamental value. Produces seed freely in cultivation[200]. A slow growing tree, it does not really thrive in Britain[11], especially in the western part of the country[200]. The best specimens are to be found in towns or cities such as Oxford and very sharply drained soils in gardens[185]. Plants cannot regenerate from old wood. Pruning is not normally necessary for this species, any pruning that is carried out should be done with care[238]. Plants are susceptible to attacks by honey fungus[238]. Plants are monoecious, male catkins being produced at the tips of branches and female cones at the base[283].

#### 6.2.473 Calocedrus decurrens

Incense Cedar, California Incense Cedar 5 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Calocedrus decurrens is an evergreen Tree growing to 15 m (49ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in May, and the seeds ripen from September

to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe dense leaflets have been used as a flavouring and protection when leaching acorns[257].

tcanta Basketry Broom Containers Miscellany WoodThe boughs and twigs have been used to make brooms[257]. The roots have been used as overlay twine warps and overlay twine weft bases in making baskets[257]. The bark has been made into baskets[257]. Wood - soft, light, close grained, very durable in the soil though it is often damaged by dry rot[82]. It has a powerful, incense-like fragrance[245] and is used for making shingles, lathes, fencing, pencils, construction etc[46, 61, 81, 171]. Mature trees are often infected by dry rot, so they are not considered to be a major timber species[229].

dwatta Miscellany StomachicA decoction of the leaves has been used to treat stomach troubles[257]. Steam from an infusion of the leaves has been inhaled in the treatment of colds[257].

nrakta South-western N. America - Oregon to California. ksacta Found on a variety of soils, usually on western slopes at an altitude of 700 - 2500 metres[229]. The best specimens are found on deep well-drained slightly acidic sandy loam soils[229].

propta Seed - sow early spring in a greenhouse[245]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for their first winter. Plant them out in late spring or early summer, after the last expected frosts and consider giving them some protection from the cold for their first winter outdoors. Cuttings of the current season's growth, taken in mid autumn, in a light sandy soil in a cold frame[245].

nwatta Landscape Uses:Pest tolerant, Screen, Specimen. Succeeds in full sun in a moist well-drained soil that is neutral to acid, though it will also survive on dry alkaline soils[200]. Plants are shade tolerant when young[200]. It grows best in a position that is sheltered from strong winds[245]. Trees are slow growing but long-lived in the wild, with specimens up to 1000 years old recorded[229]. They grow slowly in Britain, but they are perfectly hardy[11]. Young trees can grow 60cm in a year but they seldom average more than 30cm[185]. Growth virtually stops once the tree reaches 25 metres tall[185]. All parts of the plant are strongly aromatic[188, 245]. This species is strongly resistant to honey fungus[81, 188]. The tree exhibits very different crown habits dependant upon the area in which it is being grown[185, 200]. At one time these different habits were considered to be different sub-species, but it is recognised now that it is only climatic forces that cause the differences. Special Features: North American native, Fragrant foliage, Inconspicuous flowers or blooms.

## 6.2.474 Pterostyrax corymbosa

Epaulette Tree

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Pterostyrax corymbosa is a deciduous Tree growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked. A famine food, it is only used when all else fails[179].

nrakta E. Asia - China, Japan. ksacta Thickets around 1300 metres in Kiangsi[109]. Damp shaded areas along streams in forests at elevations of 400 - 1600 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 3 months cold stratification at 5°c[200]. Prick out the seedlings into individual pots when

they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. Plant them out in the late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Layering[200].

nwatta Requires a good loamy soil and a sunny position[1]. Requires a deep acid soil in sun or semi-shade[200]. A fast-growing tree[200]. Often confused with P. hispida[1]. Flowers are most abundantly produced on wood that was well-ripened the previous summer[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.475 Schizophragma hydrangeoide

Japanese Hydrangea Vine

japinese ryyutmiget vin. 5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 12 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Schizophragma hydrangeoides is a deciduous Climber growing to 12 m (39ft) by 12 m (39ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pft: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105, 177].

tcanta Plants can be allowed to sprawl and are then used as a ground cover for a shady position[188, 208].

nrakta E. Asia - Japan, Korea. ksacta Damp woods and thickets in mountains all over Japan [58].

propta Seed - sow late winter to early spring in a greenhouse. Germination is usually fair to very good[78]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in light shade in the greenhouse for their first winter, planting them out in late spring or early summer. Layering in spring directly into pots. A fair to good percentage[78], though it can be difficult to find suitable low growth[202]. Cuttings of half-ripe wood, 4 - 5cm with a heel, July in a frame[1, 78]. Keep the cuttings moist[78].

nwatta Landscape Uses:Arbor. Requires a moist leafy soil and some shade at the roots. An easily grown plant[1], it prefers a good loamy soil and plenty of moisture[11]. Succeeds on most soil types, disliking only very alkaline soils[202]. Plants succeed in sun or shade[182], though they prefer full sun[202, 219]. In the hotter parts of Britain they prefer shade from the midday sun[219]. They succeed on north-facing walls[188, 219]. The fully dormant plant is hardy to about -20°c[182, 200]. Plants are slow to establish and slow-growing when young, though they speed up somewhat with age[202]. Plants do not normally require pruning, though any unwanted growth can be removed in the winter[219]. Plants have a similar growth habit to ivy (Hedera helix) climbing trees by means of aerial roots or growing along the woodland floor[1, 182]. Plants might need some help to become attached in their early years[182]. Some named varieties have been developed for their ornamental value[182]. Special Features:Not North American native, Attractive flowers or blooms.

## 6.2.476 Catalpa ovata

Chinese Catalpa

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 10 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Catalpa ovata is a deciduous Tree growing to  $10 \, \mathrm{m}$  ( $32\mathrm{ft}$   $10\mathrm{in}$ ) at fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from July to August, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. It can tolerate atmospheric pollution.

## 6.2.500 Viburnum plicatum

Japanese Snowball, Japanese Snowball Viburnum, Doublefile Viburnum

5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum plicatum is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked. Young leaves - cooked[177]. Rather unpleasant[K].

nrakta E. Asia - China, Japan. ksacta Thickets in mountains to 1800 metres, C. and S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Massing, Screen, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. A very hardy plant, tolerating temperatures down to about -25°c. Plants are surface-rooting and are very susceptible to damage by hoeing, drought or water-logging. A section of top growth will often die back if the roots are damaged, in severe cases this will lead to the death of the plant[202]. A very ornamental plant, there are many named varieties [182, 202]. The type species is actually a sterile garden form. The true wild species is often referred to as V. plicatum tomentosum. (Thunb.)Miq. Plants take about 5 years from planting out before they produce fruit[202]. Fruit production can be erratic[202]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Special Features:Attractive foliage, Not North American native, Blooms are very showy.

## 6.2.501 Viburnum corylifolium

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum corylifolium is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils.

It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The ovoid fruit is about 8mm long and contains a single large seed[200].

nrakta E. Asia - China to India. ksacta Thickets in the Khasya hills, 1200 - 1800 metres[109, 146].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible. July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It dislikes chalky soils[1]. Prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200].

## 6.2.502 Deutzia scabra

Fuzzy pride-of-rochester, Deutzia

5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Deutzia scabra is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked. A famine food, it is only used when all else fails[105,

tcanta Nails WoodWood - fine grained. Used for mosaic and wooden nails[46, 61].

nrakta E. Asia - China, Japan, Korea. Locally naturalized in Austria[50]. ksacta Scrub and woodland edges in most areas of Japan[58].

propta Seed - sow February in a greenhouse and only just cover the seed[78, 175]. Germination is usually good, taking 1 - 3 months at 18°c[78, 175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts[78]. Cuttings of half-ripe wood, 10 - 12cm with a heel, end of June to July in a frame[11, 78]. Good to high percentage[78]. Cuttings of ripe wood, 20 - 25cm with a heel, either in an outdoor bed if it is sheltered enough, otherwise in a cold greenhouse[78].

nwatta Landscape Uses:Border, Foundation, Massing, Standard, Specimen. An easily grown plant, it tolerates most soils but prefers a moist well-drained fertile humus-rich soil with shade from the early morning sun when grown in areas with late frosts[11, 200]. Prefers a sunny sheltered position,

pollinated by Bees, flies, Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista All parts of the plant are poisonous, the toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoots cooked[2, 105, 177]. Some caution is advised due to reports of toxicity[K].

tcanta Plants can be grown as ground cover, planted about 1.2 metres apart and allowed to scramble over the ground[208].

nrakta S. Europe. An infrequent casual in Britain[17]. ksacta Hedges, thickets and waste places[89].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Cuttings of half-ripe inter-nodal cuttings, June/July in a frame[202]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200]

nwatta Prefers a deep moist well-drained soil with its roots in the shade[182, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. Thrives in exposed positions[182]. Plants are hardy to about -15°c[202]. A twining plant[182], it is fast growing[202]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A very ornamental plant[1], the flowers are very fragrant[202]. They have a pronounced smell of meadowsweet, almost too powerful when inhaled close-up[245]. They are produced on the current season's growth and so any pruning of the plant is best carried out in the spring before new growth begins[219]. Plants rarely produce fertile seed in Britain[219]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Plants seem to be immune to the predations of rabbits[233]. This species is notably resistant to honey fungus[88, 200].

## 6.2.498 Bryonia alba

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli hjonli

drutta Bryonia alba is a PERENNIAL CLIMBER growing to 4 m (13ft 1in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista All parts of the plant, and especially the root, are poisonous[232]. The root can cause severe diarrhoea and vomiting, resulting in death within a matter of hours[232].

kcakta Edible Parts: LeavesEdible Uses: One report. says that the young shoots are edible[2], though caution is advised[K]. See the notes above on toxicity. The starch of the root is a famine food for extending bread flour after removing the acrid element. The young shoots are eaten. Caution: It is probably very poisonous [1b].

dwatta Antirheumatic Homeopathy UrinaryThe root is cathartic, hydrogogue, irritant, pectoral and purgative[4]. The root is harvested in the autumn and can be used either fresh or dried[4]. It should be used with great caution, see notes above on toxicity. The fresh root, gathered before the plant comes into flower, is made into a homeopathic remedy[232]. This is used in the treatment of a wide range of complaints[232]. It is said to be one of the best diuretics and an excellent remedy for gravel as well as all other obstructions and disorders of the urinary passage[4].

nrakta Europe to W. Asia - Iran. ksacta Vineyards and woods[232].

propta Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring.

nwatta A rapid grower, it is of easy cultivation succeeding in most soils that are well drained[1], avoiding acid soils in the wild[17]. A climbing plant, attaching itself to other plants by means of tendrils[4]. Plants can be easily encouraged by scattering ripe seed at the base of hedgerows[200]. Plants in the north of their range are monoecious, but those growing in the south are dioecious[200]. Where necessary, male and female plants must be grown if seed is required.

## 6.2.499 Salix aegyptiaca

5 tlin 9 cvuc 1 kcak 2 tcan 2 dwat 4 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix aegyptiaca is a deciduous Shrub growing to 4 m (13ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from January to February. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers Inner bark LeavesEdible Uses: DrinkInner bark - raw or cooked. It can be dried. ground into a powder and added to cereal flours for use in making bread etc. A famine food, it is only used when all else fails[172]. Young shoots - cooked. They are not very palatable[172]. Male catkins - sugared[11, 177]. A perfumed drink is made from the catkins[11].

tcanta Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta N. Africa to W. Asia. ksacta Mountains in

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Closely related to S. cinerea[1]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

kcakta Edible Parts: Flowers SeedpodEdible Uses: Flowers and young pods - cooked[183]. They are boiled and washed[179]. (possibly in that order so as to remove any bitterness[K1)

dwatta DiureticThe stems are diuretic (strongly)[174, 2181.

nrakta E. Asia - C. China. ksacta Open country and margins of woods to 2500 metres[109].

propta Seed - best sown outdoors, or in a cold frame, as soon as it is ripe[200]. Stratify stored seed for 3 weeks at 1°c and sow in spring[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings. 10cm long, in a frame. They should be taken in late spring to early summer before the leaves are fully developed[200]. Root cuttings in winter[200].

nwatta Landscape Uses: Specimen. Prefers a good moist loamy soil and a sunny position that is not exposed[1, 11]. Tolerates heavy clay soils. Very resistant to atmospheric pollution[188]. Plants are hardy to about -15°c, probably more in continental climates[200], they grow best in areas with hot summers[188]. Protect plants from late frosts when they are young[200]. Transplants easily[200]. The flowers are very fragrant[245]. The bruised foliage has an aromatic fragrance[245]. The flowers are considered to be one of the best bee plants in Japan[245]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Attractive flowers or blooms.

## 6.2.477 Phellodendron lavallei

Lavalle corktree

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 10 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Phellodendron lavallei is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: OilFruit[105, 1771. This use refers to the closely related P. amurense, it almost certainly applies to this tree as well[K]. The fruit is about 1cm in diameter and has a strong scent of turpentine, it is produced copiously in Britain[200].

tcanta Cork Dye Insecticide Oil WoodThe bark is thick and corky[200]. Can this be used as a source of cork[K]? The following uses are for the closely related P. amurense. They almost certainly also apply to this tree. A vellow dye is obtained from the inner bark[178]. An oil obtained from the seed has insecticidal properties similar to pyrethrum[57]. Wood - heavy, hard, strong, close grained. Used for furniture[74].

nrakta E. Asia - N. and C. Japan. ksacta Woods in mountains[58].

propta Seed - best sown in the autumn in a cold frame[200]. Stored seed requires 2 months cold stratification, sow in late winter in a cold frame[78, 113]. Germination is usually good. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 -10cm with a heel, July/August in a frame. Pot up in autumn and over winter in a cold frame. Fair to good percentage [78]. Root cuttings - obtain in December and store in leafmold in a warm place for 3 weeks. Cut into 4cm lengths and plant horizontally in pots. Grow on in a warm greenhouse. Good percentage[78].

nwatta Prefers a moisture retentive well-drained deep rich loam in an open position in full sun[11, 200]. Grows best in areas with long hot summers[200]. Plants are gross feeders and require a rich soil if they are to perform well[11]. Dormant plants are hardy to at least -20°c, but the young growth is liable to damage from late spring frosts[11, 200]. This species is occasionally cultivated for timber in S.E. Europe[50]. Dioecious. Male and female plants must be grown if seed is required. The fruit is produced copiously on trees in Britain[200].

## 6.2.478 Pyrus serrulata

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 10 m hkuc

hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Pyrus serrulata is a deciduous Tree growing to 10 (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is about 1.5cm in diameter[200].

nrakta E. Asia - China, ksacta Thickets in W. Hupeh. 600 - 1600 metres[109]. Among shrubs, forest margins and thickets at elevations of 100 - 1600 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to at least -15°c[200]. A very ornamental tree. This species is closely related to P. serotina, differing mainly in having smaller fruit[109].

## 6.2.479 Magnolia denudata

Lily Tree, Yulan Magnolia

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Magnolia denudata is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from March to May, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: Edible Uses: CondimentThe flowers, after the calvx has been removed, are pickled and used for flavouring rice[183].

dwatta Anodyne Antifungal Astringent Carminative Cytotoxic Diaphoretic Hypotensive Sedative Tonic Uterine tonicTonic[177]. The flower buds and the seeds are carminative and diaphoretic[218]. The flower buds are antifungal, astringent, cytotoxic, hypotensive and a uterie stimulant[279]. They are used in Korea in the treatment of headaches, nasal obstruction and sinusitis[279]. They are picked in early spring, dried and then used in Chinese medicine to clear the nasal passages[177]. The plant is anodyne and sedative[218].

nrakta E. Asia - E. and S. China. ksacta Found in thickets, the trees are often cut down and sprouting from the base[109]. Forests at elevations of 500 - 1000 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200].

nwatta Landscape Uses:Border, Espalier, Firewood, Pest tolerant, Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Succeeds in an acid or neutral peaty soil in sun or part shade[184]. Tolerates alkaline soils so long as they are deep and rich in humus[188]. The branches are brittle so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. A very ornamental tree[1], it is hardy to about -20°c when dormant[184] but plants can be excited into early growth by mild winters and the flowers are then liable to be killed by frost[11]. The flowers, which begin to be produced when the plant is guite young, are deliciously scented[245]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. Special Features: Not North American native, Fragrant flowers, Blooms are very showy.

#### 6.2.480 Sorbus commixta

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sorbus commixta is a deciduous Tree growing to 10 m (32ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or cooked[105]. About 7.5mm across[200], it is produced in fairly large bunches making harvesting easy[K]. Leaves - cooked. A famine food when all else fails[177]. The leaves may contain cyanogens so caution is advised.

nrakta E. Asia - Japan. ksacta Mountains all over

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Dislikes dry soils[188]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. This species is suitable for street planting[200].

## 6.2.481 Picrasma guassioides

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Picrasma guassioides is a deciduous Tree growing to 10 m (32ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: FruitEdible Uses: Condiment TeaFruit[105, 177]. Small and red[183]. The fruit is a berry about 7mm in diameter[200]. Young buds (the report does not say if they are flower or leaf buds) are used to make a tea[177, 179, 183]. A bitter substance called quassin' is extracted from (the bark of?) the tree and can be used as a hop substitute in brewing beer[183].

tcanta Insecticide Parasiticide WoodThe bark is used as an insecticide[46, 61]. Another report says that it is the wood that is used[240]. It is a substitute for the insecticide quassia, which is obtained from the wood of a tropical tree[240]. Quassia is a relatively safe organic insecticide that breaks down quickly and is of low toxicity to mammals. It has been used as a parasiticide to get rid of lice, fleas etc. Wood - hard, fine and close grained. Used for mosaic, utensils etc[46, 61,

dwatta Anthelmintic Antiviral Bitter Febrifuge Hypotensive Parasiticide Stomachic TonicThe wood contains a number of medicinal compounds and has been shown to be anthelmintic, antiamoebal, antiviral, bitter, hypotensive and stomachic[279]. It increases the flow of gastric juices[279]. It is used in Korea in the treatment of digestive problems, especially chronic dyspepsia[279]. A decoction of the stem bark is bitter, febrifuge and tonic[46, 61, 146, 158, 174, 218, 240, 272]. The leaves have been used to treat itchy skins[240, 272]. (Probably acting by killing body parasites[K].

nrakta E. Asia - China, Japan, Korea. ksacta Lowland woods and hills[58]. Forests in the higher hills of the W. Himalayas, in ravines under forests of deodar, oak, fir etc, 1800 2400 metres[146].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 3 months cold stratification[113] and should be sown as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Root cuttings 4cm long in December. Plant them out horizontally in pots in a greenhouse[78].

nwatta Requires a fertile humus-rich moisture-retentive loam in a sunny position[200]. Plants also succeed when growing in semi-shade[188]. According to [200] this plant is only hardy to zone 10 (not tolerating frosts) but there are healthy trees in many parts of Britain including one 8.5 metres tall at Kew in 1981, one 8 metres tall seen growing in light woodland shade at Cambridge Botanical Gardens where it was bearing fruit in the autumn of 1996 and one 9 metres tall at Westonbirt in 1980[11, K].

## 6.2.482 Euptelea pleiosperma

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euptelea pleiosperma is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked. A famine food, used when all else fails[179].

nrakta E. Asia - China, Himalayas. ksacta Thickets and open wood margins, especially near streams in Sichuan[109]. Forests in valleys at elevations of 900 - 3600 metres[266].

#### 6.2.494 Vaccinium elliottii

Elliott's blueberry

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium elliottii is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is about 8mm in diameter[200]. nrakta South-eastern N. America - Virginia to Florida and Texas. ksacta Woods, thickets and swamps[43]. Pinelands[235]

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.495 Staphylea colchica

Bladdernut

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Staphylea colchica is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers

kcakta Edible Parts: Flowers OilEdible Uses: OilFlower buds[74]. No further details are given.

tcanta OilAn oil from the seed tastes like pistachio nuts but is purgative[74]. The report did not say if the oil had other uses.

dwatta PurgativePurgative[74].

nrakta W. Asia - S.W. Caucasus. ksacta Forests to 1200 metres[74, 184].

propta Seed - this can be very slow to germinate, sometimes taking 18 months or more. It is best sown as soon as it is ripe in a cold frame[200], and some of it at least should then germinate in the spring. Stored seed should be sown as early in the year as possible and given cold stratification - it might not germinate until spring of the following year. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first winter. Plant them out early the following summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Fair to good percentage[78]. Layering in July/August. Takes 15 months. Good percentage[78].

nwatta Tolerant of a wide range of soils so long as they are not too dry[182, 200], it prefers a rich loamy soil in full sun or semi-shade[1, 11, 200]. Prefers a neutral to acid soil but tolerates some alkalinity[202]. A very ornamental plant. it is hardy to about -20°c[184]. Fairly fast-growing when young, but slowing with age[202]. Flowers best in years that follow hot summers[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.496 Clematis patens

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Clematis patens is a deciduous Climber growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[105, 177]. Some caution is advised, see the notes above on toxicity

nrakta E. Asia - China, central and southern Japan. ksacta Forests, slopes and scrub at elevations of 200 - 1000 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants do not generally require pruning, any dead, unwanted or weak shoots are best removed in the winter or early spring[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

## 6.2.497 Clematis flammula

Fragrant Virgin's Bower, Fragrant clematis 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Clematis flammula is a deciduous Climber growing to 4 m (13ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from March to December, in flower from August to October, and the seeds ripen from October to January. The species is hermaphrodite (has both male and female organs) and is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil

pcista Leaves contain the glycoside Phillyrin[179], its potency is unknown.

kcakta Edible Parts: LeavesEdible Uses: RutinYoung leaves - cooked[105, 177, 179]. Some caution is advised due to the presence of a glycoside[179]. The leaves are rich in rutin[218].

tcanta The sub-species F. suspensa sieboldii is a lax grower that roots freely where the branches touch the ground. It makes a very good tall ground cover when planted about 2.5 metres apart each way [208]. Landscape Uses: Border, Erosion control, Espalier, Massing, Screen.

dwatta Antidote Antiphlogistic Antitussive Cancer Diuretic Emmenagogue Febrifuge Laxative Tonic Urinary VermifugeLian Qiao has been used in Chinese herbalism for over 4,000 years and is considered to be one of the 50 fundamental herbs[218]. A bitter tasting pungent herb with an antiseptic effect, it is chiefly used to treat boils, carbuncles, mumps and infected neck glands[254]. The fruit is a bitter astringent herb that stimulates the heart, nervous system and gall bladder[238]. It contains vitamin P, which is used to strengthen capillaries[238]. The fruit is also antidote, antiphlogistic, antitussive, diuretic, emmenagogue, febrifuge, laxative and tonic[116, 147, 174, 176, 178, 218, 238]. It is used internally in the treatment of acute infectious diseases such as mumps, and also for tonsillitis, urinary tract infections allergic rashes etc[238]. The fruit is harvested when fully ripe and is dried for use in decoctions[238]. The plant has a similar action to Lonicera japonica and is usually used in combination with that species to achieve a stronger action[176]. The flowers have a broad-spectrum antibacterial action, inhibiting the growth of Staphylococcus aureus, Shigella dysenteriae, haemolytic streptococcus, Pneumococcus. Bacillus typhi. Mycobacterium tuberculi etc[176]. The plant is vermifuge, though the part used is not stated[116, 147, 174, 178]. The leaves are febrifuge and are also poulticed onto ulcerated glands and haemorrhoids[218]. A decoction of the leaves and twigs is used in the treatment of breast cancer[61]. The root is used in the treatment of cancer, colds, fever and jaundice[218].

nrakta E. Asia - E. China. ksacta Thickets, moors and cliffs, 300 - 1200 metres[109]. Thickets or grassy areas on slopes, valleys and gullies at elevations of 300 - 2200 me-

propta Seed - sow spring in a cold frame. The seed usually germinates within 2 months[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 15cm taken at a node, July/August in a frame. Plant out in autumn or spring. A very high percentage, they root within 3 weeks[78]. Cuttings of mature wood in a sheltered outdoor bed. Good percentage[78]. Layering in spring or summer. Plants often self-layer[K].

nwatta An easily grown plant, it succeeds in all soil types[202] but prefers a rich soil. Succeeds in limey soils. Grows well in heavy clay soils. It prefers a sunny position but succeeds in semi shade though it is apt to get leggy if grown in the shade of trees[182]. Succeeds against a north-facing wall[219]. Plants are hardy to about -25°c[184]. The flowers are produced quite early in the year and are frost-resistant[182]. Plants are medium to fast growing[202]. Flowers are produced on wood that is more than one year old[202]. Any pruning is best done after the plant has finished flowering[182]. A very ornamental plant, there are several named varieties[182]. This species is notably susceptible to honey fungus[200]. Special Features: Not North American native, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

## 6.2.493 Cotinus coggygria

Smoke Tree, European smoketree, Venetian Sumac, Wig Tree, Smoke Tree

5 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 5 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasilutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cotinus coggygria is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to July, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Skin contact with this plant can cause dermatitis in sensitive people[200]. Though related to several poisonous species, this species is definitely not poisonous[65].

kcakta Edible Parts: LeavesEdible Uses: Leaves[2, 179]. They are possibly edible[105, 177]. Some caution is advised. A volatile oil in the leaves contains pinene and camphene[179]. One report suggests that the essential oil contained in the flowers and leaves has a mango-like odour[158]. We have tried these leaves and really would not recommend them to anyone[K].

tcanta Basketry Dye Essential Tannin WoodAn essential oil is obtained from the leaves and flowers[105]. It has a mango-like smell[158]. Is it edible[K]? A yellow to orange dye is obtained from the root and stem[1, 4, 11, 14, 57]. It is somewhat fugitive though[4]. The leaves and bark are a good source of tannins[46, 61, 158]. Wood - ornamental. Used for cabinet making, picture frames[158]. The twigs are used in basketry[158].

dwatta Cholagogue Febrifuge OphthalmicThe yellow wood is used as a cholagogue, febrifuge and for eye ailments[218].

nrakta S. Europe to W. Asia. ksacta Dry hillsides, rocky places and open woods, usually on limestone, to 1300 metres[45, 50, 89].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 113, 200]. It should germinate in the spring. Slightly immature or 'green' seed, harvested when it has fully developed but before it dries on the plant, gives the best results[113]. Warm stratify stored seed for 2 - 3 months at 15°c, then cold stratify for 2 - 3 months[164]. Germination can be very slow, often taking 12 months or more at 15°c[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed has a long viability and should store for several years[113]. Cuttings of halfripe wood, July/August in a frame[113]. Trench layering in spring[200].

nwatta Industrial Crop: Dye Industrial Crop: Tannin Management: Coppice Wild CropLandscape Uses: Border, Container, Massing, Pollard, Screen, Standard, Specimen, Tolerates most soils[202], Prefers a well-drained dry or moist soil in a sunny position[108, 200], doing better in a soil that is not very rich[11, 49]. Prefers a fertile but not over-rich soil[188]. Tolerates light shade[188]. Established plants are drought tolerant. Plants are hardy to about -20°c[184], though die-back often occurs at the tips of shoots during the winter[202]. Plants are slow to establish but are then guite fast growing when young though they slow down with age[202]. Hybridizes with C. oboyatus[182]. A number of cultivars have been developed for their ornamental value[182, 200]. The purple-leafed cultivars are susceptible to mildew[202]. Plants flower on wood that is at least 3 years old[202]. Any pruning is best done in the spring[202]. Branches sometimes wilt, especially after hard pruning, and these should be removed[182]. This species is notably resistant to honey fungus[88, 200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Not North American native, Attractive flowers or blooms.

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering.

nwatta Prefers an open moderately rich free soil[1] and full sun[200]. Grows well in an open situation in a woodland garden or shrub border[200].

## 6.2.483 Lonicera affinis

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lonicera affinis is an evergreen Climber growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers FruitEdible Uses: Fruit[177]. No more details are given. The fruit is about 7mm in diameter[200]. Flowers. Used as a flavouring in drinks[177]

dwatta SkinA tea made from the flowers and leaves is used to treat rashes and boils[218].

nrakta E. Asia - China, C. and S. Japan. ksacta In thickets or edges of forests, mainly in warm coastal areas at elevations of 10 - 800 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 2 months cold stratification[113] and should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 -10cm with or without a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with or without a heel. November in a cold frame. Good percentage[78]. Layering in autumn[200].

nwatta Prefers a good moist soil with its roots in the shade and its top growing into the light[200]. A climbing plant, supporting itself by twining around other plants[219].

## 6.2.484 Cornus occidentalis

Western Dogwood

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

wis hpa7tmwatli xre7t hionli

drutta Cornus occidentalis is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. They were often eaten by native North Americans, but they are bitter and acid[161, 257].

dwatta OphthalmicThe bitter-tasting bark is astringent, ophthalmic and tonic[118, 257]. An infusion has been used as a wash for sore eyes[257].

nrakta Western N. America. ksacta Moist soils, especially by streams[60].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the

seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Lavering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in poorly drained soils[200]. Succeeds in full sun or light shade[[188]. Allied to C. stolonifera and considered to be part of that species by some botanists[11, 60, 200]. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.485 Ptelea baldwinii

Common hoptree

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ptelea baldwinii is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed. Ground into a powder and mixed with yeast to make a bread[106].

nrakta South-eastern N. America. ksacta Sandy places[72]

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed requires 3 months cold stratification at 5°c and should be sown as early as possible in the year[113]. Very little of the seed produced in Britain is viable[11]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a greenhouse or cold frame for their first winter. Plant them out in early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Layering.

nwatta Succeeds in any fertile well-drained moisture retentive soil in full sun or light part day shade[11, 200]. The young growth in spring can be damaged by late frosts. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.486 Acer acuminatum

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Acer acuminatum is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[183].

tcanta Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20], Wood compact, moderately hard. It is seldom used[158].

nrakta E. Asia - W. Himalayas. ksacta Open ravines on shady aspects at altitudes between 2400 - 3300 metres[158].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Good results are usually obtained.

nwatta Of easy cultivation, it prefers a good moist well-drained soil[1, 11] in a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. This species is often confused with A. papilio[11]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Dioecious. Male and female plants must be grown if seed is required.

## 6.2.487 Viburnum cylindricum

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum cylindricum is an evergreen Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Oil OilEdible Uses: Oil OilAn edible oil is obtained from the seed[105, 146, 158, 179]. It is used for cooking[272].

tcanta Oil Oil WoodAn oil from the seed is used as a luminant[146]. Wood - hard, close grained[146, 158].

dwatta SkinThe oil from the seed is used to soothe itchy skin[272].

nrakta E. Asia - China to Burma and the Himalayas. ksacta Rather dry forests, mainly with rhododendron and oak, 1200 - 2400 metres from Himachel Pradesh to S.W. China[51,

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, succeeding in most soils but ill-adapted for poor soils and dry situations[1]. Prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in spring[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. The flowers are sweetly scented[245].

## 6.2.488 Weigela coraeensis

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Weigela coraeensis is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105]. A famine food, they are only used when all else fails[177].

nrakta E. Asia - Japan. ksacta Grows near seashores all over Japan[58].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter or early spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Softwood basal cuttings, 10 - 12cm long, in a sandy soil in a cold frame in early summer[200]. Cuttings of halfripe wood, 8 - 10 cm with a heel, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth. 20 cm long, November in a sheltered outdoor nursery bed[200].

nwatta An easily grown plant, succeeding in most fertile soils[11, 200]. Prefers a moist well-drained soil in sun or partial shade[200]. Tolerates atmospheric pollution[200]. Judging by the plants native range, it is likely to succeed in maritime exposure[K]. Plants are very floriferous and can exhaust themselves, literally flowering themselves to death. The flowers are borne in the leaf nodes of the previous years growth and any pruning is therefore best done as soon as the plant has finished flowering[182]. There are some named forms, selected for their ornamental value[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.489 Clematis chinensis

Wei Ling Xian

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Clematis chinensis is a deciduous Climber growing to 5 m (16ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This species is harmful if eaten[238]. The toxic principle is dissipated by heat or by drying[65]. The plant is also a mild skin irritant[238].

kcakta Edible Parts: LeavesEdible Uses: Young shoots-cooked[179]. They are said to be non-toxic in one report[179] but caution is still advised due to reports of toxicity in this genus[238]. It is quite probable that cooking destroys the acrimonious principle, though this is a plant that I have no desire to eat[K].

dwatta Anodyne Antidote Antiperiodic Antirheumatic Antispasmodic Antitumor Cancer Carminative DiureticThe root is anodyne, antidote, antiperiodic, antispasmodic, carminative, diuretic and sedative[147, 176, 178, 218, 238]. A decoction is taken internally in the treatment of rheumatism and arthritis, tetanus and cold-type stomach-ache[147, 238]. The root is harvested in the autumn and dried for later use[238]. The whole plant is antirheumatic[147, 176, 178, 218]. The plant has a history of folk use in the treatment of cancer[147, 176, 178, 218]. The root contains anemonin, this has antibacterial, analgesic, sedative and antispasmodic

actions. It also inhibits the heart and central nervous system and is rubefacient[176].

nrakta E. Asia - C. and W. China. ksacta Open woods, hedges, thickets, roadsides and banks of streams[109, 147, 238]

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early summer[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade and its shoots growing up to the light[164]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[11]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants flower in the autumn on the current season's growth, any pruning is best carried out in the spring before new growth begins[219, 238]. The flowers are produced guite late in the season and can be damaged by late frosts, so plants generally do better in the milder western parts of the country[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. The flowers are often damaged by winter cold[11].

## 6.2.490 Clematis terniflora

Sennin-So, Sweet autumn virginsbower, Sweet Autumn Clematis, Fall Clematis

5 tlin 9 cyuc 1 kcak 1 tcan 1 dwat 5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Clematis terniflora is a PERENNIAL CLIMBER growing to 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: Flowers LeavesEdible Uses: Young shoots - cooked[105, 177]. Parboiled, then eaten boiled or oil-roasted[183]. Some caution is advised, see the notes above on toxicity. The young buds (Does this refer to flower or leaf buds?) are parboiled then eaten boiled or oil-roasted, or they can be pickled in vinegar[183]. Flowers[105, 183]. No more details are given.

tcanta As an ornamental but can be invasive so plant with care. It's a vigorous climber.

dwatta Antidote Antiscrophulatic OphthalmicAntidote, antiscrofulatic, ophthalmic. Used in the treatment of corneal opacities [178].

nrakta E. Asia - China, Japan. ksacta Hedgerows in Kiangsi around 100 metres[109]. Forest margins, scrub on slopes, grassy areas on hills, among rocks in coastal areas; near sea level to 800 metres[266]. propta Seed - best sown as soon as it is ripe in a cold frame [164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible [164]. A period of cold stratification is beneficial [164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame [200]. Layering of old stems in late winter or early spring [200]. Layering of current seasons growth in early summer [200].

nwatta Landscape Uses: Arbor, Ground cover, Specimen. Prefers a deep moist soil in a sunny position[200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. This species has the potential to spread from cultivation in areas where it has been introduced and could become problematic[274]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features: Attractive foliage, Not North American native, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms.

## 6.2.491 Weigela decora

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Weigela decora is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105]. They can be boiled with rice or millet[177].

nrakta E. Asia - C. and S. Japan. ksacta In sunny places at elevations of 100 - 2300 metres[275].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter or early spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Softwood basal cuttings, 10 - 12cm long, in a sandy soil in a cold frame in early summer[200]. Cuttings of half-ripe wood, 8 - 10 cm with a heel, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth. 20 cm long, November in a sheltered outdoor nursery bed[200].

nwatta An easily grown plant, succeeding in most fertile soils[11, 200]. Prefers a moist well-drained soil in sun or partial shade[200]. Tolerates atmospheric pollution[200]. Plants are very floriferous and can exhaust themselves, literally flowering themselves to death. The flowers are borne in the leaf nodes of the previous years growth and any pruning is therefore best done as soon as the plant has finished flowering[182]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.492 Forsythia suspensa

Lian Qiao, Weeping forsythia 5 tlin 8 cyuc 1 kcak 3 tcan 3 dwat 5 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli dyatxre7t hjonli

drutta Forsythia suspensa is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from March to April. The species is

plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

tcanta Basketry FodderThe stems are very flexible and are occasionally used in basket making[199]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta E. Asia - N. Japan. ksacta Not known

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth. November to February in a sheltered outdoor hed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

Coppice Other Systems: SRC Regional CropSucceeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. This species is very closely related to S. purpurea[11, 199]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

## 6.2.668 Atractylodes macrocephala

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Atractylodes macrocephala is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antibacterial Diuretic Sedative Stomachic TonicBai Zhu is widely used in traditional Chinese medicine[238]. The root contains an essential oil, glucoside and inulin[283]. It is a bitter-sweet tonic herb that acts mainly upon the digestive system and strengthens the spleen[238, 254]. The root is antibacterial, diuretic, hypoglycaemic, sedative, stomachic and tonic[176, 238]. It is used in the treatment of poor appetite, dyspepsia, abdominal distension, chronic diarrhoea, oedema and spontaneous sweating[176]. It is often used in conjunction with other herbs such as Codonopsis tangshen and Glycyrrhiza uralensis[238]. Combined with Baical skullcap (Scutellaria baicalensis) it is used to prevent miscarriage[254]. The roots are harvested in the autumn and baked for use in tonics[238].

nrakta E. Asia - China, Japan and Korea, ksacta Pastures and waste ground[238]. Grassland and forests at elevations of 600 - 2800 metres[266].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in the following spring or early summer.

nwatta Succeeds in any well-drained soil in sun or partial shade[238]. This species is probably hardy in most of Britain, it tolerates temperatures down to at least -15°c[238]. Widely cultivated in China for its use as a medicinal herb[238,

2661. This species is dioecious. Both male and female plants need to be grown if seed is required[266].

## 6.2.669 Primula macrophylla

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat m hkuc

htut cvutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Primula macrophylla is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Antiinflammatory FebrifugeThe entire plant is used in Tibetan medicine, it is said to have a bitter taste and a cooling potency[241]. Antidiarrhetic, anti-inflammatory and febrifuge, it is used in the treatment of diarrhoea, inflammation of the liver, gall bladder, stomach and intestines[241]. It is especially used for children with high fever and diarrhoea[241].

nrakta E. Asia - Himalayas from Afghanistan to China. nwatta Fodder: Bank Industrial Crop: Biomass Management acta Grassy mountain slopes, rock crevices, wet meadows and marshes at elevations of 4000 - 5200 metres[266].

> propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn. This is best done every other year[200].

> nwatta A plant of high alpine areas, it is of difficult cultivation in Britain[200]. In the wild it experiences wet summers, relatively dry autumns and long winters under a blanket of snow that protects the bulb-like resting bud[200]. It is best to give the plants a deep, well-drained soil in a sunny position with the added protection of a pane of glass[200].

## 6.2.670 Ageratina herbacea

Fragrant Snakeroot

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ageratina herbacea is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta A cold infusion of the plant is drunk and also used as a lotion in the treatment of headaches and fevers[257].

nrakta South-western to South Central N. America. ksacta Pinyon-Juniper Woodland at elevations of 1500 - 2200 metres in California[276].

propta Seed - sow spring in a cold frame, only just covering the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Succeeds in an ordinary well-drained but moisture retentive garden soil in sun or part shade[200].

## 6.2.671 Carex morrowii

Iwashiba, Japanese Sedge

5 tlin 9 cvuc 0 kcak 4 tcan 0 dwat m hkuc

pcimhmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Carex morrowii is an evergreen Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic piced annually when grown for basket making, though it medium (loamy) and heavy (clay) soils. Suitable pH: mildly is possible to coppice it every two years if thick poles are required as uprights. The bark has been used extensively in basket making[257]. Fibres from the inner bark can be twisted into long ropes[226]. The soft roots have been used as a towel to rub down after bathing[257]. An infusion of the roots has been used as a hair wash[257]. Wood - light, soft, close grained[82]. Dynamic accumulator.

dwatta Anodyne Antidote Febrifuge MiscellanyThe leaves have been used as an antidote to shellfish poisoning[257]. The fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta Western N. America - Alaska to California. ksacta Borders of salt marshes and ponds, also on sandy coastal dunes[82]. Streams, ponds and sloughs near the shore[229].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Tolerates maritime exposure[11, 200]. A fastgrowing but short-lived species[229]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is

## 6.2.549 Kalimeris pinnatifida

Japanese Aster

5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Kalimeris pinnatifida is a PERENNIAL growing to 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young plants - cooked[1, 46, 61, 105, 177].

nrakta E. Asia - China, Japan. ksacta Hills and low mountains in C. Japan[58].

propta Seed - sow spring in a greenhouse and only just cover. Keep the compost moist. The seed usually germinates in 2 - 3 weeks at 15°c[138]. Grow on in cool conditions, about 10°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer after the last expected frosts. Division in spring. This should be done at least every 3 years in order to maintain the vigour of the plant.

nwatta Landscape Uses:Border, Container, Massing, Specimen. Prefers a moist loamy soil[138] though it succeeds in most soils[1]. Cultivated as a vegetable in Japan[46].

## 6.2.550 Spiraea nervosa angustifolia

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Spiraea nervosa angustifolia is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy),

acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea[177, 183].

nrakta E. Asia - China, Japan, ksacta Thickets and ravines, 300 - 1300 metres in W. Hupeh[109].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame[200]. Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent posi-

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. This species has not proved to be very hardy in Britain, it is often killed back to ground level in barsh winters but usually resprouts from the base[11]. Hybridizes freely with other members of this genus[11].

## 6.2.551 Pennisetum alopecuroides

Chinese Fountain Grass, Fountain Grass, Swamp Foxtail Grass Chinese Fountain Grass

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pennisetum alopecuroides is a deciduous Perennial growing to 1.5 m (5ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. It can be ground into a powder and used as a flour[105]. An emergency food, used when all else fails[177].

tcanta Plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200]. They are best spaced about 45cm apart each way[208].

nrakta E. Asia - Japan. ksacta Grassy places and waste ground in lowland all over Japan[58].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination usually takes place within 3 weeks. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Massing, Rock garden, Seashore, Specimen. Requires a light well-drained soil in a sunny position[162]. Succeeds in dry soils and, once established, tolerates drought[190]. This species is only hardy in the mild areas of Britain[162]. Plants are growing well at Cambridge botanical gardens, which is certainly not one of the milder areas of the country[K]. There are many named varieties selected for their ornamental value[200]. Plants do not flower freely in Britain except in warm sunny autumns[208]. Older clumps are more shy of flowering than young clumps[208]. Special Features: Attracts birds, Attractive foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Attractive flowers or blooms.

#### 6.2.552 Potentilla bicolor

5tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla bicolor is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[61].

nrakta A hybrid of garden origin, P. atrosanguinea x P. argyrophylla. ksacta Not known in the wild.

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This is a hybrid species and it will not come true from seed. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta An easily grown plant, succeeding in a well-drained loam, preferring a position in full sun but tolerating shade[1]. It prefers an alkaline soil but tolerates a slightly acid soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.553 Panax pseudoginseng

Ginseng, Japanese ginseng 5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 1 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Panax pseudoginseng is a PERENNIAL growing to 1 m (3ft 3in) by 0.7 m (2ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Avoid during pregnancy and breastfeeding. Avoid if on anticoagulants or ticlodipine (for blood clot formation) [301].

kcakta Edible Parts: LeavesEdible Uses: Drink TeaYoung leaves and shoots - cooked as a vegetable[272]. The roots are chewed, used as a flavouring in liqueurs or made into a tea[183].

dwatta Antibacterial Antiinflammatory Antiseptic Aphrodisiac Cardiotonic Diuretic Expectorant Haemostatic Hypoglycaemic StimulantThe roots and the flowers are antibacterial, anti-inflammatory, antiseptic, aphrodisiac, cardiotonic, diuretic, expectorant, haemostatic, hypoglycaemic and stimulant[176, 238, 272]. The root is used internally in the treatment of indigestion, vomiting, coronary heart disease and angina[238, 272]. The roots are also used both internally and externally in the treatment of nosebleeds, haemorrhages from the lungs, digestive tract and uterus, and injuries[238]. The roots are harvested in the autumn, preferably from plants 6 - 7 years old, and can be used fresh or dried[238]. The flowers are used to treat vertigo and dizziness[238].

nrakta E. Asia - China to the Himalayas and Burma. ksacta Forests and shrubberies, 2100 - 4300 metres in C. Nepal in the Himalayas[51]. Moist shady places at elevations of 2000 - 3300 metres in Nepal[272].

propta Seed - sow in a shady position in a cold frame preferably as soon as it is ripe, otherwise as soon as the seed is obtained. It can be very slow and erratic to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a shady position in the greenhouse or frame for at least their first winter.

Make sure the pots are deep enough to accommodate the roots. Plant out into their permanent positions in late summer. Division in spring.

nwatta Requires à moist humus rich soil in a shady position in a woodland[200]. Plants are hardy to at least 15°c[238]. Nomenclature of this genus is rather confused with some botanists recognising P ginseng as a variable plant that includes this species. Other botanists divide it into 4 or even 5 distinct species, giving this plant specific status. This plant has been grossly over-collected from the wild for its use as a medicinal plant and it is rapidly approaching extinction in most parts of its range[238]. The sub-species P pseudo-ginseng notoginseng. (Burkill.)Hoo. and Tseng. is the form used medicinally in China[176], this plant is given a separate entry in this database[K].

## 6.2.554 Berberis soulieana

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Berberis soulieana is an evergreen Shrub growing to 1.5 m (5fl). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It brefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or

tcanta DyeA good informal hedging plant[200]. A yellow dye is obtained from the roots.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

#### 6.2.555 Vaccinium smallii

5tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium smallii is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow

dwatta Antiseptic AntitumorThe plant contains the antiseptic and antitumor compound aristolochic acid[222]. A decoction of the root has been used externally to treat 'swelling of feet and legs'[257]. A compound infusion of stalk chips has been used in the treatment of 'yellowish urine'[257].

nrakta Eastern N. America - Pennsylvania to Minnesota, Georgia, Tennessee and Kansas. ksacta Moist, rich woodlands[200, 235]. Forests, often on dissected uplands and rugged, rocky slopes; Cumberland and Blue Ridge mountains at elevations of 50 - 1300 metres[270].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Pre-soak stored seed for 48 hours in hand-hot water and surface sow in a greenhouse[134]. Germination usually takes place within 1- 3 months at  $20\,^{\circ}c[134]$ . Stored seed germinates better if it is given 3 months cold stratification at  $5\,^{\circ}c[200]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer after the last expected frosts. Division in autumn[200]. Root cuttings in winter[200]

nwatta Landscape Uses:Arbor, Screen. Prefers a well-drained loamy soil, rich in organic matter, in sun or semishade[1, 200], but succeeds in ordinary garden soil[134]. Plants are hardy to at least -10°c[200]. A fast-growing climbing plant, attaching itself by means of twining around other plants, it has been recommended for covering pergolas[200]. Most species in this genus have malodorous flowers that are pollinated by flies[200]. Special Features:Attracts birds, Attractive foliage, North American native, All or parts of this plant are poisonous, Attracts butterflies, Attractive flowers or blooms.

## 6.2.665 Forsythia viridissima

Golden Bells, Greenstem forsythia, Forsythia 5 tlin 8 cyuc 0 kcak 3 tcan 2 dwat 2.5 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli dyatxre7t hjonli

drutta Forsythia viridissima is a deciduous Shrub growing to 2.5 m (8ft 2in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Leaves contain the glycoside Phillyrin[179], its potency is unknown.

tcanta Landscape Uses: Border, Erosion control, Ground cover, Massing.

dwatta Antibacterial Antifungal Antispasmodic EmmenagogueThe fruit is antibacterial, antifungal, antispasmdic and emmenagogue[279]. It is used in Korea to treat carbuncles, mastitis, inflammation, suppuration, lymphadenitis and suppressed menstruation[279].

nrakta E. Asia - China. ksacta Ravines, margin of woods near river valleys and streamsides[266].

propta Seed - sow spring in a cold frame. The seed usually germinates within 2 months[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 15cm taken at a node, July/August in a frame. Plant out in autumn or spring. A very high percentage, they root within 3 weeks[78]. Cuttings of mature wood in a sheltered outdoor bed. Good percentage[78]. Layering in spring or summer. Plants often self-layer[K].

nwatta An easily grown plant, it succeeds in all soil types[202] but prefers a rich soil. Succeeds in limey soils Grows well in heavy clay soils. It prefers a sunny position but succeeds in semi shade though it is apt to get leggy if grown in the shade of trees[182]. Succeeds against a north-facing wall[219]. Plants are hardy to about -25°c[184]. Plants are medium to fast growing[202]. Flowers are produced on wood that is more than one year old[202]. Any pruning is best done immediately after the plant has finished flowering[182].

200]. There are some named varieties, selected for their ornamental value[11, 200]. This species is notably susceptible to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

## 6.2.666 Magnolia macrophylla

Bigleaf Magnolia

5 tlin 8 cyuc 0 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Magnolia macrophylla is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant is not wind tolerant. It can tolerate atmospheric pollution.

tcanta WoodWood - soft, light, not strong, close-grained. Used for flooring, cabinet making etc[61]. The wood is hard but weak according to another reports, which say that it is not used commercially[82, 229]. The wood weighs 33lb per cubic foot[235].

dwatta Odontalgic StomachicAn infusion of the bark has been used in the treatment of stomach aches or cramps[257]. A hot infusion of the bark has been snuffed for treating sinus problems and has been held in the mouth for treating toothache[257].

nrakta South-eastern N. America - Kentucky to North Carolina, Florida, Arkansas and Louisiana. ksacta Usually growing in isolated groups of a few individuals in sheltered deep rich woods. often in ravines and river vallevs

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200].

nwatta Landscape Uses:Firewood, Pest tolerant, Specimen. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Dislikes limey soils[11]. Prefers a neutral to acid soil but tolerates alkaline soils so long as they are deep and rich in humus[188]. The branches are brittle and the leaves very large, so a sheltered position is required[200, 229]. Very tolerant of atmospheric pollution[200]. Dormant mature plants are hardy to about -20°c[200] but the plants are apt to be damaged by late frosts when they are young[1]. Trees are slow-growing in the wild[229] and do not commence flowering until they are mature[245]. The leaves are very large and can be up to 80cm long by 25cm wide[229]. The flowers are sweetly scented[229, 245]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. Special Features: Attractive foliage, North American native, Fragrant flowers, Blooms are very showy.

## 6.2.667 Salix miyabeana

5 tlin 9 cyuc 0 kcak 3 tcan 2 dwat m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix miyabeana is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female

be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years[78].

nwatta Succeeds in most soils so long as they are not water-logged[200]. This species is related to I. crenata[11]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or  $\mathsf{two}[\mathsf{K}].$  Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

## 6.2.662 Euonymus fortunei

Winter Creeper, Wintercreeper Euonymus 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 4.5 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euonymus fortunei is an evergreen Climber growing to  $4.5 \, \mathrm{m} \, (14 \, \mathrm{ft}) \, \mathrm{p} \, 10 \, \mathrm{m} \, (32 \, \mathrm{t}) \, \mathrm{a} \, \mathrm{t} \, \mathrm{a} \, \mathrm{medium} \, \mathrm{rate}.$  See above for USDA hardiness. It is hardy to UK zone  $5. \, \mathrm{lt}$  is in leaf all year, in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers fry or moist soil.

pcista Although no records of toxicity have been seen for this species, a number of plants in this genus are suspected of being poisonous and so some caution is advised.

tcanta Hedge HedgeA good evergreen ground cover plant[184, 200]. The sub species E. fortunei radicans and E. fortunei carrieri are particularly useful, other forms to use include 'Emerald and Gold', 'Emerald Gaiety', 'Coloratus', 'Dart's Carpet' and 'Kewensis[182, 188, 197]. Plants can be grown as a low hedge[29], the varieties 'Emerald and Gold' and 'Variegatus' are normally used. They are very tolerant of clipping[200].

dwatta Cancer Women's complaintsPlants contain the anticancer compound dulcitol[218]. The plant is used in gynaecological applications[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and thickets in low mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Landscape Uses:Container, Erosion control, Ground cover, Massing. Thrives in almost any soil, including chalk, and is particularly suited to dry shaded areas[200]. Grows well in heavy clay soils. Prefers a well-drained loamy soil. Thrives in sunny positions and in deep shade[11, 182], though it does not fruit so well in the shade. Plants are hardy to about -18°c[202]. A shrubby somewhat creeping plant that can also climb by means of aerial roots[184], if placed by a support, a wall, tree or fence, the plant will start to climb it and will be self-attaching to a large degree[182, 219]. Plants do not normally require pruning[219]. Plants have two forms of growth, a juvenile form and a mature form when the plants come into flower[219]. Plants in Britain often retain the juvenile form and never flower[219]. A polymorphic species[58], there are a number of named varieties selected for their ornamental value[182, 202]. Special Features:Not North American native, Invasive, Inconspicuous flowers or blooms.

#### 6.2.663 Abelia triflora

Indian Abeli

5 tlin 9 cyuc 0 kcak 1 tcan 0 dwat 3.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwisslip hpa7tmwatli xre7t hionli

drutta Abelia Triflora is a deciduous Shrub growing to 3.5 m (11ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Wood - hard, close and even-grained. Used for walking sticks[146, 158].

nrakta E. Asia - N.W. Himalayas ksacta Dry scrub and rocky slopes in calcareous soils, 1200 - 4200 metres in Uttar Pradesh[146, 158].

propta Seed - we have no specific information for this plant, but suggest sowing the seed in early spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7-10cm with a slight heel, July in pots of sandy soil in a frame[11]. Takes 3-4 weeks. Very easy, a good percentage of the cuttings root[78]. Cuttings of mature wood, 7-10cm with a heel if possible, November in a cold frame. High percentage[78]. Layering young shoots[245].

nwatta Requires a well-drained open loamy soil[11] in a warm, sheltered sunny position[200, 245]. Plants are best grown in semi-shade[219]. They are intolerant of waterlogging[200] and of dry soils[219]. Succeeds in any soil but new growth is less vigorous in dry soils[202]. One report says that the plant likes a soil with a high chalk content[245], though another says that chlorosis occurs on very alkaline soils[202]. This species is hardy to about -15°c[184], it grows well in the open at Kew[11]. A fairly slow-growing plant, it is shy to flower in British gardens unless placed against a sunny wall[219]. It flowers on wood that is 2 - 3 years old or older[182]. Another report says that the plant flowers on the new wood[219], whilst another says that it flowers on terminal clusters[245]. Any pruning is best done immediately after flowering by thinning out the old wood.[182. 219]. Plants in this genus are notably resistant to honey fungus[200], Closely related to A buddlejoides and A. umbellata[182]. The flowers are wonderfully scented[182], with the fragrance of vanilla[245].

#### 6.2.664 Aristolochia macrophylla

Pipevine, Dutchman's Pipe 5 tlin 8 cyuc 0 keak 0 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Aristolochia macrophylla is a CLIMBER growing to 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is polinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista We have no specific details for this species but most members of this genus have poisonous roots and stems[179]. The plant contains aristolochic acid, this has received rather mixed reports on its toxicity. According to one report aristolochic acid stimulates white blood cell activity and speeds the healing of wounds, but is also carcinogenic and damaging to the kidneys[254]. Another report says that it is an active antitumour agent but is too toxic for clinical use[218]. Another report says that aristolochic acid has anti-cancer properties and can be used in conjunction with chemotherapy and radiotherapy and that it also increases the cellular immunity and phagocytosis function of the phagocytic cells[176].

in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. [105, 177]. The fruit is about 6 mm in diameter [200].

nrakta E. Asia - Japan. ksacta Thickets and sunny places in mountains, C. and N. Japan[58].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.556 Cuscuta japonica

Japanese Dodder

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cuscuta japonica is a ANNUAL CLIMBER growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young growth, boiled and seasoned[177].

dwatta Aphrodisiac Demulcent Diaphoretic Enuresis Hepatic Ophthalmic TonicA sweet, pungent herb that acts mainly as a liver and kidney stimulant[238], the seed of Japanese dodder is aphrodisiac, demulcent, diaphoretic, enuresis, hepatic and tonic[147, 176, 178, 218, 238]. A decoction of the seed is used to treat a variety of complaints including diarrhoea, vaginal discharge, enuresis, backache, constipation and impotence[218]. The young shoots are used to treat sore eyes[218].

nrakta E. Asia - China, Japan, Korea. ksacta Parasitic on shrub branches[147] in lowland and low mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in the autumn, by lodging it among the stems of a host plant[238].

nwatta This is a parasitic species that is devoid of leaves, roots or chlorophyll and so is totally dependant upon its host[238]. It must be grown next to the host plant, which it penetrates with suckers in order to obtain nutriment[238]. Plants are hardy to at least -15°c[238]. A climbing plant, supporting itself by twining around other plants[238].

## 6.2.557 Spiraea blumei

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Spiraea blumei is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay)

soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: Edible Uses: TeaThe leaves are a tea substitute[177, 183].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and ravines, 600 - 2000 metres in W. Hupeh[109]. Sunny slopes, mixed forests and roadsides at elevations of 500 - 2000 metres[266].

propta Seed - we have no information for this species but suggest sowing the seed as soon as it is ripe in a cold frame if possible. It is likely to require stratification before it germinates, so stored seed should be sown in a cold frame as early in the year as you receive it. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a light sandy soil a frame. Cuttings of mature wood of the current seasons growth, 15cm long, October/November in an outdoor frame(200). Another report says that September is a good time to do this[11]. Division of suckers in early spring[200]. They can be planted out straight into their permanent positions.

nwatta Tolerates most soils[200], but prefers a good loamy soil, abundant moisture and full sunlight[11, 200]. Hybridizes freely with other members of this genus[11]. A variable species, it is often confused in gardens with S. trilobata[11, 200].

## 6.2.558 Peucedanum palustre

Marsh Hog's Fennel, Hogfennel 5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Peucedanum palustre is a BIENNIAL growing to 1.5 m (5th). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although no mention of toxicity has been seen for this species, skin contact with the sap of a number of members in this genus is said to cause photo-sensitivity and/or dermatitis in some people[65, 218]. They are also said to contain the alleged 'psychotroph' myristicine[218].

kcakta Edible Parts: Edible Uses: CondimentThe root can be used as a ginger substitute[2, 4, 17, 115, 183].

dwatta Antispasmodic Epilepsy StimulantThe root is stimulant[4]. It is used in the treatment of epilepsy[4].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Altai and Urals. ksacta Fens and marshes, usually on calcareous soils[17].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta An easily grown plant, it succeeds in any moisture-retentive soil in a sunny position[200]. Suitable for group plantings in the wild garden[200].

## 6.2.559 Perovskia atriplicifolia

Russian Sage, Azure Sage 5 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Perovskia atriplicifolia is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor

soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: FlowersEdible Uses: The small lavender flowers have a sweet flavour and can be eaten in salads or used as a garnish[177, 183].

tcanta Hedge HedgeThis species is suitable for forming an internal decorative hedge of moderate height[200].

dwatta FebrifugeThe plant is used as a cooling medicine in the treatment of fevers[240].

nrakta E. Asia - Himalayas to China. ksacta Open rocky places[187]. Freely draining gravels and screes[200].

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of softwood in late spring in a frame[200]. Easy[200]. Cuttings of half-ripe wood, 7cm long with a heel, July/August in a cold frame[200].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Seashore, Specimen. Prefers a rich well-drained dry soil and a sunny position[1, 11, 187, 190, 200]. Tolerates light shade but plants become more lax in habit in such a situation[200]. Succeeds in poor soils and, once established, tolerates drought[190]. Tolerant of dry chalk soils, it also succeeds in maritime gardens[200]. Plants are hardy to about -15°c, though the stems are often cut back by hard frosts[200]. A very ornamental plant[1]. In cultivation people often cut the plants to the ground in the spring in order to encourage strong new growth and plenty of flowers[190, 200, 233]. Plants rarely produce seed in Britain[200]. The crushed leaves are very aromatic[190]. There are some named varieties, selected for their ornamental value[200]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers.

## 6.2.560 Lactuca virosa

Wild Lettuce, Bitter lettuce

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 1.8 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lactuca virosa is a ANNUAL/BIENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Poisonous[7, 19]. Cases of poisoning caused by this plant have only been recorded very rarely[65].

kcakta Edible Parts: Leaves OilEdible Uses: OilLeaves raw or cooked[52]. Very tender[5]. Caution is advised, see the notes above on toxicity. A mild flavoured oil, used in cooking, is obtained from the seeds[4].

dwatta Anodyne Antispasmodic Digestive Homeopathy Hypnotic Narcotic Sedative Tonic UrinaryThe whole plant is rich in a milky sap that flows freely from any wounds. This hardens and dries when in contact with the air[4]. The sap contains 'lactucarium', which is used in medicine for its anodyne, antispasmodic, digestive, diuretic, hypnotic, narcotic and sedative properties[9, 21, 46, 165, 192, 213, 238]. Lactucarium has the effects of a feeble opium, but without its tendency to cause digestive upsets[4], nor is it addictive[7]. It is taken internally in the treatment of insomnia, anxiety, neuroses, hyperactivity in children, dry coughs, whooping cough, rheumatic pain etc[238]. Concentrations of lactucarium are low in young plants and most concentrated when the plant comes into flower[238]. It is collected commercially by cutting the heads of the plants and scraping the juice into china vessels several times a day until the plant is exhausted[4]. This species is probably the richest supply of lactucarium[4]. The plant also contains 'hyoscyamine', a powerful depressant of the parasympathetic nervous system[213]. An infusion of the fresh or dried flowering plant can also be

used[9]. The plant should be used with caution, and never without the supervision of a skilled practitioner. Even normal doses can cause drowsiness whilst excess causes restlessness[238] and overdoses can cause death through cardiac paralysis[7, 9]. Some physicians believe that any effects of this medicine are caused by the mind of the patient rather than by the medicine[213]. The sap has also been applied externally in the treatment of warts[222]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of chronic catarrh, coughs, swollen liver, flatulence and ailments of the urinary tract[9].

nrakta Europe, including Britain, from Belgium south and west to N. Africa, Central Russia and W. Asia. ksacta Grassy places by roads, canals etc and on banks near the sea[17], usually on calcareous soils[7].

propta Seed - sow spring or autumn in situ and only just cover the seed. Germination is usually fairly quick.

nwatta Prefers a light sandy loam and a sunny position[1]. The wild lettuce is cultivated as a medicinal plant in many areas of Europe[4, 46, 61].

## 6.2.561 Carex riparia

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Carex riparia is an evergreen Perennial growing to 1.5 m (5ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or

kcakta Edible Parts: Root SeedEdible Uses: Root cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe straw is used for bedding[61].

nrakta Much of Europe, excluding the north but including Britain, N. Africa, W. Asia and the Caucasus. ksacta By slow flowing rivers, in ditches and ponds and occasionally on drier ground[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. A very aggressive and invasive plant[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.562 Rhodiola tibetica

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhodiola tibetica is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105].

## 6.2.659 Salix eriocephala

Missouri Willow, Missouri River willow 5 tlin 9 cyuc 0 kcak 3 tcan 2 dwat 4 m hkuc htut cyutli tcuphja7n hwicli hyishrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix eriocephala is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

tcanta Basketry Fodder Shelterbelt Soil stabilizationThe stems are tough and very flexible, they are used in basket making[199, 257]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The cultivar 'Green USA' is ideal as a windbreak, it tolerates very poor light soils[199]. The plants extensive root system make it effective at binding the soil along the sides of streams[229]. Wood - more durable that that of most willows, it is used for fence posts[82, 229]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta Eastern and Central N. America - Newfoundland to Nebraska, south to Mississippi. ksacta Sandy to rocky soils, near rivers, creeks and swamps[229]. Sand bars along rivers[199].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Fodder: Bank Industrial Crop: Biomass Managementlin 9 cyuc 0 kcak 0 tcan 1 dwat 4 m hkuc Coppice Other Systems: SRC Regional CropSucceeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. A fast-growing and relatively long lived species[229]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Closely related to S. mackenzieana and S. lutea[11]. There are some named varieties[199]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 6.2.660 Clematis orientalis

Oriental virginshower 5 tlin 9 cyuc 0 kcak 1 tcan 1 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Clematis orientalis is a deciduous Climber growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

tcanta Plants can be used as ground cover[208]. They grow rapidly to give a tangled mass of growth in sun or moderate shade [197].

dwatta Antiseptic RefrigerantThe plant is antiseptic and refrigerant. It is used as a gargle for ulcerated throats and also to treat dog bites[178].

nrakta W. Asia - Turkey and westwards. ksacta Hot dry valleys, especially on rocks by rivers, and in scrub to 3000 metres[184]. River banks, riparian forests, scrub gullies, slopes and sand depressions in semi-desert and desert zones[74].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. Plants are hardy to about -15°c[184]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Flowers are produced on the current season's growth, any pruning is best carried out in spring[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. The flowers have a delicate perfume similar to cowslips[245].

## 6.2.661 Ilex vunnanensis

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ilex yunnanensis is an evergreen Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274]. The fruit is poisonous[177].

dwatta FebrifugeA tea made from the leaves is used as a febrifuge[218].

nrakta E. Asia - W. China to eastern Tibet, ksacta Evergreen broad-leaf forests, thickets, Tsuga forests, margins of woods, shrub forests in valleys or mountains at elevations of 1100 - 3500 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not

#### 6.2.656 Weigela japonica

5tlin 9 cyuc 0 kcak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Weigela japonica is a deciduous Shrub growing to 5 m (16ft Sin). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista The leaves are slightly toxic[178].

tcanta Hedge HedgePlants can be grown as a hedge[178].

dwatta SalveSalve. Used as a wash for virulent sores[178].

nrakta E. Asia - C. and S. Japan. ksacta A rare plant, grwing on sunny hills and in mountains at elevations of 100 - 1800 metres[275].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter or early spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Softwood basal cuttings, 10 - 12cm long, in a sandy soil in a cold frame in early summer[200]. Cuttings of halfripe wood, 8 - 10 cm with a heel, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth. 20 cm long, November in a sheltered outdoor nursery bed[200].

nwatta An easily grown plant, succeeding in most fertiles soils[11, 200]. Prefers a moist well-drained soil in sun or partial shade[200]. Tolerates atmospheric pollution[200]. Plants are very floriferous and can exhaust themselves, literally flowering themselves to death. The flowers are borne in the leaf nodes of the previous years growth and any pruning is therefore best done as soon as the plant has finished flowering[182]. There are some named forms selected for their ornamental value[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.657 Cotoneaster bacillaris

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cotoneaster bacillaris is a deciduous Shrub growing to 5 m (16ft Sin) at a fast rate. See above for USDA hardness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Dye WoodA rose-tan dye is obtained from the fruit[168]. Wood - very hard, elastic, close and even grained but splits and warps easily. Too small for many purposes but the branches are used for making walking sticks, agricultural implements etc[11, 146, 158].

dwatta AstringentThe stolons are said to be astringent[240].

nrakta E. Asia - W. Himalayas. ksacta Blanks in forests, old grazing camps etc, in the higher hill forests, 1500 - 3000 metres[146].

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at 15°c and then 3 months cold stratification at 4°c[164]. The seed usually germinates within 1 - 18 months at 15°c but it can take 2 years[164]. Pot

the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than 10cm tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta A vigorous and easily grown plant[1], it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Tolerates atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. A very ornamental plant[1]. Trees are notably susceptible to honey fungus[200].

#### 6.2.658 Clematis tibetana

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Clematis tibetana is a deciduous Climber growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

dwatta Antipruritic AntitumorThe stem and flowers are used in Tibetan medicine, they are considered to have and acrid and sweet taste with a heating potency[241]. They promote stomach heat and destroy 'cold tumours'[241]. They are used in the treatment of skin irritations and itches, and tumours[241].

nrakta E. Asia - Himalayas in India, Nepal, China and Tibet. ksacta Slopes, scrub, grassy areas and gravelly river banks at elevations of 2200 - 4800 metres in western China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. Plants are hardy to about -15°c[184]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Flowers are produced on the current season's growth, any pruning is best carried out in spring[219]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

nrakta E. Asia - Himalayas. ksacta Alpine meadows with occasional summer rain, but under snow for much of the year[145]. Stony slopes on the sides of ravines at elevations of 4100 - 5400 metres[266].

propta Seed - surface sow spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse for their first winter. Plant out in early summer of the following year. Division in spring or early summer Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile well-drained soil in a sunny position [200]. Established plants are drought tolerant [200]. This species is closely related to R. quadrifida [1]. The flowers of this species are dark purple [1]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity [62, 85]. Dioecious, male and female plants must be grown if seed is required.

#### 6.2.563 Gaultheria insana

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Gaultheria insana is an evergreen Shrub growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Most members of this genus have more or less edible fruits, but it is unwise to eat the fruits of this species. See below under medical uses for more information.

dwatta The fruits cause intoxication when consumed[192]. The person becomes confused, often suffers delirium and, if the fruit is taken in excess, a permanent mental condition that mimics insanity can be caused[192].

nrakta S. America - S. Chile, Argentina. ksacta Open fields or clearings in woods[192].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Layering.

nwatta Prefers a cool moist but not boggy humus rich soil in shade or semi-shade[11, 200]. A peat and moisture loving species, it requires a lime-free soil[11, 200]. Prefers full sun but tolerates light shade[11, 200]. This species is slightly tender in Britain and does not succeed in the colder parts of the country[11]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.564 Iris tectorum

Roof Iris, Wall iris, Japanese Roof, White Root Iris 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Iris tectorum is an evergreen Perennial growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkanine) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: RootEdible Uses: Root - an edible starch is said to be extracted from it[2, 105, 177]. Some caution is advised since there are reports that the plant might be poisonous. Perhaps the extracted starch is edible.

nrakta E. Asia - China, Japan. ksacta Grows wild on shady rocky slopes and in scrub, it is also found planted on thatched roofs in Japan. Forest margins, sunny banks, meadows, damp places, beside water to 3500m[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Stored seed does not require cold conditions in order to stimulate germination. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in July/August after flowering. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Massing, Seashore. Prefers a well-drained loam rich in leafmold with plenty of moisture in summer and an open sunny position[1. 42, 79, 200]. Requires a really well-drained soil that is dry rather than damp, and a hot sunny position[233]. Prefers a lime-free soil but succeeds in most good soils and in partial shade[79]. Succeeds in dry soils and, once established, is drought tolerant[190]. Cultivated for its edible root in Japan[2]. There are some named varieties, selected for their ornamental value [233]. In China the plants are grown on the roofs of houses[190]. Plants do not flower so freely in cultivation in Britain. In their native habitat they experience cold dry winters and warm wet summers[187]. It is best to lift the plants in October, store them in sand in a cool frost free place over winter and replant in March[1]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: All or parts of this plant are poisonous, Attractive flowers or blooms.

#### 6.2.565 Acaenia anserinifolia

Pirri-Pirri Bur

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Acaenia anserinifolia is an evergreen Perennial growing to 0.1 m (0ft 4in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: TeaThe leaves are used as a substitute for tea[2, 144, 173, 183].

tcanta A good ground-cover plant, tolerating some treading[200]. A carpeting plant, rooting as it spreads[208]. dwatta Antiphlogistic Diuretic VulneraryThe leaves are antiphlogistic, carminative, diuretic and vulnerary[61].

nrakta Eastern Australia, New Zealand. Naturalized in Britain[17]. ksacta Open positions from lowland to the

montane zone in North, South and Stewart Islands of New Zealand[44].

propta Seed - sow March in a greenhouse. Germination, which can be very poor, usually takes place within 1- 3 months at  $10^{\circ} \text{c}[133].$  When the seedlings are large enough to handle, prick them out into individual pots, planting them out in the summer. Division in April or October. Very easy, the plants can be divided at any time of the year if required, though it will need to be done in a greenhouse during the winter months. Cuttings - August in a cold frame.

nwatta An easily grown plant, it succeeds in ordinary well-drained soil in sun or semi-shade[133, 200]. Requires a warm position[208]. Adaptable to poorly-drained soils in Australia[157]. A very invasive plant, spreading freely by its procumbent rooting stems[K]. It is low-growing, however, and so can be grown as a ground cover amongst taller plants[K].

#### 6.2.566 Antirrhinum majus

Snapdragon, Garden snapdragon 5 tlin 10 cyuc 1 kcak 2 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Antirrhinum majus is a PERENNIAL growing to 1 m (3ft 3in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: OilEdible Uses: OilAn oil that is little inferior to olive oil is said to be obtained from the seeds[4]. The report also says that the plant has been cultivated in Russia for this purpose[4]. The seeds are very small and I wonder about the authenticity of this report[K].

tcanta Dye OilA green dye is obtained from the flowers, it does not require a mordant[168]. Dark green and gold can also be obtained if a mordant is used[168].

dwatta Antiphlogistic Bitter Resolvent StimulantThe leaves and flowers are antiphlogistic, bitter, resolvent and stimulant[7, 115]. They have been employed in poultices on tumours and ulcers[4]. It is effective in the treatment of all kinds of inflammation and is also used on haemorrhoids[7]. The plant is harvested in the summer when in flower and is dried for later use[7].

nrakta Europe. Naturalized in Britain[17]. ksacta Old walls, rocks and dry places[17, 100].

propta Seed - surface sow March in a greenhouse. The seed usually germinates in 10 - 21 days at  $18^{\circ}([134])$ . Cool nights assist germination[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in situ in July/August and will produce larger and more floriferous plants the following summer. Cuttings of half-ripe wood in September in a cold frame[200].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Specimen, Woodland garden. Prefers a light well drained loam and a sunny position[1, 200]. Plants are tolerant of clay and lime soils, and also grow well on old walls[200]. Plants are often grown as an annual since they usually degenerate in their second year[1]. They often self sow when well-sited[K]. There are many named forms, selected for their ornamental value[200]. Special Features:Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers, Fragrant flowers

## 6.2.567 Sedum oreganum

Oregon stonecrop 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hjonli drutta Sedum oreganum is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - raw or cooked[60, 177, 256].

tcanta Plants can be grown as a ground cover when planted about 25cm apart each way[208].

nrakta Western N. America - Oregon to Alaska. ksacta Chiefly montane on rock ledges, gravelly ridges and talus slopes[60].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are drought tolerant[200]. Can be grown on a wall[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

## 6.2.568 Leucocrinum montanum

Sand Lily, Common starlily 5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat m hkuc

5 tim 9 cyuc 1 Reak 0 tean 1 dwat in nkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli lwisslip hpa7tmwatli xre7t hionli

drutta Leucocrinum montanum is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root[105, 161, 257]. No more details are given.

dwatta PoulticeA poultice of the pulverized roots has been applied to sores and swellings[257].

nrakta South-western N. America - Oregon to California. ksacta Sagebrush desert to open montane forest in sandy to rocky areas in fairly heavy soils that are not swampy[60].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse as soon as it is ripe if possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Requires a sunny position in a well-drained but moisture-retentive alkaline soil[200]. Tolerates temperatures down to about -20°c[200].

#### 6.2.569 Phalaris minor

Small Canary Grass, Littleseed canarygrass 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc

the growth of nearby plants [18, 20]. This species is closely related to A. giraldii[11].

## 6.2.653 Catalpa bungei

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Catalpa bungei is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

tcanta WoodWood - hard, excellent quality. Used for printing blocks, chess tables etc[174, 178].

dwatta Anthelmintic Poultice StomachicThe stem bark is made into a lotion for cancer[218]. It is also anthelmintic and stomachic[178, 218]. The leaf, stem bark and the seeds are all used as dressings for sores, boils etc[218].

nrakta E. Asia - C. China. ksacta Roadsides in. Gansu, Hebei, Henan, Hunan, Jiangsu, Shaanxi, Shandong, Shanxi, Zhejiang[266].

propta Seed - best sown outdoors, or in a cold frame, as soon as it is ripe[200]. Stratify stored seed for 3 weeks at 1°c and sow in spring[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings, 10cm long, in a frame. They should be taken in late spring to early summer before the leaves are fully developed[200]. Root cuttings in winter[2001.

nwatta Prefers a good moist loamy soil and a sunny position that is not exposed[1, 11]. Tolerates heavy clay soils. Very resistant to atmospheric pollution[188]. Plants are hardy to about -15°c, probably more in continental climates[200], they grow best in areas with hot summers[188]. Protect plants from late frosts when they are young[200]. Transplants easily[200]. There are some named varieties selected for their ornamental value[188]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.654 Fraxinus longicuspis

5tlin 9 cyuc 0 kcak 0 t<br/>can 1 dwat 8 m hkuc htut cyutli tcup hwicli hrasjlutnyik h<br/>pa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fraxinus longicuspis is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta InkA bluish indelible dye is produced by steeping the bark in water[178].

dwatta Astringent Tonic UrinaryAstringent. A tonic for the genito-urinary system[178].

nrakta E. Asia - central and southern Japan. ksacta Deciduous forests in mountains at elevations of 100 - 1100 metres, C. and S. Japan[58, 275].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an out-door seedbed, preferably in the autumn. Grow the seedlings

on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. This species is closely related to F. chinensis[11]. There is some confusion over the correct name for this species. The information was gathered under the name F. pubinervis which, according to [11] is a synonym for F. longicuspis Sieb. and Zucc. However, [200] says that F. pubinervis a synonym for F. sieboldiana and that F. longicuspis Hort. is also a synonym of F. sieboldiana. This species might be dioecious, in which case male and female plants must be grown if seed is required.

## 6.2.655 Clematis connata

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Clematis connata is a deciduous Climber growing to 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

dwatta MiscellanyThe juice of the plant is inhaled to relieve sinusitis[272].

nrakta E. Asia - Himalayas from Pakistan and Kashmir to Bhutan, Tibet and western China. ksacta Forests at mid altitudes in the Himalayas, especially along the sides of streams[273].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1- 9 months or more at  $20^{\circ} \text{C}[164].$  Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Requires a warm, sheltered sunny position and plenty of water during the growing season[273]. Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. A very vigorous plant, with new shoots extending up to 6 metres in a season. It can be rather invasive[273]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants flower on the current seasons growth. They often require no pruning, especially if left to clamber into large shrubs and trees. Weak or dead stems can be removed in the winter and, where pruning may be required to reduce the size of the plant, shoots can be cut back by up to two thirds in the winter[273]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

plant that dislikes waterlogged, very dry or very acid soils but otherwise succeeds in all soil types[1, 17, 238]. It grows well in heavy clay soils. Prefers some lime in the soil. Tolerates very dense shade[24, 31], though it may not flower in such a position[K]. The plant is very hardy and tolerant of atmospheric pollution[4]. Established plants are drought tolerant[190]. A very ornamental and hardy plant[190], it tolerates temperatures down to about -25°c[184]. There are many named varieties[190], the variegated forms are less hardy than the species and also require more light[238]. Ivy is a rampant climbing plant, clinging by means of aerial roots and often trailing on the ground in woods and hedges[186]. It is of benefit rather than harm when growing on a wall because it keeps the wall dry and acts as an insulation[11, 24]. It does not damage the structure of a wall. Similarly, it does not harm large trees when climbing into them, though it can shade out smaller and ailing trees[200]. It is not a parasitic plant, but instead obtains all its nutrient from the sun and the soil[186]. A very good plant for wild-life, it provides dense shelter for birds, spiders etc, an abundant late supply of nectar for insects and a supply of seeds for winter food[4, 24, 186]. It is a food plant for the larvae of many species of butterfly[24, 30]. A very variable plant, there are many named varieties. This species is notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 6.2.651 Catalpa bignonioides

Indian Bean Tree, Southern catalpa 5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 15 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Catalpa bignonioides is a deciduous Tree growing to 15 m (49ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista The roots are highly poisonous[254].

tcanta WoodA fast-growing tree with an extensive root system, it has been planted on land that is subject to landslips or erosion in order to stabilize the soil[7]. Wood - coarse and straight-grained, soft, not strong, moderately high in shock resistance, very durable in the soil. It weighs about 28lb per cubic foot. It is highly valued for posts and fencing rails, and is also used for interior finishes, cabinet work etc[46, 61, 82, 227].

dwatta Antidote Antiseptic Cardiac Laxative Malaria Ophthalmic Sedative VermifugeA tea made from the bark has been used as an antiseptic, antidote to snake bites, laxative, sedative and vermifuge[222]. As well as having a sedative effect, the plant also has a mild narcotic action, though it never causes a dazed condition[7]. It has therefore been used with advantage in preparations with other herbs for the treatment of whooping cough in children, it is also used to treat asthma and spasmodic coughs in children[7, 254]. The bark has been used as a substitute for quinine in treating malaria[254]. The leaves are used as a poultice on wounds and abrasions[222]. A tea made from the seeds is used in the treatment of asthma and bronchitis and is applied externally to wounds[222]. The pods are sedative and are thought to have cardioactive properties[222]. Distilled water made from the pods, mixed with eyebright (Euphrasia officinalis) and rue (Ruta graveolens) is a valuable eye lotion in the treatment of trachoma and coniunctivitis[7].

nrakta South-eastern N. America - Florida, Alabama, Missouri and Louisiana. ksacta Rich moist soils by the sides of streams and rivers[229]. propta Seed - best sown outdoors, or in a cold frame, as soon as it is ripe[200]. Stratify stored seed for 3 weeks at  $1^\circ$ c and sow in spring[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings, 10cm long, in a frame. They should be taken in late spring to early summer before the leaves are fully developed[200]. Root cuttings in winter[200].

nwatta Landscape Uses: Specimen, Street tree, Prefers a good moist loamy soil and a sunny position that is not exposed[1, 11]. Tolerates heavy clay soils[200]. Very resistant to atmospheric pollution[188]. Plants become chlorotic on shallow alkaline soils[202]. Plants are hardy to about -15°c, probably more in continental climates[200], they grow best in areas with hot summers[188]. Protect plants from late frosts when they are young[200]. A very ornamental plant[1], it is fast-growing in the wild where it often flowers when only 6 - 8 years old[229]. The sweetly-scented flowers are borne in forked panicles at the end of branches[245]. There are some named varieties selected for their ornamental value[188, 200, 202]. The trees transplant easily[200]. The crushed foliage has an unpleasant smell[202]. Another report says that the leaves are attractively scented when bruised[245]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Naturalizing, All or parts of this plant are poisonous, Blooms are very showy.

## 6.2.652 Acer caesium

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Acer caesium is a deciduous Tree growing to 15 M (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. Wood-close grained, soft to moderately hard. Occasionally used for carving, bowls, cups etc[146, 158].

dwatta AstringentThe juice of the bark is used externally in Nepal to treat muscular swellings, boils and pimples[272].

nrakta E. Asia - Himalayas, China. ksacta Generally found in open places such as grazing grounds. Isolated trees are found in coniferous forests at 2400 - 3800 metres in Kashmir[145].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the

nwatta Of easy cultivation, it prefers a good moist welldrained soil in a sunny position but tolerates some shade. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Most maples are bad companion plants, inhibiting htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phalaris minor is a ANNUAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from May to October, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Seed - cooked[257]. The seed can be ground into a flour and used in making bread, cakes etc. It is rather small and fiddly to utilize.

nrakta Europe - Mediterranean to northwest France. Naturalized, or perhaps native, in the Channel Islands. ksacta Sandy soils[17].

propta Seed - sow spring in situ[162].

nwatta An easily grown plant, succeeding in an ordinary garden soil[1]. It is tolerant of most conditions, dry or wet[200].

## 6.2.570 Cochlearia danica

Danish Scurvy Grass

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwishsom hpa7tmwatli fyifxre7t hjonli

drutta Cochlearia danica is a ANNUAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[100, 105, 177]. Used as a flavouring in salads, it is considered to be superior to C. officialis[183]. The leaves are rich in vitamin C[100], though very few people will actually enjoy the pungent flavour[K].

dwatta Antiscorbutic Vitamin CThe leaves are a rich source of vitamin C and are used as an antiscorbutic[100].

nrakta Coastal regions of Europe, including Britain, from Norway to Atlantic Spain and Portugal. ksacta Sandy and rocky shores, walls and banks by the sea and along railway lines, avoiding acid soils[17].

propta Seed - sow spring or autumn in situ. Germination usually takes place within 2 - 3 weeks at 15°c[164].

nwatta Prefers a damp well-drained soil. Avoids acid soils in the wild. Prefers a sandy or gritty well-drained soil[200]. Hybridizes with C. officinalis[17].

## 6.2.571 Salix x mollisima hippophaeifolia

5tlin 9 cyuc 1 kcak 3 tcan 2 dwat m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix x mollisima hippophaeifolia is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required, and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - cooked. Not very palatable[172].

tcanta Basketry/The stems are very flexible and are used in basket making [131]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. Succeeds in wet, ill-drained or intermittently flooded soils[1, 11]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta A hybrid of garden origin, S. triandra x S. viminalis. ksacta Not known in a truly wild situation.

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. This is a hybrid species and it will not breed true from seed. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood, June to August in a frame. Very easy.

watta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other in sects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Plants are rarely bisexual[200], but they are usually dioecious and then male and female plants must be grown if seed is required.

## 6.2.572 Berberis chinensis

5 tlin 9 cvuc 1 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis chinensis is a deciduous Shrub. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177].

tcanta A yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China. ksacta Sandy mountain slopes and river sands[74].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but is by no means fastidious, succeeding in thin, dry and shallow soils. Grows well in heavy clay soils. Plants are hardy to about -25°c[184]. Plants can be pruned back quite severely, they resprout well from the base[200]. This species

is closely related to B. poiretii. C.K.Schn., differing in its broader leaves and dark red fruits[200]. The range of this plant is often mistakenly given as the Caucasus, this is based on a misidentification[200]. Hybridizes freely with other members of this genus[1].

## 6.2.573 Corvdalis ambigua

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.2 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Corydalis ambigua is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from March to June, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is selffertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland). It prefers moist soil.

pcista Although no specific mention has been seen for this species, there is a report that Corydalis species are potentially toxic in moderate doses[222].

kcakta Edible Parts: RootEdible Uses: Root - cooked[46. 61, 105, 1771.

dwatta Alterative Analgesic Antiperiodic Antispasmodic Astringent Contraceptive Deobstruent Diuretic Emmenagoque Sedative TonicAlterative, antiperiodic, astringent, deobstruent, diuretic, emmenagogue, sedative, tonic[178]. The root is analgesic, antispasmodic and sedative[218]. The tuber has a history of over a thousand years use in mitigating pain[218]. This species was ranked 10th in a test of 250 potential antifertility drugs[218].

nrakta E. Asia - Japan. ksacta Woods and meadows from the lowland to the mountains of N. Japan[58].

propta Seed - best sown as soon as it is ripe, the seed rapidly loses viability if it is allowed to become dry[129]. Surface sow and keep moist, it usually germinates in 1 - 3 months at 15°c[164]. Germinates in spring according to another report[129]. Two months warm, then a cold stratification improves the germination of stored seed[134, 164]. Sow the seed thinly so that the seedlings can be allowed to grow undisturbed in the pot for their first year. Apply liquid feed at intervals during their growing season to ensure they are well fed. The seedlings only produce one leaf in their first year of growth[175] and are very prone to damping off[129]. Divide the seedlings into individual pots once they have become dormant and grow them on in a partially shaded area of a greenhouse for at least another year. Plant them out into their permanent positions when they are dormant. Division in spring after flowering. Once the plants are dying down, dig up the clump and divide the tubers, planting them out straight into their permanent positions if required.

nwatta Prefers a moist, well-drained rather light soil, thriving in semi-shade[1]. Grows well in a woodland garden or peat bed[129]. This species is very closely related to and probably part of C. fumariifolia[175]. It is probably not really worthy of specific status and is best treated as a cultivar, C. 'Ambigua'[200]. Plants seem to be immune to the predations of rabbits[233].

#### 6.2.574 Iris cristata

Crested Iris, Dwarf crested iris 5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Iris cristata is a PERENNIAL growing to 0.2 m (Oft 8in) by 0.5 m (1ft 8in) at a medium rate. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

poista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: RootEdible Uses: Root - used as a spice[2, 105]. Frequently chewed by local people to alleviate thirst[177, 207]. When first chewed the roots have a pleasant sweet taste, within a few minutes this changes to a burning sensation far more pungent than capsicums[207]. Caution is advised, see the notes above on toxicity.

dwatta Hepatic PoulticeAn ointment made from the roots is applied to cancerous ulcers[222, 257]. A tea made from the roots is used in the treatment of hepatitis[222, 257].

nrakta Eastern N. America - Marvland to Ohio, south to Georgia, Tennessee and Missouri, ksacta Rich woods. wooded bottoms and ravines, usually in calcareous soils[43,

propta Seed - best sown as soon as it is ripe in a cold frame. It does not require cold stratification. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division in July/August[42]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Alpine garden, Container, Ground cover, Massing, Rock garden, Woodland garden, Requires a light or gravelly[42] lime-free[79] soil of a woodland nature in partial shade[42, 79, 127] or full sun[42]. Likes plenty of moisture in summer but the soil must be welldrained[127]. Grows well on a peat bank[188]. Plants are hardy to about -20°c[187]. Another report says that it is best if the plants are lifted intact in October, stored in sand and planted out in March[1]. Members of this genus are rarely if ever troubled by browsing deer and rabbits[233]. Plants require protection from slugs[187]. Frequent division and transplanting every other year is necessary if the plant is to thrive and persist[187]. Special Features: North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers. The plant is heat tolerant in zones 10 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## **6.2.575** Hydrocotyle sibthorpioides

Water Pennywort, Lawn marshpennywort 5 tlin 9 cvuc 1 kcak 0 tcan 2 dwat 0.1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Hydrocotyle sibthorpioides is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September, and the seeds ripen from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: The whole plant is eaten raw or cooked as a potherb[61, 105, 183]. It has a parslev-like aroma[183].

dwatta Depurative FebrifugeDepurative, febrifuge. Resolves mucus formation[147]. The juice of the plant is used in the treatment of fevers[272]. A paste made from the plant is applied externally to wounds and boils[272]. The plant is decocted and used in the treatment of abscesses, boils,

for USDA hardiness. It is hardy to UK zone 6. It is in leaf in heavy clay and nutritionally poor soils. Suitable pH: mildly all year, in flower from February to March, and the seeds ripen from October to March. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

tcanta Incense Shelterbelt WoodThe leaves are very aromatic and are used as incense sticks[46, 61, 272]. Å fairly wind-tolerant tree, it can be used in shelterbelt plantings[200]. Wood - light, fragrant, fine grained[46, 61]. The wood is strongly rot resistant, easily worked, and is used for buildings, bridges, ships, lamp posts, furniture, utensils, and paper manufacture[1, 46, 61, 266]. The wood can be used as a substitute for Deal[146]. Old wood that has been buried in the soil turns a dark green and is then much esteemed[46,

dwatta Depurative VDAn oil and/or a resin from the plant is depurative and also used in the treatment of gonorrhoea[218].

nrakta E. Asia - China, Japan. ksacta Mountains and hills in areas of higher rainfall in S. and C. Japan[58, 200]. Rarely spontaneous[58]. Forests on deep, well-drained soils subject to warm, moist conditions, 1100 - 2500 metres[266].

propta Seed - sow early spring in a cold frame. The seed germinates better if given a short cold stratification for 2 - 3 weeks at 4°c and is then placed in a warm position[164]. Germination usually takes place within 3 - 9 weeks at 15°c[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. An alternative is to plant out the young trees into an outdoor nursery bed when they are about 8cm tall and grow them on for a couple of years before planting them into their permanent positions in late autumn or early spring[164]. Cuttings in the autumn in a sandy soil in a cold frame

nwatta Landscape Uses:Screen, Specimen, Street tree Prefers a deep rich moist alluvial soil and a sheltered position in full sun[1, 11, 164]. Tolerates very acid to somewhat alkaline soils, but becomes chlorotic on shallow soils over chalk[200]. Plants are fairly wind-tolerant[200]. A very ornamental tree[1], it has been widely cultivated as a forestry tree for several centuries in Japan and there are many strains each adapted to the various local conditions[11]. Many forms, almost all of them dwarf, have also been selected for their ornamental value[185, 200]. A fast-growing tree on deep, well-drained soils in montane areas with a warm. moist climate, but intolerant of poor soils and cold, drier climates[266]. Occasionally planted for timber in Europe[50], trees do not generally do as well as could be expected in Britain, the best specimens are to be found in the west, especially in the south-west[11]. Trees can grow quite fast in the western part of the country with annual increases of 1 metre or more[185]. New growth takes place from early June to August[185]. Growth decreases rapidly with age, virtually ceasing when the tree reaches 25 metres[185]. This species is notably resistant to honey fungus[200]. Unlike most conifers, this species can be coppiced[81]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

#### 6.2.650 Hedera helix

Ivy, English ivy, Algerian ivy, Baltic Ivy, Common Ivy 5 tlin 11 cyuc 0 kcak 4 tcan 3 dwat 15 m hkuc pcimhmimhtut cyutli hgattcuphja7n hwicli hyishrasilutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Hedera helix is an evergreen Climber growing to 15 m (49ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from October to November, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista The plant is said to be poisonous in large doses[7, 10, 65, 76] although the leaves are eaten with impunity by various mammals without any noticeable harmful affects. The leaves and fruits contain the saponic glycoside hederagenin which, if ingested, can cause breathing difficulties and coma[274]. The sap can cause dermatitis with blistering and inflammation. This is apparently due to the presence of polyacetylene compounds[274].

kcakta Although they are almost certainly not edible, there is a report that the seeds contain 16.2% protein and

tcanta Dye Hair Hedge Hedge Parasiticide Pollution Soap WoodA yellow and a brown dye are obtained from the twigs[46, 61]. A decoction of the leaves is used to restore black fabrics[7, 46, 53] and also as a hair rinse to darken the hair[7, 53]. If the leaves are boiled with soda they are a soap substitute for washing clothes etc[61]. An excellent ground cover for shady places, succeeding even in the dense shade of trees[197, 208]. A very effective weed suppresser[190]. The cultivars 'Hibernica', 'Lutzii' and 'Neilsonii' have been especially mentioned[190]. Plants can be grown along fences to form a hedge. The variety 'Digitata' is very useful for this[200]. Plants have been grown indoors in pots in order to help remove toxins from the atmosphere. It is especially good at removing chemical vapours, especially formaldehyde[259]. The plants will probably benefit from being placed outdoors during the summer[259]. The wood is very hard and can be used as a substitute for Buxus sempervirens (Box), used in engraving etc[46, 61]. Another report says that the wood is very soft and porous and is seldom used except as a strop for sharpening knives[4].

dwatta Antibacterial Antirheumatic Antiseptic Antispasmodic Astringent Cathartic Diaphoretic Emetic Emmenagogue Parasiticide Skin Stimulant Vasoconstrictor Vasodilator VermifugeIvv is a bitter aromatic herb with a nauseating taste[238]. It is often used in folk herbal remedies[218], especially in the treatment of rheumatism and as an external application to skin eruptions, swollen tissue, painful joints. burns and suppurating cuts[9, 238]. Recent research has shown that the leaves contain the compound 'emetine', which is an amoebicidal alkaloid, and also triterpene saponins. which are effective against liver flukes, molluscs, internal parasites and fungal infections[238]. The leaves are antibacterial, antirheumatic, antiseptic, antispasmodic, astringent, cathartic, diaphoretic, emetic, emmenagogue, stimulant, sudorific, vasoconstrictor, vasodilator and vermifuge[7, 218, 2381. The plant is used internally in the treatment of gout. rheumatic pain, whooping cough, bronchitis and as a parasiticide[238]. Some caution is advised if it is being used internally since the plant is mildly toxic[7]. Excessive doses destroy red blood cells and cause irritability, diarrhoea and vomiting[238]. This plant should only be used under the supervision of a qualified practitioner[238]. An infusion of the twigs in oil is recommended for the treatment of sunburn[4]. The leaves are harvested in spring and early summer, they are used fresh and can also be dried[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Hedera helix for cough, bronchitis (see [302] for critics of commission E)

nrakta Europe, including Britain, south and east to the Mediterranean and Iran. ksacta Woodlands, hedges and shady places, climbing up trees, walls etc and clambering over the ground[7]. Found on all types of soils[7].

propta Seed - remove the flesh, which inhibits germination, and sow the seed in spring in a cold frame[113]. Four weeks cold stratification will improve germination[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a shady position in a frame. Good percentage[78]. Cuttings of mature wood, 12cm long, November in a cold frame[78]. Layering. Plants often do this naturally.

nwatta Landscape Uses:Cascades, Container, Erosion control, Ground cover, Massing. Ivy is a very easily grown

harvested in August and dried for later use[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are "Tiredness", 'Weariness' and 'Mental and physical exhaustion (2091.

nrakta Europe, including Britain, from Sweden to the Pyrenees east to Iran in W. Asia. ksacta Woodlands and hedgerows on sandy or clay loams[17], preferring heavier soils[13].

propta Seed - best sown in an outdoors seedbed as soon as it is ripe[78]. Germination is usually good, though it may take 18 months[80]. If collected whilst still 'green' (after the seed is ripe but before it has dried fully on the plant) and sown immediately it should germinate in the following spring[80]. Grow the plants on for two years in the seedbed and then plant them out into their permanent positions in the winter. The average seed viability is around 65%[98]. Pretreat stored seed with 4 weeks warm and 12 weeks cold stratification and sow in a cold frame[98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame until they are at least 15cm tall before planting them into their permanent positions.

nwatta Landscape Uses:Espalier, Pest tolerant, Hedge, Superior hedge, Specimen, Street tree. Thrives in any good loam, including chalk[1, 11], it does not demand much light[186]. Prefers a deep open loam[1] and does well on damp clays[186]. Succeeds in all but the most acid soils[186]. Dormant trees are very cold tolerant, the young growth is not usually damaged by late spring frosts[186]. The trees cast a deep shade[98, 186]. A very ornamental plant[1]. Trees are shallow-rooted[7]. The hornbeam has 28 species of associated insects[24]. Trees take 10 - 20 years from seed before they produce seed[98] and about 100 years to reach maturity[186]. At one time this tree was commonly pollarded or coppiced for its wood and for fuel[11, 13, 186]. Special Features: Not North American native, Inconspicuous flowers or blooms.

## 6.2.647 Fraxinus chinensis rhynchophylla

Hua Qu Liu

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 25 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fraxinus chinensis rhynchophylla is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Weather protection WoodThe plant (extract?) is said to be used as a barrier to protect the skin from ultraviolet light[176]. The wood is used for cabinet making[266].

dwatta Analgesic Antiinflammatory Antitussive Astringent Diuretic Dysentery Expectorant StomachicThe bark is analgesic, anti-inflammatory, antitussive, astringent, diuretic, expectorant and stomachic[176, 218, 238]. It controls bacterial infections and coughs[238]. It is used in the treatment of apoplexy, liver diseases, diarrhoea, dysentery, eye diseases such as cataracts, cough and asthma[176, 279]. The bark contains aesculin, this has anti-inflammatory, anticoagulant and analgesic actions[176]. The bark also contains fraxetin. This has an inhibitory effect on the central nervous system, is a stronger and safer anodyne than aspirin and has some antibacterial activity[176].

nrakta E. Asia - China, Japan, Korea. ksacta Woodland and thickets to 3000 metres in W. China[109]. Slopes, along rivers, roadsides, below 1500 metres[266].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree-and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant

them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. This sub-species grows well in Britain and is much more common in cultivation than F chinensis[11, 200]. This species might be dioecious, in which case male and female plants must be grown if seed is required.

#### 6.2.648 Fraxinus latifolia

Oregon Ash

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 20 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Fraxinus latifolia is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in April, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

tcanta Shelterbelt WoodA fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200]. Woodhard, brittle, light, coarse grained. A valuable timber tree, it is largely used for making furniture, the interiors of buildings, cooperage etc, and as a fuel[46, 61, 82, 171].

dwatta Anthelmintic Febrifuge VulneraryThe pulverised fresh roots were used by some native North American Indian tribes to treat serious wounds[213, 257]. A cold infusion of the twigs has been used to treat fevers[257]. The bark is anthelmintic[257]

nrakta Western N. America - Washington to California. ksacta Rather deep, fertile, usually moist soils in the neighbourhood of streams near the coast[60, 82].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

nwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 2001. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. They tolerate atmospheric pollution[200]. A fast growing tree for its first 75 years in the wild, it then grows slowly reaching a maximum age of 250 years[229]. This species is closely related to F. pennsylvanica[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 6.2.649 Cryptomeria japonica

Japanese Cedar, Sugi 5 tlin 8 cyuc 0 koak 0 tcan 1 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Cryptomeria japonica is an evergreen Tree growing to 20 m (65ft) by 8 m (26ft) at a fast rate. See above

bruises, cirrhosis, colds, coughs, hepatitis, hepatoma, influenza, itch, jaundice, sinusitis and sore throat[218]. It is a Chinese herbal drug for hepatoma[218].

nrakta E. Asia - China, Japan. ksacta Shady places in lowland areas of C. and S. Japan[58]. Stream banks or forests in wet grassy places at elevations of 400 - 3000 metres in China[266].

propta Seed - we have no information on this species but suggest sowing it in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of rooted runners. Probably best done in spring but can be done at any time in the growing season if the plants are kept moist.

nwatta Requires a permanently moist position in sun or light shade[200]. Plants are occasionally found as weeds in damp lawns[1].

## 6.2.576 Centaurea iberica

Iberian Star Thistle, Iberian knapweed 5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.9 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Centaurea iberica is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pol-

inlinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Edible cooked[145, 177]. The part used is not specified.

dwatta Antioxidant and antimicrobial activity. Antibaccerial and antifungal. Used in Turkish folk medicine to alleviate the pain and inflammatory symptoms in rheumatoid arthritis, high fever, headache, and for healing of wounds. In its native range, various uses in folk medicine are proving to have a scientific basis [1d].

nrakta S.E. Europe to S.W. Asia. ksacta Mountain slopes in Tibet at elevations of 500 - 800 metres[266].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. Tolerates is closely related to C. calcitrapa. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.577 Tricvrtis hirta

Toad Lily, Japanese Toad Lily 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatprik

hmimhtut cyuth tcup hwich hrasjlut hpa7th flatprik hpa7tmwatli xre7t hjonli drutta Tricyrtis hirta is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in) at a slow rate. See above for

drutta Incytus inita is a FEREINIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta  $\rm \dot{E} dible \ Parts: \ Leaves E dible \ Uses: \ Leaves \ and \ young \ shoots$  -  $\rm cooked.$ 

nrakta E. Asia - Japan. ksacta Shady rocks[187].

propta Seed - best sown in a cold frame as soon as it is ripe. Stored seed requires 12 weeks stratification at 5°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division just before growth

starts in spring to single crowns[175]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Landscape Uses:Border, Container, Rock garden, Woodland garden. Prefers a humus-rich fertile welldrained but moisture-retentive acid or neutral light sandy loam in partial shade[175, 200]. Prefers the dappled shade of a woodland garden but tolerates full sun if the soil is reliably moist throughout the growing season, flowering earlier in such a position[200]. Plants also require a sunnier position in the northern parts of Britain[233]. This species is hardy to about -20°c, but if prolonged cold weather is not accompanied by snow cover the plants will appreciate a good mulch of organic matter[187]. Plants are very susceptible to attacks by slugs[175]. Special Features:Attractive foliage, Suitable for cut flowers.

## 6.2.578 Urospermum dalechampii

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Urospermum dalechampii is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw. They can be used in salads but are very bitter[217].

nrakta S. Europe - Mediterranean. ksacta Cultivated ground.

propta Seed - we have no information for this species but suggest sowing the seed in situ either as soon as it is ripe in late summer or in the spring. Division.

nwatta Succeeds in any fertile soil in a very sunny position[233]. A very ornamental plant[233].

#### 6.2.579 Plantago asiatica

Che Qian Zi

5 tlin 9 cyuc 1 kcak 2 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Plantago asiatica is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves - raw or cooked[218]. Rather fibrous, unless they are very young, they have a slightly bitter flavour[K].

tcanta Dynamic accumulator.

dwatta Antibacterial Antiinflammatory Antiseptic Antitussive Cardiac Diuretic Expectorant Haemostatic LaxativeThe leaves and the seed are anti-inflammatory, antiseptic, antitussive, cardiac, diuretic, expectorant, haemostatic. Assists the repair of joints[174, 176, 238]. The seed is used internally in the treatment of a variety of ailments including asthma, bladder problems, bronchitis, fever, hypertension and rheumatism[218, 238, 279]. The leaves are also used for these purposes, though they are considered to be less powerful than the seed[218]. The leaves can be harvested at any time in the growing season, and are used fresh or dried[238]. A decoction of the roots is used in the treatment of coughs[218]. Plantain seeds contain up to 30% mucilage which swells up in the gut, acting as a bulk laxative and soothing irritated membranes[238]. Sometimes the seed husks are used without the seeds[238]. Extracts of the plant have antibacterial activity[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and waste ground in lowland and mountains all over Japan[58].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer A sowing can be made outdoors in situ in mid to late spring if you have enough seeds.

nwatta Succeeds in any moderately fertile soil in a sunny position[200]. This species is hardy to at least -15°c[238]. Closely related to P. major and included as a sub-species of that plant by some botanists[238].

## 6.2.580 Bupleurum rotundifolium

Hare's Far

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Bupleurum rotundifolium is a ANNUAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[177]. Added to salads or used as a pot-herb[2]. The leaves are also used as a spice[105, 183].

nrakta Central to southern Europe, including Britain, south and east to N. Africa and the Caucasus. ksacta Cornfields, waste places and waysides, often as a weed of cultivated land[17, 2001.

propta Seed - sow spring in situ.

nwatta Requires a well-drained soil and a sunny position[200].

## 6.2.581 Cynoglossum officinale

Hound's Tongue, Gypsyflower

5 tlin 9 cvuc 1 kcak 2 tcan 2 dwat 0.8 m hkuc

htut cyutli tcup hwicli hyishrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Cynoglossum officinale is a BIEN-NIAL/PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Houndstongue contains alkaloids that can cause cancer when the plant is consumed in large quantities[238]. The plant is also said to be slightly poisonous[21], there are no reported cases of human poisoning but there are some cases of cattle being poisoned[76]. The plant has a disagreeable odour and taste so is seldom eaten by animals[212]. Contact with the plant can cause dermatitis in sensitive people[222].

kcakta Edible Parts: LeavesEdible Uses: Young leaves raw or cooked[46, 61, 105, 177, 183]. A disagreeable odour and taste[212]. Caution is advised, see the notes above on toxicity

toanta Leaves of C. officinale have been used as a mole repellent in gardens and for protection of stored vegetables and fruits from rodents [1d].

dwatta Analgesic Antidiarrhoeal Antihaemorrhoidal Antispasmodic Astringent Cancer Digestive Emollient NarcoticHound's tongue has a long history of use as a medicinal herb, though it is rarely used in modern herbalism[7, 268]. The leaves contain allantoin, a highly effective agent that speeds up the healing process in the body[238, K]. Caution should be applied, however, since narcotic effects result

from large doses taken internally[7] and the plant is potentially carcinogenic[222] (though it has also been used in the treatment of cancer[218]). The leaves and roots are analgesic, antihaemorrhoidal, antispasmodic, astringent, digestive, emollient and slightly narcotic[4, 7, 9, 21, 46, 222]. The plant contains the alkaloids cynoglossine and consolidin, which are used medicinally to relieve pain[212]. They depress the central nervous system and are also potentially carcinogenic[222]. The plant has been used internally in the treatment of coughs and diarrhoea, though it is now mainly used externally as a poultice on piles, wounds, minor injuries, bites and ulcers[222, 238]. The root is harvested at the end of spring of the plants second year[7]. Another report says that it is best harvested in the autumn and dried for later use[238]. The leaves and flowering shoots are harvested as the plant comes into flower and are dried for later use[238]. The plant has a wide antitumour reputation for cancers of various types[218]. A homeopathic remedy is made from the roots[7]. It is very effective in the treatment of insomnia[7]. nrakta Europe, including Britain, though absent from

the extreme north and rare in south, east to Asia. ksacta Dry grassy areas and the edges of woods, often near the sea, on sand, gravel, chalk or limestone soils[7, 17, 244].

propta Seed - sow in situ in early summer. The seed can be sown in spring or autumn, a period of cold stratification improves germination.

nwatta Prefers sandy, gravelly and basic soils[17]. Grows well in an ordinary well-drained soil[1]. Succeeds in full sun or partial shade[238]. The flowers are an absolute magnet for bees[K]. The plant smells of mice[17].

#### 6.2.582 Sedum arboroseum

Garden Stonecrop

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sedum arboroseum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Young plant -cooked. A famine food, it is only used when all else fails[177].

dwatta Poultice Women's complaints The leaves are used in the treatment of fevers, inflammations and wounds [218]. The leaf juice is applied to burns and eruptions [218]. The flowers are used in the treatment of vaginal fluxes, nervous afflictions of children, corneal opacity and prolapse of the genitals following labour [218]. The whole plant is crushed and used as a poultice on inflammations etc[218].

nrakta E. Asia - China, Japan. ksacta Not known in a truly wild situation[58]

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil, succeeding in dry soils but preferring one that does not dry out completely[200]. Established plants are very drought tolerant[200]. Plants can be grown on walls[200]. Requires a sunny position[188]. Hardy to at least -15°c[200]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

and sedative[254]. Diluted with a carrier oil such as almond, and massaged into the skin it is used in the treatment of skin diseases, ulcers, chest infections, catarrh, cystitis and dandruff[4, 238, 254]. It is used as an inhalant for treating bronchitis, tuberculosis and nervous tension[4, 238]. An infusion of the branches can also be used[238].

nrakta N. Africa - Morocco and Algeria. ksacta Upper slopes of the Atlas mountains where there is little or no rain in the growing season but the soil is fed by the melting snow from the peaks above[200].

propta Seed - collect the cones in winter and keep in a warm room until they open[1]. Sow immediately in a cold frame[78]. One report says that a short cold stratification of one month improves germination rates[113]. Keep the seed pot moist, but be careful because the young seedlings are very prone to damp off, keep them well ventilated[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a cold frame for their first winter and plant them out into their permanent positions in late spring or early summer. Give them some protection from winter cold for their first winter or two outdoors[K]. Cuttings of terminal shoots can be tried in a frame in November but they are very difficult 113].

nwatta Thrives on most soils, being very tolerant of chalk, dry sites and of drought when it is established[11, 81, 200]. Prefers a rich loam or a sandy clay in full sun[1]. This species is more tolerant of atmospheric pollution than other members of the genus[11]. Succeeds in warm dry areas with less than 40cm of rain a year, but also in areas with cool summers and up to 200cm of rain[200]. Small trees less than 50cm tall establish much guicker and better than taller trees. those more than 2 metres tall are difficult to establish[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Trees grow fairly rapidly, with height gains of 60cm in a year recorded[185]. This species is cultivated for its timber in some parts of S. Europe[50]. Small male cones are formed on the lower branches of trees, whilst the larger female cones are formed on higher branches[238]. These female cones persist on the tree for 2 - 3 years before breaking up[238]. Trees are notably susceptible to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

## 6.2.645 Chamaecyparis lawsoniana

Lawson Cypress, Port orford cedar, Oregon Cedar, Port Orford Cedar, Lawson's Cypress

5 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 25 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Chamaecyparis lawsoniana is an evergreen Tree growing to 25 m (82ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

tcanta Broom Hedge Hedge Resin WoodPlants can be grown as a tall hedge[29, 75, 200] They are very tolerant of clipping so long as this does not extend into the brown barked wood since trees cannot regenerate from this[200]. Any trimming should be done in the summer[200]. Certain dwarf forms can be used for ground cover, the cultivars 'Knowefieldensis', 'Nidiformis' and 'Tamariscifolia' have been recommended[208]. The branches have been used to make brooms[257]. Wood - very close-grained, hard, strong, durable, easily worked, light, abounding in fragrant resin, acid resistant. One of the world's finest timbers, it is widely used for flooring, fencing, making boats etc[46, 61, 82, 171].

It is now in short supply due to over-harvesting without replanting[200].

dwatta DiureticThe resin is a powerful diuretic[46, 61,

nrakta Western N. America - Oregon to California. Locally naturalized in S. Europe[50]. ksacta Usually scattered in small groves on moist slopes and canyons, often on serpentine soils, below 1500 metres. Seldom more than 50 kilometres from the coast[71, 82].

propta Seed - sow March/April in a seedbed outdoors[78]. The seed is best sown in pots in a frame[K]. Seed can take 18 months to germinate. One month warm then one month cold stratification has produced good results[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings in late summer or autumn in sandy soil in a cold frame[1, 11, 200]. Difficult, it may be best done in late winter to early spring[113].

nwatta Landscape Uses: Hedge, Screen, Specimen, Succeeds in most soils and situations, but prefers a moist deep loamy soil and a sheltered position[1, 11]. Grows well in heavy clay soils. Survives on dry alkaline soils[200]. Growth of trees is hardly affected by a lack of phosphate in the soil. Plants are moderately shade tolerant, especially when young[81, 200]. Plants are tolerant of atmospheric pollution according to one report[200], whilst another says that they do not do well in a polluted atmosphere[1]. A fairly wind tolerant plant, but it does not like severe maritime exposure[75]. Plants are susceptible to wind burn and recover variably[75]. This species is hardy to about -25°c[200]. A fairly long-lived tree in the wild with specimens 500 - 600 years old[229]. It is a very valuable timber tree in N. America and it is sometimes cultivated as a forestry tree in Britain. where it occasionally self-sows[1, 11]. It establishes well and grows quickly. New shoots can make 1 metre in a year but trees rarely maintain that rate and 30cm is nearer the average[185]. New growth starts very slowly in April, speeds up in June and ceases in September[185]. A very uniform species in the wild[200], in cultivation it is polymorphic and there are many named varieties[1, 185, 200]. The crushed foliage has a pungent smell[245]. Favoured by many birds for roosting, providing high cover and especially for nesting, large specimens of this tree help to attract songbirds to the garden[200]. Trees are notably susceptible to honey fungus[200]. Special Features: Attractive foliage. North American native, Inconspicuous flowers or blooms.

## 6.2.646 Carpinus betulus

Hornbeam, European hornbeam, Common Hornbeam, European Hornbeam

5 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 25 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Carpinus betulus is a deciduous Tree growing to 25 m (82ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Dye Fuel Hedge Hedge WoodPlants can be grown as a medium to tall hedge, they retain their dead leaves throughout the winter if clipped at least once a year in late summer[11, 29, 186]. They should not be clipped in spring since they will bleed profusely[200]. A yellow dye is obtained from the bark[115]. Wood - heavy, close grained, hard, very tough, very durable, not very durable according to another report. Used for flooring, cogs, tools, piano mechanisms etc[1, 11, 13, 46, 115]. A good fuel[6].

dwatta Bach Haemostatic OphthalmicThe leaves are haemostatic[7]. They are used in external compresses to stop bleeding and heal wounds[7]. A distilled water made from the leaves is an effective eye lotion[7]. The leaves are

nrakta E. Asia - Japan. ksacta Woods in foothills, C. and 6.2.643 Pseudolarix amabilis S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies

nwatta Succeeds in ordinary garden soil but prefers a moist well-drained humus-rich soil[1, 200]. Tolerates dry summer conditions[200]. This species is closely related to A. nemerosa[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

## 6.2.642 Ephedra major

Ma Huang

5 tlin 9 cvuc 1 kcak 0 tcan 4 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli nvanhien hionli

drutta Ephedra major is an evergreen Shrub growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Fruit - raw.

dwatta Antiasthmatic Antidote Cardiac Diaphoretic Diuretic Febrifuge Nervine Pectoral Tonic Vasoconstrictor VasodilatorMembers of this genus contain various medicinally active alkaloids (but notably ephedrine) and they are widely used in preparations for the treatment of asthma and catarrh[238]. This species is the richest source of ephedrine in India, the stems containing over 2.5% total alkaloids. of which about 75% is ephedrine[240]. The whole plant can be used at much lower concentrations than the isolated constituents - unlike using the isolated ephedrine, using the whole plant rarely gives rise to side-effects[254]. The plant also has antiviral effects, particularly against influenza[238]. The stems are a pungent, bitter, warm herb that dilates the bronchial vessels whilst stimulating the heart and central nervous system[238]. The stems are also diaphoretic, diuretic, febrifuge, hypertensive, nervine, pectoral, tonic, vasoconstrictor and vasodilator[165, 176, 238]. They are used internally in the treatment of asthma, hay fever and allergic complaints[238]. They are also combined with a number of other herbs and used in treating a wide range of complaints[238]. This herb should be used with great caution, preferably under the supervision of a qualified practitioner[238]. It should not be prescribed to patients who are taking monoamine oxidase inhibitors, or suffering from high blood pressure, hyperthyroidism or glaucoma[238]. Ephedrine is seen as a performance-boosting herb and, as such, is a forbidden substance in many sporting events such as athletics[K]. The stems can be harvested at any time of the year and are dried for later use[238].

nrakta Europe to E. Asia - the Mediterranean to the Himalayas. ksacta Stony slopes and gravel terraces, often on limestone, in arid regions[200].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[200]. It can also be sown in spring in a greenhouse in a sandy compost[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse. Plant out in the spring or early summer after the last expected frosts and give some protection in their first winter[K]. Division in spring or autumn[238]. Layering.

nwatta Requires a well-drained loamy soil and a sunny position[11]. Established plants are drought resistant and are also lime tolerant[200]. Dioecious, male and female plants must be grown if fruit and seed are required.

Golden Larch, Chinese golden-larch

5 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 40 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli hjonli

drutta Pseudolarix amabilis is a deciduous Tree growing to 40 m (131ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Miscellany WoodThe wood is used for furniture, boat building, and bridges[266].

dwatta MiscellanyThis plant is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. The stem bark is used in the treatment of ringworm[218]. The bark shows fungicidal activity against the parasitic Epidermophyton and Trichphyton fungi that cause ringworm[218].

nrakta E. Asia - E. China. ksacta Evergreen and deciduous, broad-leaved mixed, forests; 100-1500 metres[266].

propta Seed - sow late winter in a cold greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Landscape Uses:Border, Pest tolerant, Specimen. Best grown in a warm sheltered site on a deep fertile soil with a pH between 5 and 6 and an annual rainfall of around 1000mm[200]. Plants dislike dry winds and soils that dry out readily[200]. Slow-growing[11]. A difficult tree to grow well in cool temperate regions, if planted out when small it is easily scorched and can be killed by temperatures of -5°c[200]. In Britain good trees are only found in the southern part of the country[200]. Plants prefer a continental climate with hot summers - they are then much hardier and tolerate cold winters[200]. Best planted out when 30 -80cm tall, it needs to be kept weed free until established and might require winter protection for its first few years[200]. There are several named forms, selected for their ornamental value[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

#### 6.2.644 Cedrus atlantica

Atlas Deodar, Atlantic cedar

5 tlin 9 cyuc 0 kcak 3 tcan 2 dwat 25 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Cedrus atlantica is an evergreen Tree growing to 25 m (82ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in September, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pol-

tcanta Essential Hedge Hedge Repellent WoodAn essential oil obtained from the distilled branches is used in perfumery, notably in jasmine-scented soaps[238]. The essential oil also repels insects[238]. Plants can be grown as a tall hedge[29]. Wood - fragrant and durable[238]. It is prized for joinery and veneer and is also used in construction[61, 238]. It is also used for making insect-repellent articles for storing textiles[238].

dwatta Antidandruff Antifungal Antiseptic Nervine Pectoral SkinAn essential oil obtained from the distilled branches is a good antiseptic and fungicide that stimulates the circulatory and respiratory systems and also calms the nerves[238]. The oil is also astringent, diuretic, expectorant

## 6.2.583 Euphrasia officinalis

Evebright

5 tlin 9 cvuc 1 kcak 0 tcan 3 dwat 0.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Euphrasia officinalis is a ANNUAL growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista Use for eve conditions currently not recommended. Adverse effects include: mental confusion, headaches, eve pressure, redness and swelling of the eye if 10-60 lotion drops used. Eye symptoms possibly followed by sensitivity to light, sneezing, nausea, constipation, cough, shortness of breath and increased passing of urine [301].

kcakta Edible Parts: LeavesEdible Uses: Leaves raw[7]. They are occasionally used in salads for their slightly bitter flavour[7].

dwatta Antiinflammatory Astringent Digestive Homeopathy Ophthalmic TonicEvebright has a long history of herbal use in the treatment of eye problems and is still in current herbal use[4]. It is important that only the correct forms of evebright, with glandular hairs on the calvx, are used. since other forms do not possess medicinal virtues[268]. Eyebright tightens the mucous membranes of the eye and appears to relieve the inflammation of conjunctivitis and blepharitis[254]. Its ability to counter catarrh means that it is often used for infectious and allergic conditions affecting the eyes, middle ear, sinuses and nasal passages[254]. The whole plant is anti-inflammatory, astringent, digestive, ophthalmic and slightly tonic[[4, 7, 9, 14, 165, 220]. It is taken internally in the treatment of catarrh, sinusitis, hav fever, upper respiratory tract infections etc[238]. As an ophthalmic, an infusion of the plant can be taken internally or used as an eve wash. Alternatively, the diluted juice can be dropped into the eyes[232]. Some caution should be exercised, experimentally it can induce side effects including dim vision[222]. The plant's astringency makes it inappropriate for treating dry or stuffy congestion[254]. The plant can be used externally as a poultice to aid the healing of wounds[268]. Eyebright should be harvested when in flower and can be dried for later use[238]. The dried herb is a ingredient of herbal smoking mixtures, used in the treatment of chronic bronchial colds[4]. A homeopathic remedy is made from the expressed juice of the plant[232]. It is used particularly in the treatment of eye inflammations and colds[7, 232].

nrakta W. Europe, including Britain, to E. Asia. ksacta Moist grassland and chalky pastures, semi-parasitic on grass[4, 7].

propta Sow the seed outdoors in situ in early spring amongst grass in a moist but not marshy soil[1].

nwatta Succeeds in most soils, preferring chalk or limestone[200]. Evebright is a semi-parasitic plant, growing on the roots of various species of grass[4] and also on Trifolium pratense and Plantago species[238]. The grass does not seem to suffer unduly from this parasitism since eyebright is an annual and its cells do not penetrate very deeply into the grass[4]. There is some doubt over the validity of the name of this species, some botanists now call it Euphrasia rostkoviana. Evebright is a variable aggregate species, some botanists divide it into a number of different species[1, 50]. Only those forms of eyebright which have glandular hairs on the calvx possess medicinal qualities [268]. It hybridizes freely with other members of this genus[200].

## 6.2.584 Sedum stenopetalum

Wormleaf Stonecrop

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Sedum stenopetalum is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. Best used when young[85].

dwatta VDAn infusion of the whole plant has been used in the treatment of venereal diseases[257].

nrakta Western N. America - South Dakota to Alberta. Nebraska, Oregon and California. ksacta Open rocky slopes and bluffs, rock crevices, in gravel and talus, also in grassland and sagebrush desert, usually in well-drained very dry places and often in ponderosa pine forests[83].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Bulbils harvested in late summer and planted out immediately

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are very drought tolerant[200], they grow well in dry soils and can be grown on a wall[200]. Plants are viviparous, producing bulbils in their leaf axils at flowering time[83, 200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

#### 6.2.585 Daphniphyllum macropodum

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Daphniphyllum macropodum is an evergreen Shrub growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked. A 'New Year's green'[177]. (This quite possibly relates to the Chinese new year which begins in February)

tcanta WoodWood - soft, close and even grained, very handsome. Used for turnery, carving etc[146]. The wood of the roots is especially handsome, it is deep red in colour[158]

nrakta E. Asia - China, Japan, Korea. ksacta By the sides of streams in moist woods[109, 184] at elevations of 600 -1,900 metres[266]..

propta Seed - sow spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent. positions in late spring or early summer, after the last expected frosts. Cuttings of moderately ripened wood, 7 - 10cm with a heel or at a junction with old wood, July in individual

pots in a frame. The cuttings are slow to root, give them brisk bottom heat[78]. Fair percentage[78]. Layering of current seasons growth, 12cm long in August/September. Takes 12 - 18 months. High percentage[78].

nwatta Succeeds in any good soil, tolerating lime but perhaps not suitable for very chalky soils[11]. A useful plant for moist shady positions[11]. Dislikes cold drying winds. A very ornamental plant[1], it is hardy to about '20°c[184]. Plants have withstood 30° of frost at Kew Gardens, but prefer shelter[11]. Very closely related to D. himalense and possibly no more than a sub-species of that species[11]. The flowers have a pungent aroma[182]. They are produced in racemes on the previous year's wood[11]. Dioecious, male and female plants must be grown if seed is required.

## 6.2.586 Lychnis fulgens

Brilliant campion

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lychnis fulgens is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: LeavesEdible Uses: Young plant - cooked[177].

tcanta SoapAlthough no specific mention has been seen for this species, the root of several members of this genus contains saponins, a soap substitute used for washing clothes, hair etc[K]. It is extracted by boiling the roots in water[20]. Do not overboil the roots because this will break down the saponins[K].

nrakta E. Asia - Japan, Korea, Manchuria, Siberia. ksacta Meadows and shrub thickets[74]. Woodlands on low hills, wet shady scrub meadows[266].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in situ in spring or early autumn though this requires more seed. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, succeeding in a good garden soil and a warm sheltered position[1].

## 6.2.587 Lithospermum officinale

Gromwell, European stoneseed

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Lithospermum officinale is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is polinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[46, 61, 183].

tcanta DyeA purple dye is obtained from the roots. It is best harvested in the spring[178].

dwatta Contraceptive Depurative Diuretic Lithontripic Oxytoxic SedativeThe mature seeds are diuretic, lithontripic and oxytocic[9, 240]. They are ground into a powder and used in the treatment of bladder stones, arthritis and febrile conditions[9]. An infusion of the leaves is used as a sedative[240]. The root is depurative[240]. A syrup made from a decoction of the root and stems is used in the treatment of

eruptive diseases such as smallpox, measles and itch[240]. All parts of the plant contain a substance that inhibits the secretion of the pituitary gonadotrophic hormone[240]. Extracts of the herb possess contraceptive properties[240].

nrakta Europe, including Britain, except the extreme suthwest and north, east to Iran and the Caucasus. ksacta Hedges, bushy places and woodland borders, usually on basic soil[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttinos. Division.

nwatta Prefers a moderately fertile well-drained soil[200].

## 6.2.588 Artemisia schmidtiana

Sagebrush, Silvermound, Wormwood, Mugwort 5 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Artemisia schmidtiana is a PERENNIAL growing to 0.3 m (1ft) by 0.6 m (2ft in) at a medium rate. It is in flower from August to November, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: StemEdible Uses: Stems - cooked[177].

nrakta E. Asia - Japan. ksacta Bare soil in high mountains and also by the sea, C. and N. Japan[58, 187]. Grassy slopes in high mountains and on seashores[275].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about10 - 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted. Very easy.

nwatta Landscape Uses:Border, Ground cover, Specimen. Requires a well-drained sandy soil in full sun[187]. Established plants are drought tolerant[190]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Plants are hardy to about -20°c[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Fragrant foliage, Inconspicuous flowers or blooms.

## 6.2.589 Gentiana macrophylla

in Jiao

5 tiin 9 cyuc 1 kcak 0 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana macrophylla is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[177]. An emergency food, used when all else fails.

dwatta Analgesic Antiinflammatory Antipyretic Antirheumatic HypotensiveOin Jiao has been used in Chinese

diaphoretic, diuretic, emmenagogue, rubefacient, stimulant, stomachic and vesicant[4, 61, 238]. An infusion of the leaves is used in the treatment of flatulence, nausea, indigestion, catarrh in the upper respiratory tract, and to induce sweating and promote urination[4, 254]. The herb is principally used externally as a rubefacient, applied as a poultice it helps to lessen the pain of arthritic joints by increasing the flow of blood in the area and thereby hastening the flushing out of toxins[4, 254]. The leaves can be harvested before the plant flowers, or they can be harvested with the flowering stems. They can be used fresh or dried[238]. The plant is a rich source of the medicinal essential oil 'thymol', which is antiseptic[4, 213, 222]. The plant has been commercially cultivated for its essential oil, though this is now produced synthetically[222]. Thymol is also an effective hookworm remedy, but must be ingested in such large quantities that it can prove fatal to the patient[213].

nrakta N. America - Louisiana and Florida, north to Long Island. ksacta Dry sandy soils in fields on or near to the coastal plain[43, 235].

propta Seed - sow mid to late spring in a cold frame. Germination usually takes place within 10 - 40 days at 20°c. When large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late summer in areas where the winters are not too severe and will produce larger plants. Cuttings of soft basal shoots in spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division in spring or autumn, Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in ordinary garden soil so long as it is not too dry[1, 200]. Requires a moist soil and a sunny position[200]. This species prefers a light dry alkaline soil[238]. Plants are hardy to about -10°c[260] and should succeed outdoors in most parts of Britain. A polymorphic species[200]. A good bee plant[200]. Subject to mildew in dry summers[200].

## 6.2.640 Matricaria recutita

German Camomile

5 tlin 9 cyuc 1 kcak 4 tcan 5 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hionli

drutta Matricaria recutità is a ANNUAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Allergic reactions (tongue thickening, tightness in the throat,swelling of the lips, throat and eyes, itching over the body) have been reported with German chamomile but are infrequent. Patients with severe allergic responses to ragweed (ragwort) should be warned about the possible cross-sensitivity to chamomile and other members of the Asteraceae/Compositae family (e.g. echinacea, feverfew, milk thistle)

kcakta Edible Parts: Edible Uses: Condiment TeaThe young sprigs are used as a seasoning[15]. The dried flowers are used to make herb teas[21, 37]. It is aromatic but with a very bitter flavour[4].

tcanta Dye Essential Hair Liquid feed Repellent StrewingAn infusion of the flowers is used as a hair shampoo, especially for fair hair[14, 20, 168]. It is also used as a liquid feed and general plant tonic, effective against a number of plant diseases[14, 18, 20]. The flowers are also an ingredient of 'Quick Return' herbal compost activator[32]. The whole plant was formerly used as a strewing herb[4, 168]. The whole plant is insect repellent[14, 20]. An essential oil from

the whole plant is used as a flavouring and in perfumery[46]. Yellow to gold dyes are obtained from the flowers[168].

dwatta Anodyne Antiinflammatory Antiseptic Antispasmodic Carminative Cholagogue Diaphoretic Homeopathy Nervine Stomachic Tonic VasodilatorGerman camomile is a well known herbal remedy and is much used in the West. In particular it is an excellent herb for treating various digestive disorders, nervous tension and irritability and is also used externally to treat skin problems[254]. An infusion of the flowers is taken internally as an anodyne, anti-inflammatory, antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, emmenagoque, febrifuge, sedative, stomachic, tonic and vasodilator[7, 218, 238]. An infusion is particularly useful as a stomachic, nervine and sedative for young children, especially when they are teething[238]. It is also used in the treatment of irritable bowel syndrome, Crohn's disease, peptic ulcers and hiatus hernia[254]. In large doses, or when taken regularly for several times each day, the tea can be emetic[218] and can also cause the symptoms it is intended to cure[232]. The flowers are also used externally to treat wounds, sunburn, burns, haemorrhoids, mastitis and leg ulcers[238]. The flowers are harvested when fully open and are dried for later use[254]. The flowers contain various volatile oils including proazulenes[254]. Upon steam distillation these proazulenes produce chamazulene, this is remarkably anti-allergenic and is useful in the treatment of asthma and hay fever [254]. The flowers are sometimes added to cosmetics as an anti-allergenic agent[238]. The whole plant, harvested when in flower, is used to make a homeopathic remedy[232]. It is especially suited to teething children and those who have been in a highly emotional state over a long period of time[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Camomile for coughs and bronchitis, fevers and colds, inflammations of the skin, inflammation of the mouth and pharynx, tendency to infection - improve immunity, wounds and burns (see [302] for critics of commission E).

nrakta Europe, including Britain, east to W. Asia and the Himalayas. ksacta Sandy or loamy arable soils in Britain[13, 17]. Also found on saline steppes in Europe[50].

propta Seed - sow spring or autumn in situ[238]. Germination should take place within 3 weeks.

nwatta An easily grown plant, it succeeds in any well-drained soil in a sunny position[200]. It prefers neutral to slightly acid conditions and succeeds in poor soils[238]. It usually self-sows freely when well-sited[K]. Chamomile has a long history as a gentle and effective folk medicine for a wide variety of disorders, being especially effective and safe for children[K]. There is some confusion between this plant and Chamaemelum nobile as to which is the genuine camomile. This species is said to be more bitter and inferior to Chamaemelum nobile in some reports[200] and to be more active medicinally in other reports[9, 238]. Both have similar properties and can probably be used interchangeably[K]. The whole plant has a pungent aroma[245].

#### 6.2.641 Anemone nikoensis

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Anemone nikoensis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[177]. Some caution is advised, see the notes above on toxicity.

drutta Centaurea solstitialis is a ANNUAL/BIENNIAL 6.2.638 Sambucus microbotrys growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista There is a report that the plant causes brain lesions and a nervous syndrome called 'chewing disease' in horses[274].

kcakta Edible Parts: LeavesEdible Uses: The plant is eaten as a vegetable[100]. The part used is not specified.

dwatta LithontripicThe powdered seed is used as a remedy for stone[4]. The powdered root is said to be a cure for fistula and gravel[4].

nrakta S. Europe to W. Asia. Occasionally established in S. and E. England[17], ksacta Cultivated land and waste ground[100].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. If you have sufficient seed it can be sown in situ in the spring, and an autumn swing in situ might also be

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. A good bee and butterfly plant the flowers are rich in nectar[171]. Members of this genus are rarely if ever troubled by brows-

#### 6.2.637 Anemone flaccida

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 0.1 m hkuc pcimhmim cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Anemone flaccida is a PERENNIAL growing to 0.1 m (Oft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems - cooked[46, 61, 177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - N. and W. China, Japan. ksacta Moist shaded places along streams and ravines in foothills[58] in loose peaty soils[187].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1 - 6 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies

nwatta Succeeds in ordinary garden soil but prefers a woodland soil[1]. Prefers a moist peaty soil in some shade[187]. Plants succeed in maritime gardens[233]. Hardy to at least -20°c[187]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes [54]. A good woodland plant[1, 187].

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sambucus microbotrys is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermanhrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Flowers FruitEdible Uses: Flowers - raw or cooked. Fruit - raw or cooked[177, 257]. The fruit is about 4mm in diameter and is borne in large clusters[200]. Some caution is advised, see the notes above on toxicity.

nrakta South-western N. America. ksacta Moist places, 1800 - 3300 metres in California[71].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings of mature wood of the current season's growth, 15 - 20cm with a heel, late autumn in a frame or a sheltered outdoor bed[78].

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[1]. Tolerates atmospheric pollution and coastal situations[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.639 Monarda punctata

Horse Mint. Spotted beebalm

5 tlin 9 cvuc 1 kcak 0 tcan 3 dwat 0.8 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Monarda punctata is a ANNUAL/PERENNIAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaLeaves - raw or cooked. A strong aromatic taste, they are used as a flavouring in salads and cooked foods, and also as an aromatic tea[183].

tcanta Essential IncenseThe plant has a pleasing aroma and has been hung in the house as an incense[257].

dwatta Antiseptic Carminative Diaphoretic Diuretic Emmenagogue Rubefacient Stimulant Stomachic VesicantHorse mint was traditionally taken by several native North American Indian tribes to treat nausea and vomiting, and to encourage perspiration during colds. It was also applied externally as a poultice to treat swellings and rheumatic pains[254]. Nowadays it is used primarily to treat digestive and upper respiratory tract problems[254]. The leaves are carminative, herbalism for over 2,000 years and, like other members of snake and scorpion bites, contagious infections and inflamthis genus, the roots contain some of the most bitter compounds known and make an excellent tonic for the whole digestive system, working especially on the stomach, liver and gall bladder[238, 254]. The root is analgesic, antiinflammatory, antipyretic, antirheumatic, diuretic, febrifuge, hypoglycaemic and hypotensive[176, 218, 238]. The root is used internally in the treatment of digestive problems, arthritis, allergic inflammations, low-grade fever in chronic diseases, jaundice and hepatitis[176, 218, 238, 254]. The root is harvested in the autumn and dried for later use.

nrakta E. Asia - China, Siberia. ksacta Steppes and glades in light woods[74]. Stream and river banks, roadsides, grassland slopes, wet meadows, forest margins, forests at elevations of 400 - 2400 metres[266]..

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer Division in March[1111 Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species requires a moist well-drained neutral to acid soil in a sheltered position[200, 238]. It prefers full sun but succeeds in partial shade[111]. Plants are hardy to at least -15°c[238]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. Plants are intolerant of root disturbance[200].

#### 6.2.590 Aconitum violaceum

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Aconitum violaceum is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200]. Another report suggests that the root of this species might not be toxic[240].

kcakta Edible Parts: RootEdible Uses: Root cooked[177]. It is eaten as a pleasant tonic[240]. These reports should be treated with great distrust due to the poisonous nature of the genus[K].

dwatta Antidote Antiinflammatory FebrifugeThe entire plant is used in Tibetan medicine, it is said to have a bitter taste and a cooling potency[241]. Antidote, antiinflammatory and febrifuge, it is used in the treatment of

mation of the intestines[241].

nrakta E. Asia - Himalayas. ksacta Shrubberies and open slopes, 3600 - 4800 metres from Pakistan to C.

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by the native range of the plant it should succeed outdoors in many parts of the country. It is a polymorphic species[51]. The following notes are based on the general needs of the genus. Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

## **6.2.591** Hydrocotyle vulgaris

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Hydrocotyle vulgaris is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked. A strong carroty taste[183], they cannot be eaten in quantity[144].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, Greece and the Caspian Sea, ksacta Bogs, fens and marshes, usually on acid soils[17].

propta Seed - we have no information on this species but suggest sowing it in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it would probably be worthwhile sowing the seed outdoors in situ in the spring. Division of rooted runners. Probably best done in spring but can be done at any time in the growing season if the plants are kept moist.

nwatta Requires a permanently moist position in sun or light shade[200]. Plants can be very invasive, though they are fairly easy to control by pulling out the rooted stems[200].

#### 6.2.592 Ranunculus kochii

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 0.1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Ranunculus kochii is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no specific record of toxicity has been found for this plant, many if not all members of this genus are poisonous. These toxins can be destroyed by heat or by drying[4, 10, 13, 19, 62, 65]. Many if not all plants in this

genus also have a strongly acrid juice that can cause blistering to the skin[65, 183].

kcakta Edible Parts: Flowers StemEdible Uses: Young stems[177]. No more details are given. Petals[177]. No more details are given. Caution is advised for both these uses, see the notes above on toxicity.

nrakta W. Asia - Turkey, Iraq, Iran. ksacta Rocky slopes near melting snow, to 3000 metres in Turkey[93].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in

nwatta Prefers a moist loamy soil[1]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### **6.2.593** Carex hirta

Hammer sedge

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Carex hirta is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from June to July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Root SeedEdible Uses: Root cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe leaves are used for bedding[61]. dwatta DiureticDiuretic[61].

nrakta Most of Europe, including Britain, south to N. Africa and east to temperate Asia. ksacta Rough grassy places, woods, damp meadows and damp sandy hollows[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.594 Drosera rotundifolia

Sundew. Roundleaf sundew

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.1 m hkuc htut cyutli tcuphja7n hwicli hyishrasjlut hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Drosera rotundifolia is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Edible Uses: Curdling agentThe juice of the plant is used to curdle plant milks[177, 183]. You heat the milk and the leaves together in order to make the

tcanta FungicideSubstances in the plant are used to curb the growth of bacteria[13].

dwatta Antibacterial Antibiotic Antispasmodic Demulcent Expectorant Homeopathy Hypoglycaemic WartsThe sundew has a long history of herbal use, having been popular for its fortifying and aphrodisiac effects[238]. It relaxes the muscles of the respiratory tract, easing breathing and relieving wheezing and so is of great value in the treatment of various chest complaints[254]. The plant has become quite rare and so it should not be harvested from the wild[254]. The flowering plant is antibacterial, antibiotic, antispasmodic, antitussive, demulcent, expectorant and hypoglycaemic[4, 7, 9, 13, 21, 46, 165, 172, 222, 238]. The plant is used with advantage in the treatment of whooping cough, exerting a peculiar action on the respiratory organs[4]. It is also used in the treatment of incipient phthisis, chronic bronchitis and asthma[4]. Externally, it has been used to treat corns, warts and bunions[257]. The plant is harvested in the summer and can be dried for later use[7]. Use with caution[21]. Internal use of this herb causes a harmless colouring of the urine[9]. An extract of the plant contains plumbagin, which is antibiotic against a wide range of pathogens[222, 238]. Because of their protein digesting enzymes, the leaf juice has been used in the treatment of warts and corns[4, 222]. The entire fresh plant, harvested when it is starting to flower, is used to make a homeopathic remedy[232]. It is used mainly in the treatment of coughs[232] and is specific for whooping cough[7].

nrakta Europe, including Britain but excluding he Mediterranean, N. Asia, N. America.. ksacta Wet and moist places in poor peaty soils, occasionally forming a floating fringe on small ponds[4, 17].

propta Seed - best sown thinly as soon as it is ripe into pots of a free-draining soil with some charcoal added and with a layer of finely chopped sphagnum moss on top[175]. Surface sow and keep the compost moist. The seed usually germinates in 1 - 2 months at 20°c[175]. Grow the plants on in the pots for their first growing season, making sure that the soil does not become dry. Divide the plants in the autumn, grow them on in the greenhouse for the winter and plant them out into their permanent positions in late spring.

nwatta Prefers a sandy peaty soil, succeeding in poor soils and bogs[1, 200]. Requires a sunny position[238]. An insectivorous plant, it can survive in nitrogen poor soils because it gets the nutrients it needs from insects[1, 7, 9, 200]. The upper surfaces of leaves are covered with hairs that secrete a sweet sticky substance[7]. This attracts insects, which become smeared with it and unable to escape - the plant then exudes a digestive fluid that enables it to absorb most of the insect into its system[7].

## 6.2.595 Aconitum multifidum

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Aconitum multifidum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

kcakta Edible Parts: LeavesEdible Uses: Leaves[178]. No further details are given, apart from a claim that this species is not poisonous - a report that should be treated with extreme caution

nrakta Europe - W. Alps and the Pyrenees. ksacta Not

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Considered to be a part of A. napel-

nwatta A common weed of cultivated land, it does not it may cause paralysis[222]. Large doses cause sleepiness, require cultivation. Groundsel is a good food plant for the caterpillars of many butterfly and moth species, and is one of only two species that provide food for cinnabar moth caterpillars. One report states that this plant was formerly cultivated as a food crop for livestock[54]! Since the plant is a cumulative toxin this use is most questionable.

## 6.2.634 Polygala tenuifolia

5 tlin 9 cvuc 1 kcak 0 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Polygala tenuifolia is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, at least one member of this genus is said to be poisonous in large quantities.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - cooked[105, 177, 179]. Root - cooked[105, 177]. The core is removed and the root is boiled in several changes of water[179].

dwatta Cardiotonic Expectorant Haemolytic Kidney Sedative Tonic Yuan Zhi contains triterpenoid saponins, these promote the clearing of phlegm from the bronchial tubes. The plant is used mainly as an expectorant and stimulant to treat bronchial asthma, chronic bronchitis and whooping cough[254]. The root is antibacterial, cardiotonic, cerebrotonic, expectorant, haemolytic, hypotensive, sedative and tonic[116, 147, 176, 218]. It acts mainly as a tonic for the heart and kidney energies[238]. It is taken internally in the treatment of coughs with profuse phlegm, bronchitis, insomnia, palpitations, poor memory, anxiety, depression and nervous tension[238]. Externally it is used to treat boils and carbuncles[147, 238]. The root is harvested in the autumn and dried for later use[238]. The leaves are used as a tonic for the kidneys[218].

nrakta E. Asia - Korea, Mongolia, Manchuria. ksacta Hillsides, roadsides and meadows[147]. Dry meadows and stony slopes[238].

propta Seed - sow spring or autumn in a cold frame[214]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Cuttings of young shoots in a frame in late spring[1].

nwatta Prefers a moderately fertile moisture-retentive well-drained soil, succeeding in full sun if the soil remains moist throughout the growing season, otherwise it is best in semi-shade[200, 238]. Dislikes shade according to another report. Plants are hardy to at least -15°c[238].

#### 6.2.635 Chelidonium maius

Greater Celandine, Swallow Wort, Greater Celandine 5 tlin 8 cyuc 1 kcak 0 tcan 3 dwat m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Chelidonium majus is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is poisonous[7, 10, 19]. It is of very low toxicity and this is greatly reduced by drying the plant[65]. The stem juice is highly irritating and allergenic,

skin irritation, respiratory tract irritation, violent coughing and dyspnoea[268]. It also stains the urine bright yellow and may cause ulcers[268]. May cause burning sensation in the mouth, nausea and vomiting. Avoid contact with eyes. Concerns of liver toxicity so avoid in those with liver disease. Not recommended during pregnancy and for children under

kcakta Edible Parts: Leaves OilEdible Uses: OilLeaves cooked in small quantities[177]. They contain small amounts of toxic alkaloids[179]. The leaves are boiled with clean earth, the mixture is left overnight and then thoroughly washed in several changes of water[179]. Very much a famine food, to be used when all else fails!![K].

tcanta OilPlants rapidly form a ground cover, but should only be used in wild places because of their invasive nature[200]. Seed contains 50 - 66% of a fatty oil[74]. No more details given.

dwatta Acrid Alterative Anodyne Antispasmodic Cancer Cholagogue Diaphoretic Diuretic Hydrogogue Narcotic Ophthalmic Purgative Stomachic WartsGreater celandine has a long history of herbal use[4]. Traditionally it was employed as an ophthalmic to treat and clear the eyesight whilst in modern herbal medicine it is used more as a mild sedative, antispasmodic and detoxifying herb, relaxing the muscles of the bronchial tubes, intestines and other organs[254]. The latex is much used externally to treat warts. Caution should be employed, especially when the plant is used internally however, because it contains toxic alkaloids[7, 21]. The leaves and the sap are acrid, alterative, anodyne, antispasmodic, caustic, cholagogue, diaphoretic, diuretic, hydrogoque, narcotic, purgative[4, 7, 9, 21, 46, 165, 238]. They are used in the treatment of bronchitis, whooping cough, asthma, jaundice, gallstones and gallbladder pains[254]. The plant is harvested in the spring as it comes into flower, it is best used fresh[7], but can also be dried for later use[9]. The roots can also be used, these are harvested in the autumn and dried for later use[9]. The plant has anticancer properties and is analgesic[4, 218]. It is an important component of a stomach ulcer drug[218]. The plant has an abundant acrid bright-orange sap that stains the skin strongly and is powerfully irritant[4]. It is used as an external treatment to get rid of warts, ringworm and corns[13, 187, 222, 244] and has also been used to remove films from the cornea of the eye[4]. The plant contains the alkaloid chelidonine, which is similar to the alkaloid papaverine found in poppies. This alkaloid has antispasmodic and sedative effects on the bile ducts and bronchi. However, results have been inconsistent, especially if the preparation is not fresh[244]. The plant also contains the alkaloid sparteine, which restores normal rhythm to feeble arrhythmic myocardia[207]. The German Commission E Monographs, a therapeutic guide to herbal medicine. approve Chelidonium majus for liver and gallbladder complaints (see [302] for critics of commission E).

nrakta Most of Europe, including Britain, east to N. Asia. ksacta Rubble, damp ground, banks, hedgerows and by walls[7, 17], nearly always close to human habitations[4].

propta Seed - sow in situ February to May or August to November. Germination usually takes place within 1 -12 months[164, 200]. The plant self-sows freely and should not need much encouragement. Division in March[111]. The plant bleeds profusely so this method is not recommended[200]

nwatta Landscape Uses:Woodland garden. Succeeds in any soil other than boggy conditions[1, 111, 233]. Prefers a rich soil of a woodland nature[1, 31]. Shade tolerant[31]. Plants grow well on walls if they are given a semi-shaded position and a pocket of soil into which to root[219]. A shortlived perennial[187], but it self-sows freely and can easily become a weed[200]. It quickly colonizes waste ground and thin woodland areas[233]. Once established, the plant is very difficult to eradicate. Special Features: North American native, Naturalizing, Attractive flowers or blooms.

## 6.2.636 Centaurea solstitialis

St. Barnaby's Thistle, Yellow star-thistle 5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowering head - cooked. Used as a globe artichoke substitute[2, 105, 177, 183], though they are considerably smaller and even more fiddly[K].

tcanta Weather forecastingThe flower heads expand in dry weather and close in moist weather. The dried flowers will continue to do this for a long time and they thus form a basic hygrometer for use in weather forecasting[4].

dwatta Diaphoretic PurgativeThe roots and leaves are diaphoretic and purgative[4].

nrakta Europe, including Britain, north to 60° N., east to Siberia, Caucasus and W. Asia. ksacta Poor soils[200] on dry banks and pastures[4], especially on chalk[13, 17].

propta Seed - surface sow in a cold frame in the spring. The seed usually germinates in 4-8 weeks at  $15^\circ c [138]$ . As soon as they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer.

nwatta Succeeds in a sunny position in ordinary garden soil[1]. Prefers an alkaline soil[138]. Prefers a poor soil[4, 200]. Plants are hardy to about -15°c[200]. The presence of this species in a meadow usually indicates a poor sandy soil[4]. This species resents root disturbance, it should be planted into its final position as soon as possible[138].

## 6.2.632 Sanicula europaea

Wood Sanicle

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprikl-

wisslip hpa7tmwatli fyifxre7t hjonli

drutta Sanicula europaea is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

aponins are very poorly absorbed by the body and so tend to pass through without causing harm, they are also destroyed by thorough cooking. Saponins are found in many plants, including several that are often used for food, such as certain beans. It is advisable not to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - cooked. They contain saponins so should not be eaten in large quantities. A famine food, it is only used when all else fails1791.

dwatta Alterative Astringent Carminative Dysentery Expectorant VulneraryWood sanicle used to be widely used as a herbal remedy and has a long-standing reputation for healing wounds and treating internal bleeding. The herb is traditionally thought to be detoxifying and has also been taken internally to treat skin problems[254]. A potentially valuable plant, but it is little used in modern herbalism[7, 254]. The leaves and the root are alterative, astringent, carminative, expectorant and vulnerary[4, 7, 9, 13, 21, 46]. The leaves are harvested in early summer and the roots in mid to late summer, they can be dried for later use[4, 7]. The herb is highly esteemed in the treatment of blood disorders, where it is usually given in combination with other herbs[4]. It is also taken internally in the treatment of bleeding in the stomach and intestines, the coughing up of blood, nosebleeds, chest and lung complaints, dysentery, diarrhoea etc[4, 254]. It can also be used as a mouth gargle for sore throats[4]. Externally, it is applied to rashes, chilblains, inflammations etc[4, 7] and an ointment made from the plant is applied to haemorrhoids[7]

nrakta Most of Europe, including Britain, to N. Africa, the Mediterranean, E. annd W. Asia, S. Africa. ksacta Woods, thickets and damp places, avoiding acid soils[4, 21, 31]. Often found in chalk beechwoods and oak woods on loamy soils[17].

propta Stratification improves the germination rate. If possible sow the seed in the autumn, sow stored seed as early in the year as possible. It is best to sow the seed in situ in a woodland soil under trees If seed is in short supply it is probably wise to sow it in pots of woodland soil in a shady place in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any moist moderately fertile well-drained soil in sun or semi-shade[4, 200]. Strongly dislikes poor thin soils[31]. Prefers a loamy or calcareous soil[9, 17]. The seeds are covered with little prickles, enabling them to become attached to anything that brushes against them and thus distributing the seed[41].

## 6.2.633 Senecio vulgaris

Groundsel

5 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Senecio vulgaris is a ANNUAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower all year, and the seeds ripen all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous to many mammals, including humans. The toxin affects the liver and has a cumulative affect[9, 65]. Some mammals, such as rabbits, do not seem to be harmed by the plant, and will often seek it out[4]. Various birds also eat the leaves and seeds[4].

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked or raw[7, 105]. The young leaves have been used in many areas as a salad, though this is very inadvisable, see the notes on toxicity at the too of the page[7].

tcanta A good food plant for the caterpillars of many butterfly and moth species, and is one of only two species that provide food for cinnabar moth caterpillars. Dynamic accumulator.

dwatta Anthelmintic Anticonvulsant Antiscorbutic Diaphoretic Diuretic Emmenagogue Homeopathy Poultice PurgativeGroundsel has a long history of herbal use and, although not an officinal plant, it is still often used by herbalists[4]. The whole herb is anthelmintic, antiscorbutic, diaphoretic, diuretic, emmenagogue and purgative[4, 9, 21, 54]. It is often used as a poultice and is said to be useful in treating sickness of the stomach, whilst a weak infusion is used as a simple and easy purgative[4]. The plant can be harvested in May and dried for later use, or the fresh juice can be extracted and used as required[4]. Use with caution[21]. This plant should not be used by pregnant women[7], see also the notes above on toxicity. A homeopathic remedy is made from the plant[9]. It is used in the treatment of menstrual disorders and nose bleeds[9].

nrakta Europe, including Britain, south and east from Scandanavia to N. Africa and temperate Asia. ksacta Found along roadsides and waste places, it is also a common weed of cultivated land, succeeding on most soils but avoiding shade[7, 9, 17].

propta Seed - it doesn't need any encouragement from

lus by most botanists[1], it is probably A. napellus vulgare. (Rchb.)Rouy. and Foucaud[200]. We are keeping this record separate because the suggestion that this species is not poisonous[178] requires investigation.

## 6.2.596 Patrinia scabiosifolia

Eastern Valerian, Scabious Patrinia 5 tlin 8 cyuc 1 kcak 0 tcan 3 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Patrinia scabiosifolia is a PERENNIAL growing to  $0.6\,\mathrm{m}$  (2ft) at a fast rate. It is in flower in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves, stem tips and flower buds - cooked and used as a potherb, added to soups or dried for later use[105, 177, 183].

dwatta Antibacterial Anticoagulant Antidote Antiphlogistic Antispasmodic Depurative Diuretic Febrifuge Haemostatic Hepatic Parasiticide ResolventThe root is antibacterial, anticoagulant, antiphlogistic, antispasmodic, depurative, diuretic, febrifuge haemostatic and resolvent[147, 174, 178, 218, 279]. It contains several medically active compounds, including triterpenic glycosides and has been shown to stimulate the liver into producing drug-metabolizing enzymes[279]. The root is used in Korea in the treatment of the initial stages of appendicitis, perityphlitis and neuralgia[279]. It is also used in the treatment of parasitic skin diseases and as an antidote to poison[218]. The entire plant is antibacterial, anti-inflammatory and hepatic[176]. It is used traditionally as a sedative[218] and also in the treatment of carbuncles, acute appendicitis, intestinal abscess, postpartum pain, dysmenorrhoea and endometriosis[176]. It stimulates the circulation, treats abscesses, promotes regeneration of liver cells[147, 174, 176, 178]. Large doses can cause a decrease of white blood cells, nausea and dizziness[176]. The crushed leaves are applied to abscesses and boils[147,

nrakta E. Asia - China, Japan, Korea and eastern Siberia. ksacta Sunny grassy places in hills and mountains all over

propta Seed - sow in situ in April[111]. If you only have a small quantity of seed it is probably better to sow it in a pot in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. Division in spring or autumn.

nwatta Landscape Uses:Border, Massing, Rock garden. Easily grown in any light rich soil in a sunny position[1, 111]. Special Features:Not North American native, Suitable for cut flowers.

## 6.2.597 Philadelphus microphyllus

Littleleaf Mock Orange

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Philadelphus microphyllus is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 161]. Formerly used as food[257]. No more details are given.

tcanta SoapThe leaves are rich in saponins, when crushed and mixed with water they produce a lather that is an effective cleaner, used on the body, clothes etc[169]. You can wash your hands by merely picking a couple of leaves or a bunch of blossom, wetting your hands and then rubbing the plant material vigorously as if it was a bar of soap[K]. This soap is a very gentle cleaner that does not remove the

body's natural oils, but does remove dirt. It is not very effective against oil[K].

nrakta Western N. America - Utah and Colorado to California and New Mexico. ksacta Dry rocky places in sunny rocky canyons and piñon-juniper woodland, 1200 - 3000 metres[71, 184].

propta Seed - best if given 1 months cold stratification[113]. Sow February in a light position in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long side-shoots, July/August in a shaded frame. Plant out in spring. High percentage[78]. Cuttings of mature wood of the current year's growth, 15 - 25cm with a heel, December in a sheltered bed outdoors. Fair to good percentage[78]. Layering in summer. Very easy.

nwatta Easily grown in any moderately fertile preferably dry soil[184], succeeding in thin soils over chalk and tolerating poor soils[200]. Grows well in heavy clay soils. Succeeds in semi-shade but prefers a position in full sun where it will flower more freely[182, 200]. Hardy to about ~20°c[184]. Plants grow best in the east and south-east of Britain, they are shy to flower in gardens with cool summers[11]. Plants are very tolerant of pruning, one third of the stems can be cut down to the ground each year in order to promote fresh growth and heavier flowering[202]. A very ornamental plant[1] with aromatic flowers smelling of pineapples[182].

#### 6.2.598 Scabiosa columbaria

Pigeon's Scabious, Dove pincushions, Pincushion Flower 5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat  $0.8~\mathrm{m}$  hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Scabiosa columbaria is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves[177]. No more details are given.

nrakta Europe, including Britain, south and east from the Arctic circle to N. Africa, Siberia and W. Asia. ksacta Dry calcareous pastures, banks etc, to 600 metres[17].

propta Seed - sow spring in a cold frame. The seedlings are subject to damping off[1] so water with care and make sure to give adequate ventilation. Prick out the seedlings into individual pots once they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border. Prefers a neutral or alkaline soil and a sunny position[200]. Succeeds in ordinary garden soil[1]. Grows well in a dry sunny meadow[200]. The flowers are a good nectar source for bees and lepidoptera, the plant is also a good food source for the caterpillars of many butterfly species[200]. This species name is sometimes treated as the group name for an aggregate of species[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, Attracts butterflies, Suitable for cut flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms.

## **6.2.599** Matricaria matricarioides

Pineannle Wood

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Matricaria matricarioides is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Some people are allergic to this plant[222].

kcakta Edible Parts: FlowersEdible Uses: TeaFlower heads - raw or cooked[172]. A tasty nibble[172]. The dried flowers are used to make herb teas[172]. They are pineapple scented when steeped in hot water[183].

tcanta RepellentThe plant repels insects[172]. The dried flowers are used as an insect repellent[213].

dwatta Antispasmodic Carminative Galactogogue Sedative Skin VermifugeThe flowering plant is antispasmodic, carminative, galactogogue, sedative, skin and vermifuge[9, 172, 222]. This plant is rarely used medicinally, though it is sometimes employed as a domestic remedy in the treatment of intestinal worms and also as a sedative[9]. The plant is harvested when in flower in the summer and is dried for later use[9]. Some caution is advised since some individuals are allergic to this plant[222].

nrakta N.E. Asia. An introduced and increasing weed in Britain. ksacta Waysides and waste places, especially along tracks, paths and by trampled gateways[17].

propta Seed - sow spring or late summer in situ. Germination should take place within 3 weeks.

nwatta Succeeds in any well-drained soil in a sunny position[200]. The bruised or sun-warmed leaves emit the appealing odour of ripe apples [245].

## 6.2.600 Sedum lanceolatum

Spearleaf Stonecrop, Subalpine stonecrop 5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum lanceolatum is an evergreen Perennial growing to 0.2 m (oft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset [62, 85].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[60]

dwatta Birthing aid LaxativeThe plant is laxative[257]. An infusion of the stems, leaves and flowers has been taken to clean out the womb after childbirth[257].

nrakta North-western N. America. ksacta Open exposed places, usually on rocks or on gravelly or rocky soil from sealevel to the sub-alpine zone[60].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants

are drought tolerant[190, 200]. Succeeds when grown on a wall[200]. Hardy to at least -15°c[200]. A very polymorphic species[60], it is closely related to S. stenopetalum, but this species is not creeping[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

## **6.2.601** Gagea lutea

land) or no shade. It prefers moist soil.

Yellow Star Of Bethlehem

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Gagea lutea is a BULB growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light wood-

kcakta Edible Parts: Leaves RootEdible Uses: Bulb - raw or cooked[4, 105, 177]. A famine food, it is only used in times of scarcity[4]. Young leaves - cooked.

nrakta Europe, including Britain, from Scandanavia south and east to Spain and temperate Asia to Japan. ksacta Damp woods and pastures, especially on basic soils[17].

propta Seed - sow spring in a greenhouse [200]. Sow the seed thinly so that there is no need to transplant them, and grow the seedlings on in the same pot in the greenhouse for their first year or two. Give an occasional liquid feed to ensure they do not become nutrient deficient. Pot up the small bulbs when the plants are dormant, placing 2 - 3 bulbs in each pot. Grow them on for another year or two in the greenhouse before planting them out when they are dormant. Division. We have no details of when is the best time to divide the bulbs but suggest doing it after the leaves die down in the summer.

nwatta Requires a moist soil, preferring one on the alkaline side of neutral, and succeeding in sun or shade. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -10°(214).

#### 6.2.602 Stachys officinalis

Wood Betony, Common hedgenettle, Betony, Woundwort 5 tlin 10 cyuc 1 kcak 2 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Stachys officinalis is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from June to September, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves and flowering tops make a good tea substitute. Refreshing and aromatic[21, 100, 183], it has all the good qualities of tea without the negative ones[4].

tcanta DyeA fine yellow dye is obtained from the leaves[4].

dwatta Anthelmintic Antiseptic Astringent Carminative Cathartic Cholagogue Digestive Diuretic Emetic Emmenagogue Expectorant Homeopathy Nervine Sedative Sternutatory Tonic VulneraryWood betony was at one time commonly used as a medicinal plant in the treatment of a wide range of disorders, especially as a nervine and tonic for treating maladies of the head and as an external application to wounds[4, 7, 238]. It also stimulates the digestive system and the liver, having an overall tonic effect upon the body[254]. Wood betony is much less used nowadays, and more often forms part of a mixture of herbs[4]. The whole plant is collected when in flower in the summer and can

nrakta E. Asia - Japan, S. Korea. ksacta Woody hillsides on sandy substrates[200].

propta Seed - it germinates better if given 3 months cold stratification and so it is best sown as soon as it is ripe in the autumn[113]. Sow stored seed as early in the year as possible. Make sure that all the fruit pulp is removed from the seed because it contains germination inhibitors[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of naturally layered stems in the spring[200]. Cuttings.

nwatta Requires a moist but well-drained lime-free soil and some shade[11]. Prefers a peaty soil[1, 200], succeeding in neutral to acid soils[200].

## 6.2.629 Melittis melissophyllum

Bastard Balr

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Melittis melissophyllum is a PERENNIAL growing to 0.3 m (1Ri by). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, moths. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA coumarin scented (like new-mown hay) herb, it is occasionally used for making a 'Maiwein' or 'Maibowle' type of beverage[183].

dwatta Astringent Blood purifier Diuretic Emmenagogue Sedative VulneraryAstringent, blood purifier, diuretic, emmenagogue, sedative, vulnerary[61].

nrakta Central and southern Europe, including Britain. ksacta Hedges, scrub and mountain woods[187].

propta Seed - best sown in a cold frame in the autumn[188]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring[200] or autumn[188]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any good soil in partial shade[1, 187]. Prefers a rich loam[1]. Grows well in thickets, wood-land edges and the garden border[1]. Plants are hardy to about -20°c[187]. The flowers have a pleasing sweet honey-like scent[245]. The leaves become sweetly fragrant as they dry[245], they retain their fragrance for a long time[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.630 Tsuga mertensiana

Mountain Hemlock

5 tlin 7 cyuc 1 kcak 0 tcan 2 dwat m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Tsuga mertensiana is an evergreen Tree growing to 45 m (147ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It is in leaf all year, in flower in April, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Inner barkEdible Uses: TeaInner bark - raw or dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[161]. It is best used in the spring[172]. An emergency food, it is only used when all else fails[183]. A herbal tea is made from the young leaves and shoot tips[172, 183].

tcanta Dye Hedge Hedge Incense Pot-pourri Resin Tannin WoodThe slightly unripe cones are used in pot-pourri. They retain an attractive scent for several years[200]. Yields a resin similar to Abies balsamea, it is gathered by incisions in the trunk or by boiling the wood[46, 61, 64]. The bark contains 8 - 14% tannin[46, 171]. The inner bark is used according to one report[82]. A brown dye is obtained from the bark[21, 46]. The boughs are steamed or rubbed on furniture and used as a room deodorant and disinfectant[257]. A pitch (called hemlock pitch), is obtained by distillation of the young branches[46]. Tolerant of light trimming, plants can be grown as a tall hedge[29, 81]. Wood - strong[171]. Used for heavy construction[171]. Close-grained, light, soft and weak according to other reports, which go on to say that it is occasionally manufactured into lumber when other wood is not available[82, 229].

dwatta Astringent Diaphoretic Diuretic PoulticeThe bark is astringent, diaphoretic and diuretic[21]. A tea made from the inner bark or twigs is helpful in the treatment of influenza, colds, kidney or bladder problems, and also makes a good enema for treating diarrhoea[21, 257]. It can also be used as a gargle or mouthwash for mouth and throat problems or externally to wash sores and ulcers[21]. The powdered bark can be put into shoes for tender or sweaty feet or for foot odour[21]. A poultice of the chewed leaves has been used to treat burns[257]. The warm gum obtained from the trunks has been used as a dressing on cuts[257].

nrakta Western N. America - Alaska to California. ksacta Exposed ridges and slopes at high altitudes, often to 3000 metres[82]. The best stands are found in sheltered areas with deep moist well-drained soils, high precipitation and long cold winters[229].

propta Seed - it germinates better if given a short cold stratification[80, 113] and so is best sown in a cold frame in autumn to late winter. It can also be sown in early spring, though it might not germinate until after the next winter. If there is sufficient seed, an outdoor sowing can be made in spring[78]. Pot-grown seedlings are best potted up into individual pots once they are large enough to handle - grow them on in a cold frame and plant them out in early summer of the following year. Trees transplant well when they are up to 80cm tall, but they are best put in their final positions when they are about 30 - 45 cm or less tall, this is usually when they are about 5 - 8 years old[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

nwatta Landscape Uses:Hedge, Aggressive surface roots possible, Screen, Specimen, Woodland garden. An easily grown plant, it thrives best when growing in a deep well-drained soil in the western parts of Britain where it appreciates the higher rainfall[11]. However, it succeeds in most soils and positions, being especially good on acidic sandy soils[81]. Plants are very shade tolerant when young, but need more sunlight as they grow older[81, 200] Plants are thin and poor when grown in dry or exposed places[200]. Dislikes atmospheric pollution[82]. A very ornamental plant[11], it is slow growing for the first few years, averaging 30cm a year, but older trees, especially in Scottish lowland sites in areas with cool moist summers, are growing rapidly[185]. Trees live 400 - 500 years in the wild[229]. They commence bearing seeds when about 20 - 30 years old. years of high production alternating with years of low production[229]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native. Inconspicuous flowers or blooms.

## 6.2.631 Carlina vulgaris

Carline Thistle

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Carlina vulgaris is a BIENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and

All or parts of this plant are poisonous, Wetlands plant, Suitable for cut flowers.

## 6.2.625 Calystegia soldanella

Sea Bindweed, Seashore false bindweed

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calystegia soldanella is a PERENNIAL CLIMBER growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Buterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This species is said to be purgative[173], some caution is advised.

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked as a vegetable or pickled and used as a samphire substitute[2, 105]. Caution is advised since the plant might have a purgative effect[173].

tcanta StringThe stems are very flexible and are used as a string for tying[66]. Fairly strong but not long-lasting[K].

dwatta Antiscorbutic Diuretic Febrifuge Irritant Purgative VermifugeAntiscorbutic, diuretic, febrifuge, irritant, purgative and vermifuge[218].

nrakta Coastal areas of Europe, including Britain, N. Africa, Asia, N. and S. America and Australasia. ksacta Sandy and shingly sea shores and dunes[1, 17].

propta Seed - sow spring in a cold frame in a free draining compost and only just cover. The seed usually germinates in 1 - 3 months at 15°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring whilst dormant[200].

nwatta Easily grown in ordinary well-drained garden soil in a sunny position[1, 200]. This species is very difficult to establish successfully in the garden[1].

## 6.2.626 Polygala vulgaris

Milkwort, Common milkwort

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Polygala vulgaris is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK cone 6. It is in flower from May to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, at least one member of this genus is said to be poisonous in large quantities.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[177]. They are used to adulterate green China tea[2].

dwatta Diaphoretic Diuretic Expectorant StimulantThe bitter-tasting milkwort has a reputation for increasing milk flow in nursing mothers, but this belief is in fact unfounded[254]. Whilst little used in modern herbalism, the root and aerial parts of the plant contain triterpenoid saponins which promote the clearing of phlegm from the bronchial tubes and so is a valuable herb for the treatment of respiratory problems such as chronic bronchiat is, bronchial asthma and convulsive coughs such as whooping cough[254]. The plant is also thought to have sweat-inducing and diuretic properties[2541].

nrakta Europe, including Britain, from Norway south and east to N. Africa and W. Asia. ksacta Grassland on heaths, dunes etc[17], on acidic and alkaline soils[214].

propta Seed - sow spring or autumn in a cold frame[214]. When they are large enough to handle, prick the seedlings

out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Cuttings of young shoots in a frame in late spring 11.

nwatta Prefers a moderately fertile moisture-retentive well-drained soil, succeeding in full sun if the soil remains moist throughout the growing season, otherwise it is best in semi-shade[200]. Dislikes shade according to another report. A very polymorphic species[200].

## 6.2.627 Eriogonum microthecum

Slender Buckwheat, Alpine slender buckwheat, San Bernardino buckwheat, Johnston's buckwheat, Panamin 5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Eriogonum microthecum is an evergreen Shrub growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: TeaA tea is made from the plant[257].

dwatta Diuretic Poultice TBA decoction of the roots or tops has been used in the treatment of coughs caused by TB[61, 257]. A decoction of the stems and leaves has been used to treat bladder problems[257]. It has also been used externally in hot compresses or as a wash for lameness and rheumatism[257].

nrakta South-western N. America - Nebraska to Washington, south to New Mexico and California. ksacta Sandy deserts to lower montane slopes, especially with sage-busslefol.

prota Seed - best sown as soon as it is ripe in the autumn in a sandy compost in a greenhouse. Sow stored seed in early spring in a warm greenhouse[1]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Division in early spring[1]. This has to be done with care because the plant resents root disturbance[200]. Try to obtain divisions from around the edges of the plants without digging up the whole clump. Tease the divisions out with as much root on them as possible and pot them up. Grow them on in light shade in the greenhouse until they are rooting well and plant them out in the summer. Cuttings of greenwood with a heel in the summer[200].

nwatta Requires a loose lean gritty well-drained soil in a very sunny position[200]. Succeeds in dry soils. Tolerates exposed positions[200]. Requires some protection from winter wet[1]. A very variable plant, it has been divided into a number of varieties[270]. Established plants resent root disturbance[200].

#### 6.2.628 Mitchella undulata

5 an 9 an 0 an 0 an 0 an 0 an 0 an 1 an hkuchmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Mitchella undulata is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It brefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit. Not very well-flavoured[200].

tcanta Can be used as a ground cover plant in a shady position[188]. Especially good on a peat terrace or in a wood-land[200]. Plants form a spreading carpet, rooting along the stems, and are best spaced about 30cm apart each way[208].

be dried for later use[4, 254]. It is anthelmintic, antiseptic, astringent, carminative, mildly cathartic, cholagogue, digestive, diuretic, mildly emetic, emmenagogue, expectorant, nervine, sedative, sternutatory, tonic and vulnerary[4, 9, 14, 21, 165, 218]. It is taken in the treatment of 'frayed nerves', pre-menstrual complaints, poor memory and tension[254]. It can be taken in combination with herbs such as comfrey, Symphytum officinale, and lime flowers, Tilia species, to treat sinus headaches and congestion[254]. Wood betony can be taken on its own, or with yarrow, Achillea millefolium, to staunch nosebleeds[254]. A pinch of the powdered herb will provoke violent sneezing and it has been used as part of a herbal snuff mixture in the treatment of headaches[4]. A homeopathic remedy is made from the fresh plant[9]. It is used in the treatment of asthma and excessive perspiration[9]

nrakta Europe, including Britain, south and east from Sweden to Spain, Italy, Greece and the Caucasus. ksacta Grassland, hedgebanks, heath and open woods, avoiding calcareous soils[9, 17].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots once they are large enough to handle and plant them out in the summer. Division in spring. Very easy, the plant can be successfully divided at almost any time of the year. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Ground cover, Specimen. Prefers a light moist neutral to acid soil in sun or light shade[7, 17, 238]. A characteristic plant of healthy roadside banks on heavy soils[187]. Hardy to at least -25°c[187]. At one time bugle was often cultivated for its medicinal virtues. though it is now little used[4]. There are some named varieties selected for their ornamental value[188]. An excellent bee plant[24]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Invasive, Naturalizing, Suitable for cut flowers, Suitable for dried flowers. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

## 6.2.603 Vaccinium tenellum

Small-Cluster Blueberry

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium tenellum is a deciduous Shrub growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A poor taste and texture[200]. The fruit is about 6 - 8mm in diameter[200].

nrakta South-eastern N. America - Virginia to Georgia and Florida, west to Alabama. ksacta Dry woods[235].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil

with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.604 Sedum divergens

Pacific Stonecrop

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 0.2 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum divergens is an evergreen Perennial growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[172, 177]. The leaves are very small and round, looking rather like a small green berry[256]. They have a crisp texture and were valued as a food by some North American Indian tribes who would eat them raw[256].

dwatta Antihaemorrhoidal LaxativeThe plant has been used in the treatment of piles and has been given to children as a laxative[257].

nrakta Western N. America. ksacta Rocky slopes in mountains[172]. Alpine to sub-alpine rocky ledges, ridges and talus slopes[60].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil and requires a sunny position[200]. Established plants are drought tolerant[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

## 6.2.605 Sedum anacampseros

Loce Restorer

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.1 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Sedum anacampseros is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 177]. Used as a vegetable in soups[183]. There is a distinctive bitterness in the flavour[K].

are best spaced about 30cm apart each way[208].

nrakta C. Europe - N. Spain to the Alps. ksacta Rocks in mountains[83].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta An easily grown plant, it succeeds in most soils[188] but prefers a fertile well-drained soil[200]. Dislikes lime[50]. Shade tolerant[83], though it prefers a sunny position[K]. Established plants are drought tolerant[190]. Hardy to at least -15°c[200]. Spreads rapidly at the roots, but it is easily controlled[83]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

## 6.2.606 Centaurea jacea

Brown Knapweed

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Centaurea jacea is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is selffertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought

kcakta The young leaves are cooked as a vegetable [1b].

dwatta Bitter Diuretic Ophthalmic Stomachic TonicThe root is bitter tonic, diuretic and stomachic[7]. An excellent bitter for treating difficult digestive systems, it is still used in rural areas as a digestive and also to reduce the temperature of feverish children[7]. A distilled water made from the leaves is used as an eye lotion in the treatment of conjunctivitis[7].

nrakta Europe. Naturalized in Britain. ksacta Hedgerows, uncultivated land and waste ground[7].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Division in autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. This should be done at least once every three years in order to maintain the vigour of the plant. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates drv. low fertility and alkaline soils[200]. Plants are suitable for the wild garden and for naturalising[200]. This species is hardy to at least -15°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

## tcanta Plants can be used for ground cover[190]. They **6.2.607 Sisymbrium officinale**

Hedge Mustard

5 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sisymbrium officinale is a ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: CondimentYoung shoots - raw or cooked[2, 9, 85]. A bitter cabbage-like flavour, they are used as a flavouring in salads or cooked as a potherb[183, K]. Seed - raw or cooked[257]. It can be ground into a powder and used as a gruel or as a mustard-like flavouring in soups etc[85, 183].

tcanta Soil conditionerAlkaline secretions from the growing roots help to sweeten an acid soil[18].

dwatta Antiaphonic Diuretic Expectorant Laxative StomachicThe whole plant is said to be antiaphonic, diuretic, expectorant, laxative and stomachic[4, 7, 21, 46]. This plant was at one time known as the 'singer's plant' because of its use in treating loss of the voice[7]. A strong infusion of the whole plant has been used in the treatment of throat complaints[4, 238]. Excessive doses can affect the heart[238]. The dried plant is almost inactive, so it should only be used when freshly harvested[7].

nrakta Europe, including Britain, south and east from Scandanavia to N. Africa and the Near East. ksacta Hedge banks, uncultivated ground, waste ground, the sites of ruined buildings etc. It is a fairly common weed of cultivated

propta Seed - sow spring or autumn in situ[238].

nwatta An easily grown plant, it succeeds in most soils but prefers a moist to dry acid to alkaline soil in full sun or light shade[238]. Plants are hardy to at least -15°c[238]. Hedge mustard grows well near oats but it inhibits the growth of turnips[18]. The plant has a peculiar aptitude for collecting and retaining dust[4]. This means that when growing near roads or other polluted places the leaves are seldom edible[K]. A food plant for the caterpillars of several butterfly and moth species[30].

#### 6.2.608 Limonium tetragonum

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Limonium tetragonum is a BIENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[105, 177].

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Sandy places by the sea, central and southern Japan[58].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Requires a well drained soil and a sunny position[200].

## 6.2.609 Hypericum erectum

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Hypericum erectum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is

are usually avoided by grazing animals[274]. The flowers are headaches[155, 172]. An infusion of the roots is used exterconsidered to be poisonous by some Indian tribes[161, 177].

kcakta Edible Parts: FlowersEdible Uses: Young blossoms - cooked[161, 177]. Some caution is advised, see the notes on toxicity at the top of the page.

tcanta LatexRubber can be made from latex contained in the leaves and the stems[112].

nrakta South-western N. America - C. Mexico. ksacta Not known

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Prefers a well-drained light rich or peaty soil in a sunny position[1, 200]. Succeeds in poor soils. There is some confusion over nomenclature. A. mexicana. Rydb. is a synonym of A. fascicularis and the reports on the uses of this plant did not specify the authors name[60]. We have assumed that the uses refer to A. mexicana. Cav. There is also some confusion over the hardiness of this plant with one report saying that it needs greenhouse protection in Britain[1] whilst another says that it is hardy to zone 6, or about -20°c[200]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207].

## 6.2.623 Ligusticum porteri

Porter's Licorice Root

5 tlin 9 cvuc 1 kcak 0 tcan 3 dwat 0.9 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ligusticum porteri is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

kcakta Edible Parts: Edible Uses: CondimentThe leaves are used as a flavouring, a celery substitute[155].

dwatta Antirheumatic Antispasmodic Diaphoretic Diuretic Expectorant Febrifuge Kidney Stomachic TB Uterine tonicThe roots, seed and essential oil (obtained from the roots and the seed) of this plant are a bitter, camphoraceous warming herb that stimulates the circulation, kidneys and uterus[238]. They are also antirheumatic, antispasmodic, diaphoretic, digestive, expectorant, febrifuge and stomachic[155, 172, 238]. They are used internally in the treatment of eruptive fevers, bronchial infections, digestive complaints, toothache, painful menstruation and retained placenta[238]. They have also been used to treat TB. and

nally to treat body aches[257]. The root is harvested in the autumn and can be used fresh or dried[238].

nrakta South-western N. America. ksacta Moist fertile ground, almost to the timberline, 2000 - 3500 metres in Texas[155]. Upland meadows and ravines[238].

propta The seed is best sown as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown as early in the year as possible in a greenhouse or cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer if they have grown large enough. Otherwise, keep them in a cold frame for the first winter and plant them out in early summer. Division in

nwatta Succeeds in any well-drained soil in a sunny position[200]. Succeeds in dry soils[238]. Plants are hardy to at least -15°c[238].

#### **6.2.624** Iris ensata

Japanese Water Iris

5 tlin 8 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cyutli tcuphja7n hwicli hrasjlut hpa7tli flatprik hpa7tmwatli fvifxre7t hionli

drutta Iris ensata is a PERENNIAL growing to 0.6 m (2ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: RootEdible Uses: Root - the source of an edible starch[2, 105, 177]. Some caution is advised, see the notes above on toxicity.

tcanta Basketry Broom Fibre ThatchingA fibre is obtained from the leaves, a substitute for hemp[42]. It is used for rope and coarse cloth[74]. Also used in thatching and basket making[123]. The root is long and fibrous, it is used for making brooms, brushes etc[178].

dwatta Alterative Anthelmintic Antidote Appetizer Depurative Diuretic Hepatic VermifugeThe root is alterative, anthelmintic, antidote, appetizer, depurative, diuretic, hepatic and vermifuge[61, 178, 218]. It is used with other herbs in the treatment of venereal affections, liver complaints and dropsy[240].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Dry sandy plains near lakes, meadows, clay-solonetz places in steppes and solonetz meadows[74]. Marshes, ditches and wet grassy places[187].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division in March or October. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Massing, Specimen, Woodland garden. Prefers a light well-drained soil and a sunny position[42]. Prefers partial shade[188]. Likes plenty of moisture and a rich loamy slightly acid soil[79, 200]. Requires a lime-free soil[233]. Some cultivars, in particular the 'Higo' strain, tolerate a pH up to 7.4[200]. Plants can be grown in containers in pond margins but are then best kept in drier conditions over winter[200]. This species is hardy to about -20°c[187]. Cultivated for its root in Japan[2]. (for the starch). There are many named varieties, selected for their ornamental value[187, 200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, North American native,

mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil. treatment of coughs with thin watery phlegm and gastri-tis[238]. The fresh root is extremely acrid and contains

pcista The plant is poisonous[19, 65]. kcakta Edible Parts: RootEdible Uses: Roo

kcakta Edible Parts: RootEdible Uses: Root - boiled[46, 61, 105, 115]. Rich in starch[2]. Some caution is advised, there is a report that the plant is toxic.

dwatta Anodyne Antibacterial Antispasmodic Hallucinogenic Nervine SedativeFumewort has been used as a painkiller in Chinese medicine for over 1,000 years[238]. The tuber is anodyne, antibacterial, antispasmodic, hallucinogenic, nervine and sedative[9, 13, 238]. It is used internally as a sedative for insomnia and as a stimulant and painkiller, especially in painful menstruation, traumatic injury and lumbago[238]. It is also used for lowering the blood pressure[9, 13]. Research suggests that it also has an action in the thyroid and adrenal cortex[238]. The tuber should not be prescribed for pregnant women[238]. The tubers are harvested when the plant is dormant and are dried for later use[238].

nrakta Europe. Naturalized in Britain[17]. ksacta Woods, hedgerows[9], meadows, orchards and vineyards[13], usually on stony soils, avoiding calcareous soils[90].

propta Seed - best sown as soon as it is ripe, the seed rapidly loses viability if it is allowed to become dry[129]. Surface sow and keep moist, it usually germinates in 1 - 3 months at 15°c[164]. Germinates in spring according to another report[129]. Two months warm, then a cold stratification improves the germination of stored seed[134, 164]. Sow the seed thinly so that the seedlings can be allowed to grow undisturbed in the pot for their first year. Apply liquid feed at intervals during their growing season to ensure they are well fed. The seedlings only produce one leaf in their first year of growth[175] and are very prone to damping off[129]. Divide the seedlings into individual pots once they have become dormant and grow them on in a partially shaded area of a greenhouse for at least another year. Plant them out into their permanent positions when they are dormant. Division after flowering.

nwatta Prefers a moist, well-drained rather light soil, thriving in semi-shade. Grows well in a woodland garden or peat bed. Increases well when grown in a bulb frame, but less freely when grown in the garden[90]. A very ornamental[1] and easily grown plant[129]. There are some named varieties[90]. Plants seem to be immune to the predations of rabbits[233].

## 6.2.620 Pinellia ternata

Ban Xia, Crowdipper

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pinellia ternata is a CORM growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant is toxic[147]. This report probably refers to the presence of calcium oxylate. This is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it. However, calcium oxylate is easily destroyed by thoroughly cooking or drying the plant[172].

kcakta Edible Parts: RootEdible Uses: Root[177]. The tuber is about 12mm in diameter[266]. No more details of edibility are given in these reports but caution is advised since the fresh root is toxic[238]. The toxins can be destroyed by thoroughly drying, or very well cooking the root[K].

dwatta Antiemetic Antiphlogistic Cancer Expectors. Tephrituge Sialagogue StypticThe root of ban xia is antiemetic, antiphlogistic, expectorant, febrifuge, sialagogue and styptic. It also strengthens the spleen[147, 174, 176, 178, 279]. Modern research has shown that this remedis very effective in controlling nausea and vomiting[238]. It is also an ingredient of a Chinese prescription for removing gallstones without surgery, a process that usually causes severe nausea[238]. The root is also used internally in the

treatment of coughs with thin watery phlegm and gastritis[238]. The fresh root is extremely acrid and contains toxins, these are neutralized upon drying or by soaking in tea or vinegar[238]. The root is harvested in the summer and dried for later use, it should not be used fresh[174, 238]. Extracts of the plant have been shown to have analgesic, antiemetic, anticancer and sedative activity[218].

nrakta E. Asia - China, Japan, Korea. ksacta Cultivated fields and roadsides all over Japan[58]. Shady and damp grass thickets on mountain sides and stream edges[147].

propta Seed - we have no information but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of offsets as new growth begins in spring[238]. Bulbils from the leaf axils can be potted up in late summer and be planted out in late spring[238].

nwatta An easily grown when given a rich soil, it requires plenty of water in the growing season[1]. Succeeds in full sun or partial shade[188]. This species is cultivated as a medicinal plant in China[178]. Plants produce bulbils in their leaf axils and when growing in suitable conditions can become invasive[188, 238]. The plants can be naturalized in woodland[1].

## 6.2.621 Athamantha cretensis

Candy Carrot

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Athamantha cretensis is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Edible Uses: CondimentThe seed is used as a flavouring[177, 183]. An agreeable liquor is made from it[2]

nrakta Europe - Mediterranean ksacta Rocky places, mainly in mountains, S.E. Spain and E. France to Yugoslavia[50].

propta Seed - sow spring in a cold frame[1]. Germination usually takes place within 3 - 6 weeks at 13°c[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can also be sown in situ as soon as the soil is workable in the spring[134]. Division in spring, with care[200].

nwatta Succeeds in most soils[1]. Prefers a well-drained soil in full sun[200]. The long tap root is susceptible to rot in wet winters[200].

#### 6.2.622 Asclepias mexicana

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Asclepias mexicana is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems[105, 177]. No more details.

dwatta Astringent GalactogogueThe leaves and flowering tops are galactogogue[218]. The stems are rich in tannin and are used in the treatment of arthritis, lumbago, neuralgia and rheumatism[218].

nrakta E. Asia - China, Japan, Korea. ksacta Grassy places and thin woods in hills and mountains all over Japan[58]. Grassy slopes at elevations of 400 - 2300 metresin China[266].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at  $10^{\circ}$ c. When they are large enough to handle, pricis the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any reasonably good well-drained but moisture retentive soil[1]. Succeeds in sun or semi-shade but flowers better in a sunny position[200]. One report says that the plant is vigorous but not quite hardy in Britain[1]. This seems to be a mistake, other reports say that it is hardy to zone 6, tolerating winter temperatures down to -15°c or lower[200].

## 6.2.610 Tulipa montana

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tulipa montana is a BULB growing to 0.1 m (0ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, the bulbs and the flowers of at least one member of this genus have been known to cause dermatitis in sensitive people, though up to 5 bulbs a day of that species can be eaten without ill-effect[65].

kcakta Edible Parts: RootEdible Uses: Bulb - cooked. It can be dried, ground into a powder and then mixed with cereals when making bread etc[22, 46, 61, 74].

nrakta W. Asia - Iran. ksacta Rocky and stony hills to 3000 metres[90].

propta Seed - best sown in a shady part of the cold frame as soon as it is ripe in early summer[1], or in the early autumn[200]. A spring sowing of stored seed in the greenhouse also succeeds[K]. Sow the seed thinly so that the seedlings can be grown on without disturbance for their first growing season - apply liquid feeds to the pot if necessary. Divide the bulbs once the plants have become dormant, putting 3 - 4 bulbs in each pot. Grow the on in the greenhouse for at least the next year, planting them out when dormant. Division of offsets in July. Larger bulbs can be planted out straight into their permanent positions, or can be stored in a cool place and then be planted out in late autumn. It is best to pot up smaller bulbs and grow them on in a cold frame for a year before planting them out when they are dormant in late summer to the middle of autumn.

nwatta Requires a very well-drained sandy soil in a sunny position[42]. Bulbs can be harvested after the plants have died down in July, stored in a cool dry place and then replanted in October[1]. This species is closely related to T. linifolia and T. maximowiczii[90].

## **6.2.611** Iris germanica florentina

Orris Orris-root

5 tlin 10 cyuc 1 kcak 0 tcan 3 dwat 0.9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Iris germanica florentina is a PERENNIAL growing to 0.9 m (3ft) by 0.6 m (2ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves, and especially the rhizomes, of this species contain an irritating resinous substance called irisin. If ingested this can cause severe gastric disturbances[274]. Plants can cause skin irritations and allergies in some people[238].

kcakta Edible Parts: Edible Uses: CondimentThe root can be dried, ground into a powder and used as a food flavouring[105]. The root may take several years of drying to develop its full fragrance[168].

tcanta Beads Cosmetic Dye Essential IncenseThe root is a source of Orris powder which has the scent of violets[238]. It is obtained by grinding up the dried root[4, 7, 46]. It is much used as a fixative in perfumery and pot-pourri, as an ingredient of toothpastes, breath fresheners etc and as a food flavouring. The root can take several years of drying to fully develop its violet-like fragrance, when fresh it has an acrid flavour and almost no smell[4, 168]. An essential oil is obtained from the fresh root, this has the same uses as the root[57, 61]. The root has been burnt in open fires in order to sweeten the smell of a room[245]. The juice of the root is sometimes used as a cosmetic and also for the removal of freckles from the skin[4]. A black dye is obtained from the root[168]. A blue dve is obtained from the flowers[168]. The seeds are used as rosary beads[61]. Plants can be grown for ground cover, the dense mat of roots excluding all weeds[208].

dwatta Diuretic Purgative StomachicThe dried root is diuretic, expectorant and stomachic[21, 238]. It is taken internally in the treatment of coughs, catarrh and diarrhoea[238]. Externally it is applied to deep wounds[238]. The root is harvested in late summer and early autumn and dried for later use[238]. The juice of the fresh root is a strong purge of great efficiency in the treatment of dropsy[4].

nrakta Europe - Mediterranean. ksacta Probably an albino form of I. germanica, it is not found in a truly wild situation[89].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. A sterile plant, it does not produce seed[233]. Division, best done after flowering though it is usually successful at most times of the year. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Massing, Specimen. Prefers a sunny position in a well-drained soil that contains some lime[1, 79]. Grows well in dry soils in light deciduous shade[187]. Succeeds in full sun or partial shade[79]. Prefers a pH in the range 6 to 7.5 or higher[200]. The plant is sometimes cultivated for the essential oil in its root[9, 46]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attracts birds, Not North American native, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Suitable for cut flowers, Fragrant flowers.

## 6.2.612 Chimonobambusa marmorea

Kan-Chiku

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Chimonobambusa marmorea is an evergreen Bamboo growing to 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[177]. Seed - used as a cereal[177]. The seed is neither regularly nor abundantly produced.

tcanta Hedge HedgeThe plant is useful for low screens, clumps and hedges[195, 200].

nrakta E. Asia - C. and S. Japan. ksacta This plant has long been cultivated in Japan and has been introduced elsewhere [266]. Its original habitat is obscure [200].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings.

nwatta Prefers a good loamy soil[1]. Succeeds in most soils so long as they do not dry out[200]. Dislikes drought[1]. Prefers a position sheltered from cold north and east winds[1]. Plants are liable to injury by winter cold[11]. They are hardy to about -20°c according to another report[200]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. A few stems on each plant usually produce flowers in most years without noticeable harm to the plant[11]. Plants spread rapidly by means of underground suckers and are apt to be invasive, especially when they are well established[11, 200]. New canes are produced from late April.

## **6.2.613** Asplenium trichomanes

Maidenhair Spleenwort, Dense spleenwort, Toothed spleenwort, Brightgreen spleenwort

5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 0.4 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Asplenium trichomanes is an evergreen Fern growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, and the seeds ripen from May to October. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: Edible Uses: TeaThe dried fronds have been used as a tea substitute[4].

dwatta Demulcent Emmenagogue Expectorant LaxativeA tea made from the fronds is sweet, demulcent, expectorant and laxative[4, 240]. It has been used in the treatment of chest complaints[4] and to promote menstruation[257].

nrakta Most temperate regions of the world, including Britain, mountains in the Tropics. ksacta Walls and crevices of mainly basic rocks[17].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. The spores usually germinate in the spring[1]. Spring sown spores germinate in 1 - 3 months at 15°c[134]. Pot on small clumps of plantlets as soon as they are large enough to handle and grow them on in light shade in a greenhouse. Keep the plants humid until they are well established. Once the plants are 15cm or more tall, plant them out into their permanent positions in the spring.

nwatta Requires a well-drained position and lots of old mortar rubble in the soil[1]. Requires a humid atmosphere and some shade[28, 31]. A good plant for growing on a shady part of an old dry-stone or brick wall[K]. Plants are hardy to about -30°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 6.2.614 Achillea sibirica

Siberian Yarrow

5 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Achillea sibirica is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Young shoots and leaves - cooked[177].

dwatta Antibacterial Antiinflammatory Carminative Diaphoretic Emmenagogue Odontalgic Stomachic TonicThe whole plant is antibacterial, anti-inflammatory, antibacterial, carminative, diaphoretic, emmenagogue, odontalgic, stomachic and tonic[147, 172, 218]. A decoction is used in the treatment of abscesses, abdominal cramps, amenorrhoea, bleeding, falls, snakebite and stomach ulcers[147, 218]. A poultice of the chewed root can be applied to gum sores[257].

nrakta E. Asia - China, Japan. North-western N. America. ksacta Meadows, gardens, sandy slopes and dry areas[172].

propta Seed - sow spring or early autumn in a cold frame[133]. The seed usually germinates in 1 - 3 months[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be planted direct into their permanent positions. Basal cuttings of new shoots in spring. Very easy, collect the shoots when they are about 10cm tall, potting them up individually in pots and keeping them in a warm but lightly shaded position. They should root within 3 weeks and will be ready to plant out in the summer.

nwatta Succeeds in most soils but prefers a well-drained soil in a sunny position[1, 200]. Plants succeed in maritime gardens[233]. They live longer when growing in a poor soil[200]. A very ornamental plant[200]. Polymorphic. Hybridizes freely with other members of this genus[200].

## 6.2.615 Filipendula multijuga

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Filipendula multijuga is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

tips - cooked[116].

nrakta E. Asia - Japan. ksacta Mountains, C. and S. Japan[58].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a humus-rich moist soil in semishade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils. Does well in marshy soils. Grows well in heavy clay soils. A very ornamental plant[116]. The flowers are very attractive to bees. Members of this genus are rarely if ever troubled by browsing deer[233].

## 6.2.616 Ligusticum mutellina

Mountain Lovage, Alpine lovage 5 tlin 9 cvuc 1 kcak 0 tcan 1 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Ligusticum mutellina is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves. Used as a parsley substitute[46, 61, 177]. The dried leaves are a tea substitute[46, 61].

dwatta StomachicStomachic[46, 61].

nrakta Europe. ksacta Mountains, C. and S. Europe[50]. propta The seed is best sown as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown as early in the year as possible in a greenhouse or cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer if they have grown large enough. Otherwise, keep them in a cold frame for the first winter and plant them out in early summer. Division in spring.

nwatta Succeeds in any well-drained soil in a sunny position[200].

## 6.2.617 Eremurus aucherianus

5 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Eremurus aucherianus is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked[46, 61, 177].

tcanta AdhesiveA glue is made from the mucilage contained in the root and is used with leather and in bookbinding[46, 61].

nrakta C. Asia. ksacta Dry stony heavily grazed hillsides[90].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. Sow stored seed in a greenhouse as soon as it is obtained. Germination is slow and could take 1 - 12 months at 15°c. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow on

kcakta Edible Parts: LeavesEdible Uses: Young shoot for their first winter in a greenhouse. Plant out into their permanent positions in late spring after the last expected frosts. Do not plant deeply in the soil, the crown of the plant should be slightly exposed[245]. Division after the plant dies down in late summer. Great care must be taken because the plants resent root disturbance[200]. Only divide the plants when it is really necessary, and no more frequently than once every 6 years, being careful not to break the brittle roots[245]. It is probably best to pot up the divisions and grow them on in the greenhouse until they are established.

nwatta Prefers a very well drained, very rich, light sandy loam in a warm sunny sheltered position[90, 200]. A covering of sharp sand helps the plant to survive wet winters. Plants can also be mulched overwinter with organic matter in the autumn in order to give them extra protection, but this mulch must be removed in the spring otherwise it might encourage the new growth to rot[200]. Some protection should be given to the young shoots in spring in areas subject to late frosts[200]. Keep plants dry in summer after they have flowered[90]. Plants resent root disturbance and so should be placed in their final positions as soon as possible[200]. Plants require some cold stratification in winter in order to flower well in the following summer[200]. Slugs are very attracted to this plant so some protection must be given.

## 6.2.618 Dodecatheon hendersonii

Sailor-Caps, Mosquito bills

5 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dodecatheon hendersonii is a PERENNIAL growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from March to July, in flower from April to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root cooked[22, 46, 61, 105]. Roasted in ashes[161, 257]. It is a bulbil[60]. Leaves - cooked[46, 61, 105]. Roasted in ashes[161, 257].

nrakta South-western N. America - California to Vancouver Island, ksacta Woods and prairies[60].

propta Seed - best sown as soon as it is ripe in a cold frame[175, 200]. A short period of cold stratification may improve the germination of stored seed which should be sown in spring in a cold frame. The seed usually germinates in 1 - 12 months at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or September. Autumn is best[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a moist, rich, well-drained soil and some shade[1, 175]. Prefers woodland conditions or a cool moist shady border[111, 200]. Plants prefer a dry period when dormant in the summer[188].

#### 6.2.619 Corydalis solida

Fumewort, Spring fumewort

5 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.2 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Corvdalis solida is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from March to July, in flower from April to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH:

about -5°c[200], but it should succeed outdoors in the milder areas of the country[182]. Even there it is probably best grown on a south or south-west facing wall[200]. According to the International Legume Database, this species may actually be Colutea abyssinica Kunth and Bouch., a species found in N. Africa where it grows in montane grassland and shrubland. Flowers are produced on the current year's growth[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 7.1.20 Lathyrus sylvestris

Flat pea, Wood pea

tfo2n 6 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Lathyrus sylvestris is a deciduous Perennial Climber growing to 1.5 m (5ft) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista All parts of the plant, but especially the seed, contain a toxic amino-acid. It is produced in the plant at about the same time that the seed starts to develop. In small quantities the amino acid is innocuous, and the seeds of several Lathyrus species are eaten as a nutritious part of the diet. However, in larger quantities (the seed should form less than 30% of a balanced diet), it can cause a very serious disease of the nervous system known as 'lathyrism'. Symptoms appear as a paralysis of the muscles below the knees, pains in the back, followed by weakness and stiffness of the legs and progressive locomotive incoordination[65, 76, 1309].

kcakta None Known

tcanta Agroforestry Uses: The plant is used as a green manure and soil cover for preventing erosion and for rehabilitating degraded land[1309]. It is grown as an ornamental in gardens, there are some named varieties. Nitrogen Fixer.

dwatta None Known

nrakta Eurasia - Norway through Britain to Spain, east to Western Siberia, the Caucasus and Greece ksacta Thickets and woods [17].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Lathyrus sylvestris is a moderately cold-hardy plant, able to tolerate temperatures down to around -20?c when fully dormant[200]. Grows well in full sun and in light, dappled shade, succeeding in most moderately fertile, well-drained soils[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[1309]. Suggested planting locations and garden types: Forest garden, Flower borders and beds Wall-side Borders Cottage and Informal Garden City and Courtyard Gardens. May be attacked by aphids, slugs and snails.

## 7.1.21 Cercocarpus montanus

Mountain Mahogany, Alderleaf mountain mahogany, Silver mountain mahogany, Island mountain mahogany, tfo2n 6 tlin 7 cyuc 0 kcak 3 tcan 1 dwat m hkuc htut cyutli hgatkyuctup hwicli hrasjlutnyik hpa7tli flatprikl-

wis hpa7tmwatli xre7t hionli

drutta Cercocarpus montanus is an evergreen Shrub growing to 4 m (13ft 1in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium

(loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

tcanta Brom Dye Fuel Hedge Hedge WoodBunches of the tied stems have been used as rough brooms[257]. A red to brown dye can be obtained from the root bark[257]. The bark is often mixed with alder and wild plum root barks when making the dye[257]. Tolerant of maritime exposure and amenable to training, this species can be grown as a hedge in seaside gardens[K]. The wood is heavy, hard and brittle[82]. It makes a valuable fuel and is occasionally used in the manufacture of small articles for domestic and industrial use[82].

dwatta Laxative Stomachic TonicAn infusion of the leaves has been used as a general strengthened to the system[257]. The roots and the bark have been used in the treatment of stomach complaints[257]. A cold infusion of the plant or leaves has been used as a laxative[257].

nrakta Western N. America - Washington to California. ksacta Dry rocky bluffs or mountainsides, 1,000 - 2,700 metres in Texas[227].

propta Seed - sow autumn or late winter in a cold frame. Seed of the more tender forms is best sown in the late winter whilst hardier forms are best sown in the autumn. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame.

nwatta Landscape Uses: Erosion control, Hedge, Screen. Requires a perfectly drained soil in a sunny position[200]. Tolerant of salt spray[200]. Succeeds in a hot dry position. This species has many sub-species. Whilst some forms are hardy to about -17°c when in a suitable soil and position, other forms are frost tender. The hardiest forms, succeeding in zone 5, are C, montanus argenteus (Rydb.)F.L. Matinn and C. montanus glaber (S.Wats.)F.L.Martin. Less hardy are C. montanus paucidentatus (S.Wats.)F.L.Martin which succeeds in zone 7. C. montanus blanchae (C.Schneid.)F.L.Martin and C. montanus minutiflorus (Abrams.)F.L.Martin are hardy in zone 8 whilst C. montanus traskiae (Eastw.)F.L.Martin. is the least hardy, to zone 9[200]. Some members of this genus have a symbiotic relationship with certain soil microorganisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212]. Special Features: North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]

## 7.1.22 Ulex parviflorus

tfo2n 6 tlin 9 cyuc 0 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulex parviflorus is an evergreen Shrub growing to 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

(mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known

tcanta Carbon Farming Solutions - Industrial Crop: biomass (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Carex species are popular in horticulture especially for shady positions. No information was found for Carex morowii but some Carex native species are used in wildland habitat restoration projects, natural landscaping, and in sustainable landscaping as drought-tolerant grass replacements for lawns and garden meadows. Grows well in the shade of trees. Carex morrowii is typically grown for its attractive shape and foliage. Effective accent for smaller gardens. Can be grown in pots.

dwatta None Known

nrakta E. Asia. ksacta Native to low alpine areas in Japan. Most sedges are found in wetlands – such as marshes, calcareous fens, bogs and other peatlands, pond and stream banks and riparian zones.

propta Propagation is by seed or division in spring.
nwatta Industrial Crop: Biomass Management:
Hay Regional CropClimate: boreal to warm temperate. Humidity: aquatic. Best grown in moist, fertile, medium to
wet soils in part shade to full shade. Soils should not be
allowed to dry out. In full sun and hot sites foliage tends
to bleach to an unattractive yellow. Tolerates: Deer, Heavy
Shade, Erosion, Wet Soil. Carbon Farming Solutions - Cultivation: regional crop. Management: hay (Describes the
non-destructive management systems that are used in cultivation) [1-11].

#### 6.2.672 Arnica montana

Arnica, Mountain arnica 5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Arnica montana is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Deadly in large quantities. The whole plant is toxic and should only be used for external applications to unbroken skin[9, 14, 65, 172]. Alcoholic extracts of arnica can cause toxic effects on the heart and raise blood pressure [3011]

dwatta Antiecchymotic Antiphlogistic Antirheumatic Epilepsy Nervine Sternutatory VulneraryArnica has a long history of herbal use, especially as an external treatment for bruises and sprains[232, 238] - it is an ingredient of a number of proprietary preparations[238]. Internally, it has been used in the treatment of heart complaints and as a booster for the immune system[238]. Arnica increases local blood supply and accelerates healing, it is anti-inflammatory and increases the rate of absorption of internal bleeding[254]. Generally the plant is nowadays only recommended for internal use as a homeopathic medicine, principally for treating shock, injury and pain[254]. If used as a decoction or tincture it stimulates the circulation and is valuable in the treatment of angina and a weak or failing heart, but it can be toxic even at guite low doses and so is rarely used this way[254]. The flowers are the part most commonly used[4, 232], they are harvested when fully open and dried - the receptacles are sometimes removed since these are liable to be attacked by insects[4]. The root is also used, it is harvested after the leaves have died down in the autumn and dried for later use[4]. The whole plant is antiecchymotic, antiphlogistic, nervine, sternutatory, vulnerary[4, 7, 9, 46, 165]. Although a very valuable remedy, it should be used with caution. It has been known to cause contact dermatitis when used externally and collapse when

taken internally [238]. Only take it internally under the supervision of a qualified practitioner. The freshly crushed flowers cause sneezing if inhaled[232]. The leaves have also been smoked as a tobacco[232], though it is unclear whether this was for medicinal reasons The whole plant, harvested when in flower, is used in homeopathic remedies[232]. It is especially useful in the treatment of traumatic injuries, sores and bruises[232]. The homeopathic dose has also been used effectively in the treatment of epilepsy and seasickness, and it might be of use as a hair growth stimulant[268]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Arnica montana for fever and colds, inflammation of the skin, cough/bronchitis, inflammation of the mouth and pharynx, rheumatism, common cold, blunt injuries, tendency to infection (see [302] for critics of commission E). The essential oil has to be diluted before being used

nrakta C. Europe. ksacta Calcareous soils in mountain pastures[7]. Found especially on granite or siliceous soils in the Alps, up to 2500 metres. Pasture and open woodland, usually on poorer acid soils[2001.

propta Seed - best sown as soon as it is ripe in pots outdoors. Sow stored seed in early spring in a cold frame[4]. A period of cold stratification is helpful[238]. The fresh seed can germinate in 3 - 4 weeks at 13°c according to one report[134], though it can be slow, difficult and erratic and take 2 years to germinate[268]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the following spring. Division in spring.

nwatta Prefers a moist, well-drained humus rich soil, preferably lime-free[200]. One report says that it is often found in calcareous soils in the wild[7]. Tolerates a pH in the range 5.8 to 7.6. Prefers a mixture of sand, loam and peat[1]. Prefers a position in full sun[1, 134]. Succeeds in light wood-land[14] and in a rock garden or border[1, 14]. Plants are hardy to about -25°c[187]. This species is declining in the wild, probably because of over-collection as a medicinal herb. It may become extinct in part of its range[200].

## 6.2.673 Forsythia x intermedia

Golden Bell. Border Forsythia

5 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 2.5 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Forsythia x intermedia is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semis-shade (light woodland) or no shade. It prefers moist

tcanta Hedge HedgeCan be grown as a tall hedge, the var. 'Lynwood' is frequently used[29]. Var. 'Spectabilis' also makes a good hedge[200] as does 'Beatrix Farrand'[188]. Landscape Uses: Border, Erosion control, Espalier, Pest tolerant, Hedge, Massing, Screen, Specimen.

nrakta A hybrid of garden origin, F. suspensa x F. viridissima. ksacta Not known in the wild.

propta Seed - sow spring in a cold frame. The seed usually germinates within 2 months[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This is a hybrid species and seed will not come true to type. Cuttings of half-ripe wood 10 - 15cm taken at a node, July/August in a frame. Plant out in autumn or spring. A very high percentage, they root within 3 weeks[78]. Cuttings of mature wood in a sheltered outdoor bed. Good percentage[78].

nwatta An easily grown plant, it succeeds in a well drained ordinary garden soil but prefers a rich soil[1]. Succeeds in limy soils[11]. Prefers a sunny position but succeeds in semi shade[200]. Plants are tolerant of deep shade[219]. A very ornamental plant[1], there are several named varieties. Any pruning out of weak shoots, plus any trimming

of hedges, is best done after the plant has flowered[188]. Birds may destroy the flower buds in cold areas[200]. This species is notably susceptible to honey fungus[200]. Special Features:Not North American native, Blooms are very showy. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

## 6.2.674 Ageratina altissima

White Snakeroot, Richweed

5 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ageratina altissima is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains tremetol, a complex alcohol, and glycosides. These toxins cause a fatal disease known as 'staggers' in cattle. The toxin can be passed through the milk and has caused fatalities in humans who have drunk affected cow's milk[274].

dwatta Diaphoretic Diuretic Febrifuge Odontalgic Stimulant Tonic UrinaryThe root is diaphoretic, diuretic, febrifuge, stimulant and tonic[257]. It has been used in the treatment of diarrhoea, gravel and urinary diseases[257]. It has also been used in herbal sweat baths to encourage sweating[257]. A decoction or infusion of the root has been taken to treat a fallen or inflamed womb[257]. The root has been chewed and held in the mouth as a treatment for toothache[257].

nrakta Eastern N. America. ksacta Low woods in river valleys in Texas[274].

propta Seed - sow spring in a cold frame, only just covering the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Succeeds in an ordinary well-drained but moisture retentive garden soil in sun or part shade[200]. There is some difference of opinion over the correct name for this species with some authorities using Eupatorium rugosum[K].

## 6.2.675 Asclepias subulata

Rush Milkweed

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asclepias subulata is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. One report says that the plant is considered poisonous by some native North American Indian tribes[257].

tcanta LatexRubber can be made from latex contained in the leaves and the stems[61, 112, 171]. The dogbane-milkweed family Asclepias, Apocynum, Calotropis, and Trachomitum spp) has been used for fiber industrial crops for millennia with a number in cultivation as regional crops. All of these crops are dual-purpose fibres, offering bast fibres from the stem and seed finer or 'floss' in the fruit pods. Many have also been identified as potential hydrocarbon crops due

to high latex content. Could be integrated into various agroforestry systems rather than as monocultures [1-1].

dwatta Emetic Ophthalmic Purgative StomachicThe plant is emetic, ophthalmic, purgative and stomachic[61, 257]. The reports do not specify which part of the plant is used

nrakta South-western N. America. ksacta Desert washes and sandy places below 600 metres in California[71]. propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: HayPrefers a well-drained light rich or peaty soil in a sunny position[1, 200]. Succeeds in poor soils. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. A xerophytic plant, it looks like a species of Ephedra[200]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207].

## 6.2.676 Myricaria germanica

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Myricaria germanica is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil

tcanta FuelThe wood is used as a fuel[146].

dwatta AperientA decoction of the bark is aperient[240]. It is used in Spain in the treatment of jaundice[240].

nrakta C. and S. Europe to E. Asia. ksacta River banks, by the sides of mountain streams and other sandy occasionally inundated places[11].

propta Seed - sow early spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth, November to January in a sandy propagating mix in an open frame[11, 200].

nwatta Prefers a fertile well-drained soil in full sun with shelter from cold drying winds[200]. Tolerates chalk soils[200]. An easily grown plant, preferring a damp sandy soil[182]. Closely related and very similar to Tamarisk spp[182].

them in the dormant season, preferably towards the end of winter, and plant out into their permanent positions.

nwatta Requires a light or medium well-drained soil and a sunny position[11, 200]. Succeeds on chalk[11]. Succeeds in full sun in most well-drained soils[184], including dry ones[182, 202]. Tolerates light shade[202]. The rootstock is hardy to about -15°c[184, 200] and plants resprout from the base if they are cut back by winter cold. Plants are cut back to the ground in most winters at Kew though they are all right in the milder areas of the country[11]. They flower on the current years growth[184] and flower more freely if they are pruned to the ground during the winter or early spring[219]. They do not come into new growth until quite late in the spring[219]. A very ornamental plant[1]. Fast-growing when young, but slowing with age[200]. The flowers have a vanilla scent[245]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 7.1.17 Indigofera pseudotinctoria

India

tfo2n 6 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Indigofera pseudotinctoria is a deciduous Shrub growing to 1 m (3ft 3in) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: The leaves and flowers are boiled and eaten[177, 183].

nrakta E. Asia - China, Japan. ksacta Thickets, streamsides, ravines in W. Hupeh, 300 - 2000 metres[109].

propta Pre-soak the seed for 12 hours in warm water and sow February in a warm greenhouse. The germination can be variable. Prick out the seedlings when large enough to handle and overwinter the young plants in a greenhouse for the first winter, planting out in late spring or early sumer after the last expected frosts[78]. Cuttings of half-ripe wood, 5 - 8cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Overwinter the young plants in a greenhouse for the first winter and plant out in late spring or early summer[11]. Root cuttings 3cm long in December. Good percentage[78]. Suckers. Remove them in the dormant season, preferably towards the end of winter, and plant out into their permanent positions.

nwatta Landscape Uses:Border, Container, Massing, Specimen. Requires a light or medium well-drained soil and a sunny position[11, 200]. Succeeds on chalk[11]. Most members of this genus have their top-growth cut back by winter cold in this country. The roots are much hardier, however, and the plants usually resprout freely from the base in late spring, growing away quickly and flowering freely in late summer[K]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, Attracts butterflies, Attractive flowers or blooms.

## 7.1.18 Anthyllis vulneraria

Kidney Vetch

tfo2n 6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli priklwisslip hpa7tmwatli xre7t hionli

drutta Anthyllis vulneraria is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.6 m (2ft). See above for USDA hardiness, It is hardy to UK zone 7 and is not frost tender. It is in

flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Edible Uses: TeaThe dried flower heads are a tea substitute[9].

dwatta Antiemetic Antitussive Astringent Laxative VulneraryThe roots leaves and flowers are antitussive, astringent, laxative and vulnerary[7, 9, 13, 21]. This plant is an ancient remedy for skin eruptions, slow-healing wounds, minor wounds, cuts and bruises, it is applied externally[9]. Internally, it is used as a treatment for constipation and as a spring tonic[9]. The plant can be used fresh in the growing season, or harvested when in flower and dried for later use[9].

nrakta Most of Europe, including Britain, south and east to the Caucasus and N. Africa. ksacta Dry situations on sea cliffs, stony rocks and shingle, usually on shallow calcareous soils[9, 13, 17].

propta Seed - sow spring or autumn in a cold frame. If there is sufficient seed it can be sown outdoors in situ. Presoak the seed for about 12 hrs or scarify the seed[134]. It usually germinates in 1-2 months at 10°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200].

nwatta Prefers a sunny position[200] and an alkaline soil[7, 13, 17, 21]. Tolerates a pH in the range 4.8 to 8. Prefers a sandy loam[1, 7]. Thrives in poor soils[200]. A rich food source for bees, butterflies and caterpillars[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 7.1.19 Colutea istria

priklwis hpa7tmwatli xre7t hjonli

Bladder-senna

tfo2n 6 tlin 9 cyuc 0 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasilutnyik hpa7tli flat-

drutta Colutea istria is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure

tcanta Hedge Hedge Soil reclamationUsed in land reclamation projects in the Negev desert, consolidating soil and plant debris from flood waters[200]. Plants can be grown as a hedge[200].

nrakta Middle East. ksacta Hard rock outcrops and wadis in shrub-steppes of Israel.

propta Seed - pre-soak for 24 hours in hot water and sow late winter in a greenhouse[113]. Scarification can help speed up the germination process[164]. Germination can be slow and erratic[200], though treated seed usually germinates in 1 - 3 months at  $20^{\circ}$ c[164]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[78]. Cuttings are not very long-lived[78].

nwatta Requires a well-drained soil in full sun[200]. Grows well on dry sunny banks and in poor soils[1, 182]. Dislikes strong winds, though another entry in the same book says that it tolerates salt-laden winds[200]. This species is not very hardy in Britain, tolerating temperatures down to

on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 7.1.14 Cercis chinensis

Chinese Redhud

tfo2n 6 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 15 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cercis chinensis is a deciduous Tree growing to 5 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Although no records of edibility have been seen for the seed, on a zero moisture basis it contains 16.6% protein, 9.2% fat and 2.8% ash[218].

dwatta Anthelmintic Diuretic Women's complaintsTreats bladder diseases, post-partum discharges, bleeding piles and internal parasites[178]. The wood and the bark have been used to treat abscesses, bladder ailments and head troubles[218].

nrakta E. Asia - China ksacta Woodland and clearings, 600 - 1200 metres in W. Hupeh[109].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Pre-soak stored seed for 24 hours in warm water then cold stratify for 3 months[113]. Sow spring in the greenhouse[78]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants resent root disturbance and are best planted out in their permanent positions as soon as possible[11]. Cuttings of half-ripe wood, July/August in a frame[200].

nwatta Landscape Uses:Border, Massing, Specimen. Succeeds in most soils and pH types, but dislikes growing in wet soils, especially when these are of clay[200]. Prefers a deep damp sandy loam and a very sunny position[11, 182]. Dislikes drought[200]. Repays generous treatment[11]. Although the dormant plant is cold-hardy, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species does not flower very freely in Britain. Plants do not thrive at Kew, they prefer a hotter climate[11]. The flowers are produced on the branches of the previous or earlier years, and also on the trunk of the plant[82]. Plants are susceptible to coral spot fungus, especially in areas with cooler summers where the wood is not fully ripened[11]. Plants in this genus are notably resistant to honey fungus[200]. Resents root disturbance, plants should be planted into their permanent positions as soon as possible, preferably in May, and should be kept well watered until established[11]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, Blooms are very showy.

#### 7.1.15 Gleditsia caspica

Caspian Locust

tfo2n 6 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 12 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gleditsia caspica is a deciduous Tree growing to 12 m (39ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers

dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: SeedEdible Uses: The seed of several species can be eaten raw or cooked. This species often crops well in this country and so some research into its potential edibility would be desirable [K].

tcanta SoapThe closely related G. sinensis has a saponaceous pulp inside the seed pod that can be used as a soap substitute[11]. It is quite probable that this species can be similarly used[K]. Wood - strong, durable, coarse-grained[82].

nrakta W. Asia - N. Iran, Transcaucasia. ksacta Broadleaved forests in the low montane belt[261].

propta Seed - pre-soak for 24 hours in warm water and then sow in spring in a greenhouse[78]. The seed should have swollen up, in which case it can be sown, if it has not swollen then soak it for another 24 hours in warm water. If this does not work then file away some of the seed coat but be careful not to damage the embryo[78]. Further soaking should then cause the seed to swell. One it has swollen, the seed should germinate within 2 - 4 weeks at 20°c. As soon as they are large enough to handle, prick the seedlings out into individual deep pots and plant them out into their permanent positions in the summer. Give the plants some protection from the cold for their first few winters outdoors.

nwatta Landscape Uses:Rock garden, Specimen. Easily grown in a loamy soil, requiring a sunny position[11]. Succeeds in most soils[200] including sandy ones[188]. Established plants tolerate drought[1] and atmospheric pollution[200]. This species is often confused in cultivation with the closely related G. sinensis, many of the trees grown under that name are this species[11]. This tree is remarkable for the number and length of the spines growing on its trunk, which makes it the most formidably armed of temperate trees[11]. Trees have a light canopy, they come into leaf late in the spring and drop their leaves in early autumn[200] making them an excellent top storey tree in a woodland garden. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, Fragrant flowers, Inconspicuous flowers or

## 7.1.16 Indigofera heterantha

ndigo Bush

tfo2n 6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Indigofera heterantha is a deciduous Shrub growing to 3 m (9ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf from May to November, in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: The flowers are boiled and pickled[272].

tcanta Basketry FuelThe branches are used in basket making and in making twig bridges[146, 158]. They are also used as a fuel[145, 158].

nrakta E. Asia - Himalayas from Afghanistan to W. China. ksacta Dry sunny slopes, often forming dense scrub, and in forests 1500 - 3000 metres [146, 184].

propta Pre-soak the seed for 12 hours in warm water and sow February in a warm greenhouse. The germination can be variable. Prick out the seedlings when large enough to handle and overwinter the young plants in a greenhouse for the first winter, planting out in late spring or early summer after the last expected frosts[78]. Cuttings of half-ripe wood, 5 - 8cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Overwinter the young plants in a greenhouse for the first winter and plant out in late spring or early summer[11]. Root cuttings 3cm long in December. Good percentage[78]. Suckers. Remove

#### 6.2.677 Achillea erba

Musk Milfoil

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Achillea erba-rotta moschata is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

dwatta Appetizer Diaphoretic Digestive Diuretic Stomachic TonicThe leaves and flowering stems are appetizer, diaphoretic, digestive, diuretic, stomachic and tonic[9, 46, 61]. An infusion is used in the treatment of liver and kidney disorders, as a tonic to the digestive system, exhaustion, nervous headaches etc[9]. The plant is harvested in the summer and can be dried for later use[9].

nrakta Europe ksacta Rocky slopes, alpine grassland and scree on calcareous soils in the Alps[9, 50].

propta Seed - sow spring or early autumn in a cold frame[133]. The seed usually germinates in 1- 3 months[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, the divisions can be planted direct into their permanent positions. Basal cuttings of new shoots in spring. Very easy, collect the shoots when they are about  $10\,\mathrm{cm}$  tall, potting them up individually in pots and keeping them in a warm but lightly shaded position. They should root within 3 weeks and will be ready to plant out in the summer.

nwatta Succeeds in most soils but prefers a well-drained soil in a sunny position[1]. Lives longer in a poor soil[200]. Hybridizes freely with other members of this genus[200]. Plants succeed in maritime gardens[233].

## 6.2.678 Euonymus americanus

Strawberry Bush, Bursting-heart 5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 2.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euonymus americanus is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist coil

pcista The fruits, seed and bark are considered to be poisonous[222].

dwatta Cathartic Diuretic Emmenagogue Expectorant Laxative Malaria TonicThe seed is strongly laxative[222]. A tea made from the roots is used in cases of uterine prolapse, vomiting of blood, painful urination and stomach aches[222, 257]. The bark is diuretic, expectorant, laxative and tonic[222]. It was used as a tea in the treatment of malaria, liver congestion, constipation etc[222, 257]. The powdered bark, applied to the scalp, was believed to eliminate dandruff[222]. An infusion of the plant has been used to stimulate menstruation and so should not be used by pregnant women[257].

nrakta Eastern N. America - New York to Florida, west to Texas and Illinois. ksacta Rich woods and ravines[43].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 8 - 12 weeks warm followed by 8 - 16 weeks cold stratification and can then be sown in a cold frame[78, 98]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5

- 8cm long taken at a node or with a heel, July/August in a frame. Very easy[200].

nwatta Thrives in almost any soil, including chalk, it is particularly suited to dry shaded areas[200]. Prefers a well-drained loamy soil[1]. Requires shade from the midday sunf1.11l.

#### 6.2.679 Salvia multiorrhiza

an Shen

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia multiorrhiza is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Adaptogen Alterative Anticholesterolemic Antirheumatic Antiseptic Antispasmodic Astringent Cancer Emmenagogue Hepatic Sedative Tonic VulneraryDan Shen has long been used in Chinese medicine and recent research has confirmed the validity of its use in the treatment of heart and circulatory problems[254]. The root is adaptogen, alterative, anticholesterolemic, antirheumatic, antiseptic, antispasmodic, astringent, emmenagogue, hepatic, sedative, tonic and vulnerary[147, 176, 178, 218]. It acts mainly on the heart energy, removing excess heat and clearing stagnation[238]. Its use improves the micro-circulation, increases blood flow to the coronary artery, improves myocardial contraction and adjusts the heart rate[176]. It has an antibacterial action, inhibiting the growth of Pseudomonas, E. coli, Vibrio Proteus, Bacillus typhi, Shigella dysenteriae, Shigella flexneri, Staphylococcus aureus etc[176]. It is used internally in the treatment of coronary heart disease, poor circulation, palpitations, irritability, insomnia, breast abscesses, mastitis, ulcers, boils, sores, bruises, menstrual problems and post-natal pains[238]. 'Praised for its alleged medicinal qualities, including a cure for cancer'[187]. The roots are harvested in the autumn and early winter and are dried for later use[238]

nrakta E. Asia - N.E. China. ksacta Light woodland and clearings[187]. Sunny sides of hills and stream edges[147].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Plants can be killed by excessive winter wet[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.680 Geranium pratense

Meadow Crane's Bill, Meadow geranium, Geranium 5 tiin 9 cyuc 0 kcak 0 tcan 2 dwat 1.2 m hkuc htut cyutli tcup hwicii hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geranium pratense is a PERENNIAL growing to 1.2 m (4ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Analgesic Antiinflammatory Febrifuge VulneraryThe plant is used as a vulnerary[240]. The root is used in Tibetan medicine where it is said to have an acrid, sweet flavour plus a cooling potency[241]. Analgesic, antiinflammatory and febrifuge, it is used in the treatment of

fevers from influenza, inflammation of the lungs, pain and swellings of the limbs[241].

nrakta Europe, including Britain, from Scandanavia south and east to Spain, the Himalayas and N. Asia. ksacta Meadows and roadsides[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Alpine garden, Border. Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. There are many named varieties, selected for their ornamental value[200]. Plants can be naturalized in meadows[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Special Features: Attractive foliage, Not North American native, Naturalizing, Suitable for cut flowers.

## 6.2.681 Opopanax chironium

Opopana

5 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 1.8 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Opopanax chironium is a PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from October to August, in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta GumA gum is obtained through incisions in the roots at the base of the stems[4]. It is used in perfumery[1, 46, 61] and also in medicines[171]. The gum is inflammable, burning brightly[4].

dwatta Antispasmodic DeobstruentThe gum (an oleo resin according to one report) that is obtained from the base of the stems is antispasmodic and deobstruent[4]. It is nowadays considered to be a medium of feeble powers though it was at one time widely used in the treatment of menstrual disorders, asthma, chronic visceral afflictions  ${\rm etc}[4]$ .

nrakta S. Europe. ksacta Stony ground, olive groves, vinevards etc[45].

propta Seed - sow spring in situ. If seed is in short supply then it is best to sow it in a pot in the greenhouse in early spring. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer

nwatta An easily grown plant, it succeeds in any good garden soil[1]. It can tolerate very considerable neglect, some plants we were growing were left to fend for themselves in very dense weed growth and survived well for 8 years before being moved to another site[K]. We are not sure how hardy this plant is, but the foliage has withstood short periods of temperatures down to -6°c with us[K]. A warm climate is necessary in order to produce good quality gum[4]. Plants seem to be very tolerant of root disturbance, specimens that had been growing for 4 years in one site grew away very well when transplanted as they came into growth in late autumn[K].

## 6.2.682 Xanthorhiza simplicissima

Yellowroo

5tlin9cyuc0kca<br/>k0tcan2dwat1m h<br/>kuc pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli

flat hpa7tmwatli xre7t hionli

drutta Xanthorhiza simplicissima is a deciduous Shrub growing to 1 m (3ft 3in) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to April. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils.

It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The root, when taken in high doses, is potentially toxic[222].

tcanta DyeA yellow dye is obtained from the root[46, 61]. The entire plant can be crushed to yield a yellow dye[257]. A good ground cover for damp semi-shaded positions[11, 200]. Plants should be spaced about 1.2 metres apart each waw[208]

dwatta Antihaemorrhoidal Astringent Stomachic Tonic-The root is astringent and a blood tonic[222]. A tea made from the roots is used to treat mouth ulcers[213], stomach ulcers, colds, jaundice etc[222, 257]. An infusion of the roots has also been used to treat piles, though the report does not specify if it is used internally or externally[257]. Some caution is advised in the use of this plant, see the notes above on toxicity. The root contains the alkaloid 'berberine' which is used for its tonic properties and for digestive disorders[213]. Berberine is anti-inflammatory, astringent, haemostatic, antispasmodic, immuno-stimulant, uterine tonic and antimicrobial[222]. It stimulates the secretion of bile and bilirubin and may be helpful in correcting high tyramine levels in people with liver cirrhosis[222].

nrakta Eastern N. America - New York to West Virginia and south to Florida and Alabama. ksacta Shaded stream banks, moist woods, thickets, and rocky ledges from sea level to 1200 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn[200]. Sow stored seed in a cold frame in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the autumn or late winter[11].

nwatta Requires a moist acid soil in sun or part shade[184]. Prefers shade or semi-shade[188]. Succeeds in any moist fertile soil according to other reports[1, 182, 200]. Hardy to about -20°c[184]. Plants can spread considerably by means of suckers[182], especially when they are growing in a light soil[208]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 6.2.683 Verbascum blattaria

Moth Mullein

5 tlin 9 cyuc 0 kcak 2 tcan 0 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli fla hpa7tmwatli fyifxre7t hjonli

drutta Verbascum blattaria is a BIENNIAL/PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta RepellentThe plant repels insects, it is used indoors to repel moths and cockroaches[124]. Dynamic accumulator

nrakta Europe, including Britain, from the Netherlands south and east to N. Africa, west and central Asia. ksacta Waste places in damp ground. Rather rare and not persisting, it is possibly an introduced species[17].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta An easily grown plant, it succeeds in most well-drained soils, including dry ones, and prefers a sunny position[187, 200]. Dislikes shade[200]. Plants are hardy to about -20°c[187]. Hybridizes with other members of this genus, though the progeny are usually sterile[200].

that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K].

dwatta Astringent Digestive Hepatic Pectoral TonicAstringent, digestive, pectoral, tonic. A liver tonic[94].

nrakta South-western N. America - Oregon to California and Mexico. ksacta Dry slopes below 1800 metres in California[71].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place in 1 - 2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are guite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Prefers a light soil with a low lime content[108]. Tolerates some lime, but will not succeed on shallow chalk[200]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Plants flower on the previous year's growth, if any pruning is necessary it is best carried out immediately after flowering[200, 219]. Constant pruning to keep a plant small can shorten its life[200]. A fastgrowing plant, it flowers well when young, often in its second year from seed[11]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212].

## 7.1.12 Lupinus littoralis

Seashore Lupine

tfo2n 6 tlin 9 cyuc 2 kcak 3 tcan 0 dwat 0.5 m hkuc htut cyutli hgattcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Lupinus littoralis is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable H: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The seed of many lupin species contain bittertasting toxic alkaloids, though there are often sweet varieties within that species that are completely wholesome[65, 76]. Taste is a very clear indicator. These toxic alkaloids can be leeched out of the seed by soaking it overnight and discarding the soak water. It may also be necessary to change the water once during cooking. Fungal toxins also readily invade the crushed seed and can cause chronic illness[65].

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[257]. The root can be dried and roasted[2, 44, 61,

161]. A sweet flavour, almost like sugar[256]. The tough and fibrous roots are rich in starch[2]. The root is roasted and then pounded to loosen the edible fibres from the stem[118]. The roasted, dried and powdered root can be stored for winter use[256]. The roots can be up to 1 metre long[256]. Lupine roots are best not eaten raw since they contain alkaloids that could be poisonous - North American Indians would fall into a drunken sleep if they ate them raw, though they are perfectly safe when cooked[256].

tcanta Green manureA good green manure plant for poor soils[61]. It is quite fast growing and fixes atmospheric nitrogen.

nrakta Western N. America - British Columbia to California, ksacta Sandy seashores[256].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a greenhouse[1, 200]. Germination should take place within a couple of weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. It should also be possible to sow the seed in situ in mid spring. It might be necessary to protect the sowing from mice. Division in March. Difficult. Basal cuttings, April in a cold frame. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta An easily grown plant, succeeding in any moderately good soil in a sunny position[1, 200]. It strongly dislikes excessive winter wet[1]. Requires an acid to neutral soil[200]. Succeeds in poor soils[60]. Plants dislike root disturbance. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 7.1.13 Alhagi maurorum

Comel Them

tfo2n 6 tlin 10 cyuc 2 kcak 0 tcan 2 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Alhagi maurorum is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in July. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pl: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: MannaEdible Uses: A sweet-tasting manna is exuded from the twigs at flowering time[2, 22, 105, 177]. It is exuded during hot weather according to one report[1]. It contains about 47% melizitose, 26% sucrose, 12% invert sugar[114]. Another manna is obtained from the podsit is sweet and laxative[61]. Root - cooked. A famine food, it is only used in times of need[46, 61, 177].

dwatta Diaphoretic Diuretic Expectorant LaxativeThe whole plant is diaphoretic, diuretic, expectorant and laxative[46, 114]. An oil from the leaves is used in the treatment of rheumatism[238]. The flowers are used in the treatment of piles[238].

nrakta W. Asia - Caucasus to the Himalayas. ksacta Edges of ditches, waste and often saline places etc in Turkey[93]. Grows in dry barren places[146].

propta Seed - pre-soak the seed for 12 hours in warm water and sow March/April in a warm greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least the first winter. Plant out into their permanent positions in the summer. Cuttings of young shoots in a frame[1].

nwatta Requires a sunny position in a well-drained light or medium soil. Plants are not very hardy in Britain, they can be grown outdoors in the summer but require protection in the winter[1]. The stems of the plant are covered in sharp spines[245]. Like the closely related gorse (Ulex europaea) the flowers have a pineapple scent[245]. (A slightly strange report because the gorse flowers have a strong co-conut fragrance[K].) This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules

mildly acid, neutral and basic (mildly alkaline) soils. It can well-drained soil. Suitable pH: mildly acid, neutral and bagrow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked. Used as piñole[105, 161, 177, 257].

tcanta Basketry Dye Miscellany SoapA green dye is obtained from the flowers[168]. Young flexible shoots can be used for the circular withes of baskets[257]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K].

dwatta MiscellanyThe plant has been used by some native North American Indian tribes to treat women who have suffered injury in childbirth[257].

nrakta Western N. America - Washington to California. ksacta Dry slopes and ridges in pine and mixed evergreen forests, 300 - 2000 metres[60, 71, 184, 200].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place within 1 -2 months at 20°c[138]. Another report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. It then requires a period of chilling below 5°c for up to 84 days before it will germinate[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. Requires a well-drained soil. This species is hardy to about -10°c[184, 200] according to some reports whilst another says that it requires a sheltered position or the protection of a wall when grown outdoors in Britain[1]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Any pruning is best carried out in the spring[219]. Fast growing but short lived, it flowers well when young, often in its second year from seed[11]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200,

## 7.1.10 Phaseolus polystachios

Thicket Bean. Wild bean

tfo2n 6 tlin 10 cvuc 2 kcak 3 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Phaseolus polystachios is a CLIMBER growing to 3 m (9ft) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. The flowers are pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

sic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista We have seen no specific reports for this species, but the mature seed of most, if not all, members of this genus contain various anti-nutritional factors. Soaking the seeds. discarding the water and then boiling them and discarding the water will remove these toxins and render the seeds safe and nutritious K Plants for a Future Author Ken Fern Description Notes from observations, tasting etc at Plants For A Future and on field trips. ].

kcakta Edible Parts: Seed SeedpodEdible Uses: Edible Portion: The seeds are eaten, fresh or dried. Seeds cooked[1438]. The elongate seedpod can be 70mm long and 12 mm wide, containing black, squarish seeds around 6mm long, 6 - 7mm wide and 4mm thick[1555]. Carbon farming -Staple Crop: protein.

tcanta Carbon farming - Agroforestry Services: nitro-

dwatta None Known

nrakta North America, Mesoamerica. Eastern and southern N. America - Iowa to Maine, south to Texas and Florida ksacta A temperate plant. It grows in dry woods and sandy thickets. Climbing on shrubs and young trees in moist thickets, clearings and edges of deciduous forests, in deep swamps and sometimes on dry sandy, dry shale and rocky hillsides[1555].

propta Like many species within the family Fabaceae. once they have ripened and dried the seeds of this species may benefit from scarification before sowing in order to speed up and improve germination. This can usually be done by pouring a small amount of nearly boiling water on the seeds (being careful not to cook them!) and then soaking them for 12 - 24 hours in warm water. By this time they should have imbibed moisture and swollen - if they have not, then carefully make a nick in the seedcoat (being careful not to damage the embryo) and soak for a further 12 hours before sowing[K].

nwatta Agroforestry Services: Nitrogen Historic Crop Management: Standard Staple Crop: ProteinClimate: cold temperate to tropical. Humidity: humid. Found in the wild on a range of soils from clays to sands[1555]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[755]. Carbon Farming - Cultivation: historic crop. Management: standard. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous.

## 7.1.11 Ceanothus cuneatus

Buckbrush, Sedgeleaf buckbrush, Monterey ceanothus tfo2n 6 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 1.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ceanothus cuneatus is an evergreen Shrub growing to 1.8 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in May, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: TeaSeed[94]. No more details are given. The leaves and flowers make an excellent tea when steeped in boiling water for about 5 minutes[183].

tcanta Dve SoapA green dve is obtained from the flowers[168]. A red dye is obtained from the root[94]. The stems have been used as rods in basket making[257]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[94, 168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means

## 6.2.684 Liquisticum sinense

Chuang Xiong

5 tlin 9 cvuc 0 kcak 0 tcan 3 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli fyifxre7t hjonli

drutta Ligusticum sinense is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers

dwatta Analgesic Antifungal Antirheumatic Antispasmodic Diaphoretic Emmenagogue SedativeThe root is anodyne, antibacterial, antifungal, antirheumatic, antispasmodic, emmenagogue, diaphoretic, hypotensive and sedative[176, 218, 238]. It is taken internally in the treatment of menstrual disorders, post-partum bleeding, coronary heart disease, poor circulation, headaches etc[238]. It is soaked in alcohol for 2 weeks and then used in the treatment of gout[218]. The root is harvested in the autumn and dried for later use[238]

nrakta E. Asia - China, Japan. ksacta Forests, grassy slopes or stream sides at elevations of 500 - 2700 metres[266].

propta The seed is best sown as soon as it is ripe in a cold frame in the autumn. Stored seed should be sown as early in the year as possible in a greenhouse or cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer if they have grown large enough. Otherwise, keep them in a cold frame for the first winter and plant them out in early summer. Division in spring.

nwatta Succeeds in any well-drained soil in a sunny position[1, 200]. Tolerates moister conditions than many other members of the genus[238]. Plants are hardy to at least -15°c[238].

## 6.2.685 Aconitum kusnezoffii

Bei Wu Tou

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Aconitum kusnezoffii is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1].

dwatta Alterative Anaesthetic Antiarthritic Deobstruent Diaphoretic Diuretic Sedative StimulantThe root is alterative, anaesthetic, antiarthritic, deobstruent, diaphoretic, diuretic, sedative and stimulant[178]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta E. Asia - N. China, N. Japan in Kamtschatka, Korea and Siberia. ksacta Grassy slopes, grasslands, forests, forest margins, by streams at elevations of 2200 - 2400 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. This species is closely related to A. yezoense[1]. A greedy plant, inhibiting the growth of nearby species, especially

## 6.2.686 Aconitum ferox

5 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Aconitum ferox is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 51, 200].

dwatta Alterative Anaesthetic Antiarthritic Cholera Deobstruent Diaphoretic Diuretic Leprosy Sedative Stimulant-The dried root is alterative, anaesthetic, antiarthritic, deobstruent, diaphoretic, diuretic, sedative, stimulant[178]. It is best harvested in the autumn as soon as the plant dies down. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner. It has been used in India and Nepal in the treatment of neuralgia, leprosy, fevers, cholera and rheumatism[240, 272]. When the roots are soaked in cow's urine, they become soft and lose their depressant action on the heart, becoming a stimulant instead[240].

nrakta E. Asia - Himalayas. ksacta Shrubberies and forest clearings, 2100 - 3600 metres from C. Nepal to Bhutan[51].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. The root of this plant is widely collected from the wild for medicinal use and is becoming much rarer in much of its range[272]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54]. Closely related to A. napellus[1].

## 6.2.687 Leucothoe axillaris

Coastal Doghobble

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.8 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Leucothoe axillaris is an evergreen Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, at least one other member of this genus is said to have poisonous fruits[178]

dwatta Antipruritic Expectorant PoulticePromotes the discharge of mucus from the nose[61]. An infusion of the leaf is taken internally and also used as a wash in the treatment of rheumatism[257]. n infusion of the leaves and stems has been used to bathe itchy skin[257].

nrakta South-eastern N. America - Virginia to Florida and Alabama. ksacta Moist woods near the coast[235].

propta Seed - sow late winter in a shady part of the greenhouse and only just cover the seed. Do not allow the compost to dry out. Germination is variable. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 10cm with a heel, August in a frame. Fair to good percentage[78]. Layering in autumn. Takes 12 months. Very high percentage[78].

nwatta Requires a lime-free well-drained humus-rich soil and some shade[11, 182, 200]. Plants are not very successful in Britain[11]. One report says they are not very hardy in Britain, succeeding outdoors only in the milder areas of the country, whilst another says that they are hardy to zone 6, which means tolerating temperatures down to -15° or lower[200]. The flowers are strongly fragrant[245]. This species is often confused with L. fontanesiana[182]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.688 Hypericum hypericoides

St. Andrews Cross

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1.2 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Hypericum hypericoides is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Contact with the sap can cause photosensitivity in sensitive people[222]

dwatta Antidote Kidney LithontripicLithontripic[61]. The root was chewed as an antidote to rattlesnake bites[207, 222]. A tea made from the roots is used in the treatment of colic, fevers, pain, diarrhoea etc[222]. It is applied externally to ulcerated breasts[222]. A tea made from the leaves is used in the treatment of kidney and bladder ailments, skin problems and children's diarrhoea[61, 222]. A milky substance obtained from the plant has been rubbed on sores[257].

nrakta Eastern N. America - Massachusetts to Florida, west to Texas and Illinois. ksacta Dry sandy soils[43].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination usually takes place within 1 -3 months at 10°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 -12 cm with a heel, July/August in a frame. Plant out in the following spring[200]. Cuttings of mature wood, 12 - 17cm with a heel, October/November in a sheltered position outdoors. Plants root by the spring. Good percentage [78]. Division in spring as new growth commences[78]. Very easy. larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any reasonably good well-drained but moisture retentive soil[1]. Succeeds in sun or semi-shade but flowers better in a sunny position[1]. Prefers a light loamy soil[11]. One report says that the plant requires frame protection in the winter[1] whilst another says that plants are hardy but short-lived at Kew[11]. It possibly suffers more from wet soils than from the cold, see the plant's native habitat above. Plants in this genus are notably resistant to honey fungus[200].

#### 6.2.689 Leucothoe grayana

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.2 m hkuc hmim cyutli tcup hwicli hrasilut hpa7tli frusflatprik

hpa7tmwatli xre7t hjonli

drutta Leucothoe grayana is an evergreen Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The fruit is poisonous[178].

tcanta ParasiticideA parasiticide is obtained from the plant (No details are given as to which part). It is also used in the treatment of itch and ringworm[178].

dwatta Antipruritic ParasiticideAntipruritic[178].

nrakta E. Asia - China, Japan. ksacta Moist ground[178] propta Seed - sow late winter in a shady part of the greenhouse and only just cover the seed. Do not allow the compost to dry out. Germination is variable. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 10cm with a heel, August in a frame. Fair to good percentage[78]. Layering in autumn. Takes 12 months. Very high percentage[78].

nwatta Requires a lime-free well-drained humus-rich soil and some shade[1, 182]. Requires a moist peaty soil or a sandy loam with added leafmold[11]. Plants are tolerant of transplanting, which is best carried out in the autumn[200]. The flowers are produced on the current years growth[182]. A number of named forms have been developed in Japan for their ornamental value[182]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.690 Cyrilla racemiflora

Leatherwood, Swamp titi, Black Titi, Swamp, Myrtle, Titi Swamp, Leatherwood

5 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 1.2 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Cyrilla racemiflora is a deciduous Shrub growing to 1.2 m (4ft) by 2 m (6ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf from April to October, in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

tcanta WoodWood - heavy, hard, close-grained, not strong[82].

dwatta Astringent StypticThe spongy bark at the base of the trunk is pliable, absorbent and astringent. It has been recommended as a styptic[82].

nrakta Southern North America - Virginia to Florida and Texas. ksacta Rich shaded river bottoms, the borders of sandy swamps and shallow ponds of the coastal pine-belt[82]. Also found on high, sandy, exposed ridges rising above streams[82].

propta Seed - best sown as soon as it is ripe in a green-house[200]. As soon as they are large enough to handle, prick out the seedlings into individual pots. Grow them on in the greenhouse for at least their first winter, planting them out in early summer when there is no danger of frost. Give them some protection from the cold for their first winter outdoors. Cuttings of softwood, spring in a frame[200]. Cuttings of half-ripe wood, July/August in a frame[200]. Root cuttings in the spring[200].

nwatta Landscape Uses:Hedge, Standard, Woodland garden. Requires a sunny position and a humus-rich soil[200]. Thrives in a mixture of peat and loam[11]. Prefers a circum-neutral or slightly acid, moisture-retentive soil[200]. This species has a wide distribution in the wild, extending southwards from South-eastern North America to Brazil. An evergreen small tree in the warmer parts of its range, only those forms from the most northerly part of its range can be grown outdoors in Britain. These northerly forms are deciduous, though may remain evergreen in mild winters[11, 2001. They usually take the form of a small shrub,

Eaten as a vegetable[183]. The dried leaves are a tea substitute[177, 183].

tcanta Fodder Gum Plaster PlasterA gummy extract of the plant is used as a plaster[178]. No more details are given. Wood - dense, hard, strong, takes a good polish. Used for furniture, industrial applications, firewood etc[74, 158, 272].

dwatta Analgesic Anthelmintic Carminative Digestive Diuretic Oxytoxic Plaster Plaster Sedative Stimulant Tonic VulneraryThe flower heads are carminative, digestive, sedative and tonic[176, 218, 238]. They are used internally in the treatment of insomnia, irritability, breathlessness and poor memory[176, 238]. The flowers are harvested as they open and are dried for later use[238]. The stembark is anodyne, anthelmintic, carminative, discutient, diuretic, oxytocic. sedative, stimulant, tonic, vermifuge and vulnerary 176. 178, 218]. It is used internally in the treatment of insomnia, irritability, boils and carbuncles[238]. Externally, it is applied to injuries and swellings[238]. The bark is harvested in spring or late summer and is dried for later use[238]. A gummy extract obtained from the plant is used as a plaster for abscesses, boils etc and also as a retentive in fractures and sprains[218].

nrakta W. Asia and E. Asia - Iran to China. ksacta Open sunny ravines, forests and by rivers up to 2100 metres in the Himalavas[51, 158].

propta Seed - pre-soak 24 hours in hot water and sow March/April in a greenhouse or sow as soon as it is ripe in a cold frame[113]. Germinates in 2 - 3 months at 19°c. Scarification helps[133]. There are about 11,000 seeds to a pound, about 25 - 33% of which germinate[227]. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer and consider giving them some protection from the cold for their first winter or two outdoors[K]. Root cuttings, late winter in a greenhouse[113, 200]. Cuttings of half-ripe wood, July/August in a frame[200]. Suckers planted out in late winter[200].

nwatta Agroforestry Services: Alley crop Agroforestry Contour hedgerow Agroforestry Services: Crop shade Agroforestry Services: vices: gen Fodder: Bank Fodder: Insect Industrial Crop: Biomass Management: Coppice Management: dard Regional CropRequires a well-drained moisture retentive soil and a very sunny position[200]. Succeeds in dry soils. Highly fertile soils can promote soft sappy growth which is frost tender[200]. Trees tolerate a high pH, saline soils, high winds and drought[200, 238]. They also succeed in poor soils[238]. Trees prefer a more continental climate than Britain[11] and when dormant are hardy to about -20°c in such a zone[200]. They are only hardy to about -10°c in the maritime climate of this country[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. They succeed on a sunny wall at Kew[11], and also in a more open but sunny sheltered position there[K], but only really succeed outdoors in the mildest areas of Britain[1]. If killed back to the ground by a severe winter, plants can often resprout from the base[200]. The form 'Rosea' is hardier and more compact, succeeding even in the drier parts of Britain if given some protection[11]. Plants are quite tolerant of pruning and can be fan-trained for growing on a wall. Any pruning is best done in late winter or early spring[202]. Often grown as a summer bedding plant[1]. Ouite tolerant of being transplanted[200]. Plants often produce suckers[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Attracts birds, Attractive foliage, Not North American native, Invasive, Fragrant flowers, Blooms are very

## 7.1.8 Acacia decurrens

Green Wattle

tfo2n 6 tlin 9 cyuc 2 kcak 3 tcan 1 dwat 12 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli drutta Acacia decurrens is an evergreen Tree growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in April. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: GumFlowers-cooked[144]. Rich in pollen, they are often used in fritters. A gum that exudes naturally from the trunk is edible and is used as a substitute for Gum Arabic in making jellies etc[46, 105, 177]. It is insoluble in water[153] and is of low quality[64]. Larger quantities can be obtained by tapping the trunk[64]. Some species produce a gum that is dark and is liable to be astringent and distasteful, but others produce a light gum and this is sweet and pleasant. It can be sucked like candy or soaked in water to make a jelly.[193]. The gum can be warmed when it becomes soft and chewable[193].

tcanta Dye Gum Hedge Hedge Soil stabilization TanninA yellow dye is obtained from the flowers[168]. A green dye is obtained from the seed pods[168]. The extensive root system of this plant helps to prevent soil erosion[200]. Often grown as a screen in Australia[157]. The bark contains about 40% tannin[61, 171]. On a 10% moisture basis, the bark contains 36 6% tannin[223]

dwatta AstringentThe bark is astringent[4, 153]. It should be stored for 12 months before being used[4]. Its main use is in the treatment of diarrhoea[4].

nrakta Australia - New South Wales, Tasmania, Victoria. ksacta Sheltered forests, mainly on shales and sand-stone[153]. Usually on cool moist hills and gullies[167].

propta Seed - best sown as soon as it is ripe in a sunny position in a warm greenhouse[1]. Stored seed should be scarified, pre-soaked for 12 hours in warm water and then sown in a warm greenhouse in March. The seed germinates in 3 - 4 weeks at 25°c[133]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in a sunny position in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in individual pots in a frame[78]. Overwinter in a greenhouse for the first winter and plant out in their permanent positions in late spring or early summer. Fair percentage[78].

nwatta Prefers a light sandy loam and a very sunny position sheltered from strong winds[1, 49, 89]. Succeeds in any good garden soil that is not excessively limey[11], it also succeeds in dry soils. Most species in this genus become chlorotic on limey soils[200]. Plants tolerate temperatures down to about -5°c[260]. This species is one of the hardiest members of the genus, it succeeds outdoors in the milder areas of the country, but even in Cornwall it can be killed back to the ground in excessively harsh winters[11]. It will, however, usually resprout from the base. Plants require hot, sunny summers if they are to ripen their wood fully and flower freely. In Britain they tend to do best when grown in coastal gardens in a sunny, sheltered position that is protected from the wind[11]. A fast-growing and very ornamental tree[1, 260], it is closely related to A. dealbata[11]. The cultivar 'Mollis' is notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 7.1.9 Ceanothus integerrimus

Deer Brush

tfo2n 6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ceanothus integerrimus is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH:

ing in poor soils and in dry soils[11, 200]. Established plants are drought resistant. Tolerates shade and can be grown under other trees[K]. This species is notably resistant to honey fungus[88, 200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. Fruiting as it does in April and May, this plant has excellent potential as a fruit crop, it should be fairly easy to selectively breed for improved fruit size and flavour[K]. The small flowers have a strong, pleasant scent that pervades the garden on calm days[K].

#### 7.1.6 Alnus rubra

Red Alder, Oregon Alder tfo2n 6 tlin 8 cyuc 2 kcak 4 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Alnus rubra is a deciduous Tree growing to 20 m (65ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in March, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure

pcista The freshly harvested inner bark is emetic but is alright once it has been dried[172].

kcakta Edible Parts: Flowers Inner bark SapEdible Uses: Catkins - raw or cooked. They are rich in protein but have a bitter flavour and are not very palatable[172]. Inner bark - cooked, It must be dried since it is emetic when fresh[105, 161, 177]. No more details are given but inner bark is often dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[K]. Sap - raw[118]. Harvested in late winter, the flow is best on a warm, sunny day that follows a cold frosty night. A sweet flavour, it was often used to sweeten other foods[257]. Buds[105, 177]. No further information is given. does this refer to the flower buds or leaf buds?[K]

tcanta Charcoal Dye Fodder Fuel Hedge Pioneer Shelterbelt Soil stabilization Tannin WoodA fast-growing and very wind resistant tree, it is an excellent plant for providing rapidly produced shelterbelts[K]. The trees extensive root system also makes it suitable for controlling erosion along the banks of rivers[226]. This is an excellent pioneer species for re-establishing woodlands on disused farmland, difficult sites etc[226]. Its fast rate of growth means that it quickly provides sheltered conditions to allow more permanent woodland trees to become established. In addition, bacteria on the roots fix atmospheric nitrogen - whilst this enables the tree to grow well in quite poor soils it also makes some of this nitrogen available to other plants growing nearby. Alder trees also have a heavy leaf canopy and when the leaves fall in the autumn they help to build up the humus content of the soil. Alder seedlings do not compete well in shady woodland conditions and so this species gradually dies out as the other trees become established[K]. Tannin is obtained from the bark and the strobils[82]. Both the roots and the young shoots have been used in making baskets[257]. A red to brown dye is obtained from the bark[61, 118, 257]. Wood - soft, brittle, not strong, light, close and straight-grained, very durable in water[82]. An important lumber tree, it makes a good imitation mahogany[60, 103] and is used for cheap furniture etc[46, 61, 82, 171, 229]. A good fuel, it does not spark so can be used in the open[60, 118, 172], it also makes a high grade charcoal[103].

dwatta Anodyne Appetizer Astringent Cathartic Cytostatic Eczema Febrifuge Skin Stomachic TB TonicRed alder was widely employed medicinally by native North American Indians who mainly used the bark to treat a wide range of complaints[257]. The plant is little used in modern herbalism[K]. The bark is appetizer, astringent, cathartic, cytostatic, emetic, stomachic and tonic[61, 172, 257]. The bark

contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge [226]. An infusion of the bark has been used in the treatment of many complaints such as headaches, rheumatic pains, internal injuries and diarrhoea[226, 257]. Externally, a poultice of the bark has been applied to eczema, sores and aches[257]. The sap is applied externally to cuts[257]. The catkins and young cones are astringent and have been chewed in the treatment of diarrhoea[257].

nrakta Western N. America - Alaska to California. ksacta Moist rich soils in woods, usually below 600 metres and within 50 km of the coast[60, 82, 229].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, Kl. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Agroforestry Services: Alley crop Agroforestry Services: Nitrogen Fodder: Bank Management: Coppice Management: Standard Regional CropLandscape Uses:Border, Erosion control, Woodland garden. Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates very infertile sites[200]. A very wind resistant tree with excellent establishment in severely exposed sites, it tolerates severe maritime exposure[75, K]. The red alder is a very fast growing tree, even when planted in severe exposure[75, 229, K], but it is short-lived, dying when 60 - 80 years old[229]. Trees that are 5 years old from seed have reached 6 metres in height on a very exposed site in Cornwall, they are showing no signs of wind-shaping[K]. This is an important pioneer tree, quickly invading logged or burnt over sites, and providing ideal conditions for other trees to become established[229, K]. A very ornamental tree[1]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Red alder has been estimated to fix as much as 300 kg of nitrogen per hectare[269]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 7.1.7 Albizia julibrissin

Mimosa, Silktree, Mimosa Tree, tfo2n 6 tlin 9 cyuc 2 kcak 2 tcan 2 dwat 12 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Albizia julibrissin is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Flowers LeavesEdible Uses: Gum TeaYoung leaves - cooked. An aromatic flavour[2, 106, 178, 179], they are used as a potherb[183]. Flowers - cooked. doors in the south of Britain, though can be damaged or killed in severe winters[11]. The flowers are produced at the base of the current years growth[11, 200]. Special Features:Attractive foliage, North American native, Naturalizing, Wetlands plant, Fragrant flowers, Attractive flowers or

## 6.2.691 Lithospermum caroliniense

Hairy Puccoon. Carolina puccoon 5 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Lithospermum caroliniense is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta DyeA red dye is obtained from the dried or pulverized root[61, 257].

dwatta VulneraryThe powdered root has been used in the treatment of chest wounds[257].

nrakta Eastern N. America - New York to Florida, Minnesota, Montana and New Mexico. ksacta Sandhills, pine barrens and dry sandy woods[43].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings. Division.

nwatta Requires a warm sunny position in a moderately fertile well-drained lime-free sandy soil[1, 200].

## 6.2.692 Plumbago europaea

Plumbago

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc htut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Plumbago europaea is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Acrid Emetic Odontalgic Sialagogue VesicantThe whole plant, but especially the root, is acrid, emetic, odontalgic, sialagogue and vesicant[4, 61, 100, 103]. Chewing the root produces copious salivation and is said to be of benefit in treating toothache[4].

nrakta S. Europe. ksacta Dry rocks, hills, maritime sands, roadsides etc[50, 100].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of basal shoots as new growth emerges in the spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a well-drained sandy or gritty soil in full sun[200]. One report says that the plant is not very hardy in Britain and is usually grown in a greenhouse[4].

## 6.2.693 Verbascum phlomoides

Wooly Mullein, Orange mullein

wisslip hpa7tmwatli fyifxre7t hjonli

5 tlin 9 cyuc 0 kcak 2 tcan 3 dwat 1.2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprikl-

drutta Verbascum phlomoides is a BIEN-NIAL/PERENNIAL growing to 1.2 m (4ft). See above for

but can sometimes become a small tree. They succeed out- USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

> tcanta RepellentThe whole plant is used to repel mice and rats[46, 61]. Dynamic accumulator.

> dwatta Anodyne Antiseptic Demulcent Diuretic Expectorant Pectoral VermifugeThe seed is used to expel tapeworms from the body[4]. No other details are given, but the seeds probably contain saponins and so should be used with caution[K]. The flowers and leaves are anodyne, antiseptic, astringent, demulcent, emollient, expectorant, pectoral and vulnerary[21, 238]. An infusion is used internally in the treatment of various respiratory complaints including coughs, bronchitis, asthma and throat irritations[238]. An infusion of the fresh or dried flowers in olive oil is used to treat earaches, sores, wounds, boils etc[238]. The plant is harvested when in flower and should be dried quickly and with care or it will lose its medicinal qualities[238].

> nrakta S. Europe. Rarely naturalized in Britain[17]. ksacta Dry sandy or stony ground[17].

> propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

> nwatta An easily grown plant, it succeeds in most welldrained soils, including dry ones, and prefers a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. This species is hardy to at least -15°c[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200]. Plants can perennate when growing in light well-drained soils[111].

#### 6.2.694 Aconitum orientale

5 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aconitum orientale is a PERENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

dwatta Anodyne Diaphoretic DiureticThe dried root is anodyne, diaphoretic and diuretic[4]. It should be harvested in the autumn as soon as the plant dies down[4]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner.

nrakta W. Asia - Turkey to Iran. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

## 6.2.695 Eryngium aquaticum

Button Snakeroot, Rattlesnakemaster 5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1.2 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Eryngium aquaticum is an evergreen Perennial growing to 1.2 m (4ft). See above for USDA hardiness. It hardy to UK zone 6. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

dwatta Antidote Diaphoretic Diuretic Emetic Expectorant HomeopathyThe plant is diaphoretic, diuretic, expectorant and in large doses emetic[207]. It is used mainly in the treatment of disorders of the kidneys and sexual organs[238, 257]. It has been used as an antidote to snake poison[207, 257]. The pounded roots are used as a diuretic[213]. An infusion of them is used to reduce fevers[213]. The plant is used as an antidote to snakebites. The roots are chewed and applied to the bite[213]. A homeopathic remedy is made from the fresh or dried root[4].

nrakta Eastern N. America - New Jersey to Florida. ks-acta Wet soils or uplands[235].

propta Seed - best sown as soon as it is ripe in early autumn on the surface of a well-drained compost in a cold frame[200]. The seed can also be sown in spring. It usually germinates in 5 - 90 days at  $20^{\circ}$ C. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring or autumn. Take care since the plant resents root disturbance[200]. Root cuttings in autumn or winter[200].

nwatta Requires a well-drained soil and a sunny position[1]. Prefers a light sandy soil but tolerates most soil types including lime and poor gravels[200]. Plants should be put in their final position whilst small since they resent root disturbance[200]. Plants labelled in nurseries as E. aquaticum are often E. yuccifolium[200].

## 6.2.696 Verbascum lychnitis

White Mullein

5 tlin 9 cyuc 0 kcak 2 tcan 0 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Verbascum lychnitis is a BIENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta RepellentFlower heads are used as a mouse and rat repellent in fruit stores etc[46, 61]. Dynamic accumulator.

nrakta Europe, including Britain, from Belgium south and east to Spain, Greece, Siberia and Caucasus. ksacta Waste places and calcareous banks on dry soils[17, 200].

propta Seed - sow late spring to early summer in a cold frame and only just cover the seed[200]. Germination usually takes place within 2 - 3 weeks. When they are large enough to handle, prick out the seedlings into individual pots and plant them out in late summer. The seed has a long viability[200].

nwatta An easily grown plant, it succeeds in most well-drained soils, including dry ones, preferring a sunny position[200]. Dislikes shade and wet soils[200]. Thrives on chalk[200]. Prefers a light soil[200]. Hybridizes with other members of this genus, though the progeny are usually sterile[200].

#### 6.2.697 Peucedanum cervaria

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Peucedanum cervaria is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, skin contact with the sap of a number of members in this genus is said to cause photo-sensitivity and/or dermatitis in some people[65, 218]. They are also said to contain the alleged 'psychotroph' myristicine[218].

dwatta Diuretic Emmenagogue Febrifuge StomachicDiuretic, emmenagogue, febrifuge, stomachic[61].

nrakta C. and S. Europe. ksacta Not known

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta An easily grown plant, it succeeds in any moisture-retentive soil in a sunny position[200]. Suitable for group plantings in the wild garden[200]. This species was formerly cultivated as a medicinal plant[61].

### 6.2.698 Inula conyza

Ploughman's Spikenard 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hionli

drutta Inula conyza is a BIENNIAL/PERENNIAL growing to 1.2 m (4ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil

tcanta Incense Insecticide ParasiticideThe leaves are burnt and used as an insecticide and parasiticide, especially against fleas[4, 100]. Even the smell of the plant is said to drive fleas away[4]. The root used to be burnt upon a fire in order to scent a room[2451.

dwatta Antiscrophulatic Emmenagogue Parasiticide VulneraryThe herb is antiscrofulatic, emmenagogue and vulnerary[4]. The plant was considered to be a good wound herb and it was frequently taken in decoction for bruises, ruptures, internal wounds etc[4]. It was applied externally to treat itchy skin[4].

nrakta Central and southeastern Europe, including Britain, from Denmark to N. Africa and the Near East. ksacta Dry or rocky slopes and cliffs, also in open scrub on calcareous soils171.

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying a sowing in situ in the spring or the autumn.

nwatta Succeeds in an ordinary garden soil in a sunny position[1]. The basal leaves of this species are often mistaken for the foxglove, Digitalis purpurea[17]. The basal leaves form a rosette that covers the ground for 30cm or more, destroying the grass underneath[245]. All parts of the plant are refreshingly aromatic[245].

#### 6.2.699 Reseda luteola

Weld, Dyer's Rocket 5 tlin 9 cyuc 0 kcak 3 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hionli grow them on in light shade in the greenhouse for their first winter, planting them out in late spring or early summer. Division can be carried out at almost any time of the year, though spring is probably the best time. Simply dig up the roots, harvest the tubers and replant them where you want the plants to grow. It is also possible to harvest the tuber in winter, store them in a cool fairly dry but frost-free place over the winter and then plant them out in the spring. The tubers lose moisture rapidly once they have been harvested, so make sure that you store them in a damp medium such as leafmoild.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Prefers a light rich soil and a sunny position[1, 27]. Another report says that it prefers light dappled shade[200]. Tolerates acid soils[160]. A climbing plant, supporting itself by twining around the thin branches of shrubs[235]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is tuberous with swollen potato-like roots [1-2].

## 7.1.4 Cercis siliquastrum

Judas Tree, Redbud

tfo2n 6 tlin 9 cyuc 4 kcak 4 tcan 0 dwat 12 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cercis siliquastrum is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Flowers SeedpodEdible Uses: Flowers - raw[2, 89, 105]. A sweetish-acid taste, they are a nice addition to the salad bowl[11, 183, K]. The flower buds are pickled and used as a condiment[183]. Seedpods

tcanta WoodWood - very hard, beautifully grained, takes a very fine polish. Used for veneers[89, 200].

nrakta S. Europe to E. Asia. ksacta Stony slopes and in arid warm woods[49, 132].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Pre-soak stored seed for 24 hours in warm water then cold stratify for 3 months[113]. Sow spring in the greenhouse[78]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants resent root disturbance and are best planted out in their permanent positions as soon as possible[11]. Cuttings of half-ripe wood, July/August in a frame[200].

nwatta Landscape Uses:Specimen. Succeeds in most soils and pH types, but dislikes growing in wet soils, especially when these are of clay[200]. Prefers a deep sandy loam and a very sunny position[11, 182]. Thrives on chalk[11, 98] and in dry sandy soils[98]. Probably does best on a poorish soil[49]. Succeeds in light shade[200]. Dislikes drought[200]. Dormant plants are hardy to about -15°c[202]. The young growth in spring, even on mature plants, is frosttender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants do not generally

thrive at Kew, they prefer a hotter, continental climate in order to fully ripen their wood[11]. One report says that plants require cool greenhouse treatment in Britain[1], though several good specimens have been seen outdoors in this country[K]. The tree often does not flower freely in Britain, especially if the previous summer was cool. Plants are susceptible to coral spot fungus, especially when growing in areas with cool summers where the wood is not fully ripened[11]. Plants in this genus are notably resistant to honey fungus[200]. Resents root disturbance, plants should be planted into their permanent positions as soon as possible, preferably in May, and should be kept well watered until established[11]. Any pruning is best carried out in the winter[202]. A very ornamental plant[1], flowering well in Cornwall[59]. It flowers better when growing in a continental climate[200]. The flowers are produced on the branches of the previous or earlier years, and also on the trunk of the plant[82]. A good bee plant[108]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features:Not North American native, Blooms are very showy.

## 7.1.5 Elaeagnus x reflexa

tfo2n 6 tlin 9 cyuc 3 kcak 4 tcan 2 dwat 4.5 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus x reflexa is an evergreen Shrub growing to 4.5 m (14ft 9in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from October to December, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[K]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The fruit contains a single large seed[K]. Seed raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

tcanta Hedge HedgeCan be grown as a hedge in exposed positions, tolerating maritime exposure[11]. It can also be planted in windy gaps under trees in shelterbelts and will in time fill in the gaps and climb into the trees[11, 29].

dwatta CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta A hybrid of garden origin, E. pungens x E. glabra. ksacta Not known in the wild.

propta Seed - this is a hybrid and it will not breed true from seed. If this is not a problem, then the seed is best sown as soon as it is ripe in a cold frame[78]. It should germinate freely within 4 weeks, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Rather slow, but you usually get a good percentage rooting[78]. June is the best time to take cuttings[202]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Lavering in September/October, Takes 12 months[78].

nwatta Succeeds in most soils that are well-drained[11, 200]. Prefers a soil that is only moderately fertile, succeed-

well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Good percentage[78]. It is best to take the cuttings in June[202]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Cascades, Erosion control, Hedge, Screen, Seashore. Succeeds in most soils that are well-drained[11, 200]. Dislikes very alkaline soils[202]. Prefers a soil that is only moderately fertile, succeeding in poor soils and in dry soils[[11, 200]. Grows well in heavy clay soils. Very drought and shade resistant[200]. Tolerates maritime exposure[75]. Plants are hardy to about -15°c[200]. The foliage can be damaged in severe wind-chill conditions[202]. This is a potentially valuable fruit crop, fruiting as it does in April and May[K]. There are a number of named varieties[200, 202] and so there is plenty of scope for improving size and quality of fruit by selective breeding. Most cultivars are variegated and therefore slower-growing than the species [K]. This species is notably resistant to honey fungus[88, 200]. The small flowers have a sweet but pungent aroma. They pervade the garden for some distance on sunny days[245]. Closely related to E. glabra[11]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. Special Features: Not North American native, Naturalizing, Fragrant flowers. Inconspicuous flowers or blooms. The plant is heat. tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.)

## 7.1.2 Elaeagnus macrophylla

Broad-leaved Oleaster

tfo2n 6 tlin 9 cyuc 5 kcak 3 tcan 2 dwat m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus macrophylla is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[105, 177]. A very acceptable rich flavour when fully ripe, though it is somewhat astringent before then[K]. A potentially very valuable crop, ripening as it does in April and May[K]. We are not sure how reliable a crop it is though, some plants bear very heavy crops whilst others rarely bear fruitf[K]. The fruit is up to 30mm long and contains a single large seed[K]. Seed - raw or cooked. A mild flavour, that has a hint of peanut, it can be eaten in quantity[K]. It can be eaten together with the fruit though the seed case is rather fibrous[K].

tcanta Hedge HedgePlants can be grown as a hedge in exposed positions, they are very tolerant of maritime exposure[75, 200]. Reasonably fast-growing and providing dense cover, it gives a very good protection from the wind[K]. Plants are very tolerant of regular trimming, they can also

be cut back almost to the ground and will resprout from the base[K]

dwatta CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Japan, Korea. ksacta Thickets in lowland, especially near the sea[58, 184].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate freely within 4 weeks, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Good percentage[78]. It is best to take the cuttings in June[202]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils that are well-drained[11, 200]. Prefers a soil that is only moderately fertile, succeeding in poor soils and in dry soils[11, 200]. Succeeds in sun or shade[11, 200]. Plants are very tolerant of maritime exposure[75]. This species is hardy to about -15°c[184], succeeding in the warmer counties of Britain. This is a plant with a very big potential as a commercial fruit crop. The fruit ripens outdoors in Britain in April, a season where traditionally there is no fresh fruit available. The fruit is of a reasonable size, has a very nice flavour when fully ripe and also has a fairly large edible seed[K]. Some research needs to be carried out in order to find the conditions that are necessary to ensure good crops - some plants fruit very heavily whilst others have very light or no crops[K]. This is the second of the evergreen Elaeagnus species to ripen in the spring, about a week or 10 days later than E. cordifolia[K]. This species is notably resistant to honey fungus[88, 200]. Plants can succumb to wind-rock in very wet seasons[75]. Plants are sometimes damaged by voles[75]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. Allied to E. pungens and E. glabra[11]. The flowers are very aromatic[184], their aroma pervading the garden on calm days[K].

#### 7.1.3 Apios priceana

Traveler's delight

tfo2n 6 tlin 9 cyuc 5 kcak 3 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Apios priceana is a PERENNIAL growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Tuber - raw or cooked[62]. It has a delicious flavour somewhat like sweet potatoes when roasted. The tuber can also be dried and ground into a powder. The tuber is solitary, unlike other members of this genus that produce strings of tubers[62]. The tuber can be 15cm thick and somewhat longer[235].

tcanta Nitrogen fixer.

nrakta N. America - Kentucky and Tennessee. ksacta Woods and thickets[43].

propta Seed - pre-soak for 3 hours in tepid water and sow February/March in a cold frame. The seed usually germinates in 1 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and

drutta Reseda luteola is a BIENNIAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

tcanta Dye OilA deep yellow dye is obtained from the plant, it is of very good quality[17, 46, 74]. The plant is harvested as the last flowers fade[115]. Most of the dye is found in the seed[115]. An oil is obtained from the seed, used in lighting[100].

dwatta NarcoticNarcotic (mild).

nrakta Europe, including Britain, from Sweden south and east to N. Africa and W. Asia. ksacta Disturbed ground, arable land, walls etc, especially on calcareous soils[17].

propta Seed - sow in situ in the spring and only just cover the seed. An autumn sowing usually succeeds in areas where winter temperatures do not fall below about -10°c[200]. The seed germinates in the autumn in the wild.

nwatta Easily grown in any well-drained neutral to slightly alkaline soil in a sunny position or in some shade if the summers are long and hot[200]. At one time this plant was commonly cultivated for the dye obtained from the leaves and seed but with the advent of chemical dyes it has fallen into disuse[1, 17, 46]. A good plant for bees and butter-flies[200]. Plants dislike root disturbance, they can be transplanted but care must be taken not to break the tap root[169].

## 6.2.700 Hypericum bellum

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hionli

drutta Hypericum bellum is an evergreen Shrub growing to 1 m (3ft 3in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta MiscellanyA good ground cover[11].

dwatta Dysentery Febrifuge Miscellany Vermifuge-Febrifuge, vermifuge. Also used in the treatment of hepatitis, colds, dysentery and dermatitis[91].

nrakta E. Asia - China to the Himalayas. ksacta Scrub on open hillsides[184]. Forest glades[91]. Open forest, forest edges, thickets and grassy slopes at elevains of 1900 -3200 metres in the western Himalayas[266].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 12 cm with a heel, July/August in a frame. Plant out in the following spring[200] Careful division of old suckering shrubs in the dormant season.

nwatta Easily grown in any reasonably good well-drained but moisture retentive soil[11]. Succeeds in sun or semi-shade but flowers better in a sunny position[200]. Tolerates chalk. A very ornamental plant[11], it is hardy to about-10°c[184]. Plants in this genus are notably resistant to honey fungus[200].

## 6.2.701 Rubia tinctorum

Madder, Dyer's madder 5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Rubia tinctorum is an evergreen Perennial growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista Potential to cause cancers, particularly liver and kidney. From the information currently available it is not recommended as a herbal medicine [301].

tcanta Dye PolishA very good quality red dye is obtained from the roots. Some reports say that 2 year old roots are used in the spring and autumn[61, 200, 238] whilst others say that 3 year old roots are used[169, 171]. The roots can be dried for later use[169]. The dye can also be extracted from the leaves[169]. This dye is also used medicinally[200]. The leaves and stem are prickly, the whorls of leaves having spines along the midrib on the underside[4]. This feature enables them to be used for polishing metalwork[4, 148].

dwatta Aperient Astringent Cholagogue Diuretic EmmenagogueThe root is aperient, astringent, cholagogue, diuretic and emmenagogue[4, 7, 21]. It is taken internally in the treatment of kidney and bladder stones[238]. The root is seldom used in herbal medicine but is said to be effective in the treatment of amenorrhoea, dropsy and jaundice[4]. The roots are harvested in the autumn from plants that are at least 3 years old. They are peeled and then dried[238]. When taken internally the root imparts a red colour to the milk, urine and bones, especially the bones of young animals, and it is used in osteopathic investigations[4, 200].

nrakta Europe - Mediterranean. Naturalized in Britain[17]. ksacta Neglected ground, hedgerows and among public[7].

propta Seed best sown as soon as it is ripe in a cold frame. Stored seed can be very slow to germinate[200]. Prick out the seedlings when they are large enough to handle and grow them on in light shade in the greenhouse for the first year. Plant them out into their permanent positions in early summer. Division in spring or at any time in the growing season if the divisions are kept well watered until established[200]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Prefers a light sandy soil in full sun[14]. Plants grown in fertile well-limed soils produce more pigment in the root[169]. This plant was at one time widely cultivated for the red dye obtained from its roots, this dye is now manufactured chemically[200]. However, it is still cultivated in Europe as a medicinal dye plant. The plant produces many side roots that can travel just under the surface of the soil for some distance before sending up new shoots[4]. This species is closely related to R. peredrina[4].

#### 6.2.702 Aconitum chinense

5tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aconitum chinense is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1, 200].

dwatta Analgesic Anodyne Carminative Diaphoretic Diuretic Irritant SedativeThe root is analgesic, anodyne, carminative, diaphoretic, diuretic, irritant, sedative[4, 7, 9, 145, 165]. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified

nrakta E. Asia - China ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233].

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Grows well in open woodlands[1, 4]. Members of this genus seem to be immune to the predations of rabbits and deer[233]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

#### 6.2.703 Aconitum uncinatum

Wild Monkshood. Southern blue monkshood 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Aconitum uncinatum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The flowers are pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is highly toxic - simple skin contact has caused numbness in some people[1].

dwatta Alterative Anaesthetic Antiarthritic Deobstruent Diaphoretic Diuretic Sedative StimulantThe dried root is alterative, anaesthetic, antiarthritic, deobstruent, diaphoretic, diuretic, sedative, stimulant[178]. It is harvested as soon as the plant dies down in the autumn. This is a very poisonous plant and should only be used with extreme caution and under the supervision of a qualified practitioner. A tincture is used as an external anaesthetic[207].

nrakta Eastern N. America - Pennsylvania to Indiana and south to Alabama and Georgia. ksacta Low woods and damp slopes[43]. Wet areas along streams and in springs, also less mesic locations in woods and clearings at elevations of 200 -2000 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[111]. The seed can be stratified and sown in spring but will then be slow to germinate[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Division - best done in spring but it can also be done in autumn[1, 111]. Another report says that division is best carried out in the autumn or late winter because the plants come into growth very early in the year[233]

nwatta Thrives in most soils and in the light shade of trees[1]. Grows well in heavy clay soils. Prefers a moist soil in sun or semi-shade[200]. Prefers a calcareous soil. Members of this genus seem to be immune to the predations of rabbits and deer[233]. Grows well in open woodlands[1, 4]. A greedy plant, inhibiting the growth of nearby species, especially legumes[54].

#### 6.2.704 Solidago gigantea

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Solidago gigantea is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clav) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta BasketryThe stems can be made into rough bas-

dwatta Astringent Cathartic Diuretic Febrifuge Styptic-The leaves and blossoms are astringent, cathartic and styptic[4]. They are a valuable remedy in the treatment of all kinds of haemorrhages[4]. An infusion of the blossoms has been used to treat various fevers[257]. An oil obtained from the plant (is this an essential oil?) is diuretic[4].

nrakta N. America - New Brunswick to British Columbia, south to Georgia, Texas and Utah. ksacta Low wet areas, roadsides, pond margins and the sides of streams, generally in mesic areas[274].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the sum-

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. This species has become a weed in its native range, increasing freely by seed and at the root[200]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

## 6.2.705 Hebe rakaiensis

5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hebe rakaiensis is an evergreen Shrub growing to 1 m (3ft 3in) by 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

tcanta Hedge HedgeAn excellent ground cover plant[182], though it takes about 2 years to form an effective cover[197]. Plants should be spaced about 60cm apart each way[208]. It can also be grown as a dwarf hedge, tolerating gentle clipping[182]. Attractive flowers.

nrakta New Zealand. ksacta Rocky places at low altitudes in South Island[184].

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse in spring. Only just cover the seed and do not allow the compost to dry out. Prick out the seedlings into individual pots when they are large enough to handle. Grow on the young plants for at least their first winter in a greenhouse and plant out in late spring or early summer after the last expected frosts. It would probably be worthwhile giving some protection to the plant for its first winter outdoors. Cuttings of half ripe wood, 3 - 5cm with a heel, July/August in a frame. Pot up when roots are forming and keep in a frame or greenhouse for its first winter before planting out in late spring. Cuttings of mature wood, late autumn or winter in a frame.

nwatta Prefers a position in full sun, succeeding in most well-drained soils with some shelter from cold winds[200]. Dislikes very dry soils and water-logged soils. Tolerant of atmospheric pollution and maritime exposure[200]. Plants are hardy to about -15°c[184]. Hybridizes freely with other members of this genus[200]. Plants of this species are often grown under the names of H. buxifolia or H. subalpina in British gardens[200]. This species is very easy to transplant and, with care, it can even be moved when in flower[200]. Plants in this genus are notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil

propta Seed - sow early spring in situ.

nwatta Prefers a light well-drained moderately fertile humus-rich soil in a sunny sheltered position[200].

## 6.2.771 Pachysandra procumbens

Allegheny spurge

5 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc

pcimhmim cyutli tcup hwicli hrasilutnyik hpa7tli frusflatprik hpa7tmwatli hionli

drutta Pachysandra procumbens is a PERENNIAL growing to 0.3 m (1ft) by 0.6 m (2ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil

pcista None Known

kcakta None Known

tcanta A low to medium density groundcover for shady areas especially with acid soils. Good for woodland garden-

nrakta Native to the southeast United States from West Virginia and Kentucky south to Florida, and west to Louisiana. ksacta Woodland with acid, well drained soils in shade or semi-shade

propta Propagate by root division in August or September. By softwood cuttings in spring, or by layering.

nwatta An evergreen subshrub making a good groundcover. Leaves are typically deciduous in USDA Zones 5 and 6 but semi-evergreen to evergreen in Zones 7 to 9. Performs well in a variety of soils from moist to dry and a range of soil pH as long as it is growing in partial to full shade. Spreads indefinitely by rhizomes to form a dense carpet of matte bluegreen leaves. Prefers well-draining, organic-rich soil that is mildly acidic 5.5-6.5 pH. Drought resistant over time. Flowers are fragrant white (staminate) showing in early spring. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. Flower: Showy, Fragrant

## 6.2.772 Cyrtomium fortunei

Asian netvein hollyfern

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Cyrtomium fortunei is an evergreen Fern growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

dwatta Analgesic Anthelmintic Antibacterial Anticoagulant Antiviral Depurative Febrifuge HaemostaticThe rhizome is analgesic, anthelmintic, antibacterial, anticoagulant, antiviral, depurative, febrifuge and haemostatic[147, 176, 218]. A decoction is used in the treatment of hookworm, tapeworm, ascariasis, filiariasis, acute infectious hepatitis and various bleeding ailments[147]. The decoction is also used as a preventative for influenza and measles[147].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets

found on the sides of ditches and roadways as well as in rocky crevices where it is damp and shady[147].

propta Spores - best sown as soon as ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Germinates in 1 - 3 months at 20°c[164]. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division in spring or summer[188].

nwatta Requires a moderately loose soil, do not firm the soil any more than is necessary[1]. Tolerates a little direct sun but it grows better in the shade[200]. Grows well in a woodland garden[166]. Prefers a pH between 6 and 7 but this is not critical[200]. Dislikes too much winter moisture[1]. A very ornamental and hardy plant[1], tolerating temperatures down to about -30°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

## **7** 6 tlin

## **7.1** bwon

## 7.1.1 Elaeagnus pungens

Elaeagnus, Thorny olive, Thorny Elaeagnus, Oleaster, Silverberry, Silverthorn, Pungent Elaeagnus tfo2n 6 tlin 10 cyuc 5 kcak 3 tcan 2 dwat 4 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Elaeagnus pungens is an evergreen Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from November to February, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[105, 177]. About the size of a large blackcurrant, though the seed is also quite large[K]. A nice sub-acid flavour when fully ripe but astringent if eaten before then[K]. Can be made into preserves, drinks etc[183]. The oval fruit is about 15mm long[200]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K]. A taste vaguely reminiscent of peanuts[K]. The seed contains 42.2% protein and 23.1% fat on a zero moisture basis[218].

tcanta Hedge HedgePlants can be grown as a hedge in exposed positions, tolerating maritime exposure[75]. Succeeds when planted under trees that have become bare at the base, in time it will scramble up into the tree and fill out the bottom[75].

dwatta Antiasthmatic Antitussive Astringent CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214]. The leaves and the stems are concocted and used in the treatment of asthma, cough, diarrhoea, haemorrhoids etc[147, 218]. The seed is used to treat watery diarrhoea[218]. The root is astringent and is applied to sores, itchy skin etc[147, 218].

nrakta E. Asia - China, Japan. ksacta Sunny slopes, road sides and thickets in lowlands, usually below 1000 metres and especially by the sea[184, 266].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate freely within 4 weeks, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification in hills and low mountains all over Japan [58]. In China it is can help [98]. The seed usually (eventually) germinates quite

be a short-lived perennial. There are many cultivars that are widely grown in gardens. Since these flower freely in their first year and then degenerate, they are usually treated as annuals [200]. A very variable species in the wild, it has often been subdivided into up to eight different varieties [266]. Special Features: Attractive foliage, Naturalizing, Suitable for cut flowers, Fragrant flowers, Attractive flowers or blooms.

## 6.2.767 Jurinea dolomiaea

5tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Jurinea dolomiaea is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta IncenseThe root extract is used as an incense[145]. The plant is used for incense[272].

dwatta Poultice StomachicA decoction of the root is cordial[240]. It is given in the treatment of colic and puerperal fever[240]. The juice of the roots is used in the treatment of fevers[272]. The bruised root is applied as a poultice to eruptions[240].

nrakta W. Asia - Turkey and Iran, east to E. Asia - Himalayas. ksacta Open alpine slopes, 3200 - 3800 metres[145]

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is obtained. Only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

nwatta Succeeds in any ordinary soil in a sunny position[200].

## 6.2.768 Pulsatilla chinensis

Bai Tou Weng

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Pulsatilla chinensis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from March to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

poista Although no mention has been seen for this species, at least one member of the genus is slightly toxic, the toxins being dissipated by heat or by drying the plant[65].

dwatta Analgesic Antiinflammatory Antispasmodic Cardiotonic Dysentery Hypnotic Malaria SedativeBai Tou Weng is thought to clear toxicity and to lower fever. It is most commonly taken as a decoction to counter infection within the gastro-intestinal tract[254]. The root is anodyne, antiinflammatory, antispasmodic, astringent and sedative[174, 176, 218]. The root is an effective cure for bacterial and amoebic dysentery[176, 218]. It is also used in the treatment of malaria, nose bleeds and haemorrhoids and is used externally to treat Trichomonas vaginitis[176, 254]. The root is harvested in the autumn or before the plant comes into flower in the spring, it can be dried for later use[254]. The root contains the lactone protoanemonin which has an irritant and antibacterial action. Protoanemonin is destroyed when the root is dried[254]. The fresh herb is a cardiac and nervous sedative, producing a hypnotic state with a diminution of the senses followed by a paralysing action[218]. A constituent similar to digitalis can be extracted from the whole herb with the roots removed[176]. This is cardiotonic[176].

nrakta E. Asia - N. China to E. Siberia. ksacta Dry grassy places and rocky hillsides[74, 187]. Forest margins and slopes at elevations of 200 - 3200 metres in China[266].

propta Seed - best sown as soon as it is ripe in early summer in a cold frame. The seed usually germinates in about 2 - 3 weeks. Sow stored seed in late winter in a cold frame. Germination takes about 1 - 6 months at 15°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in the spring. Root cuttings, 4cm long taken in early winter, potted up in a mixture of peat and sand[175]. They can also be taken in July/August, planted vertically in pots in a greenhouse or frame.

nwatta Requires a well-drained humus-rich gritty soil and a sunny position[200]. Tolerates alkaline soils[200]. Plants are hardy to about -20°c[187]. They are said to be difficult to grow in Britain, requiring a dry winter and spring followed by a warm humid summer[187]. Large plants have a deep woody rootstock and transplant badly[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

## 6.2.769 Carex hachijoensis

Japanese sedge

5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Carex hachijoensis is an evergreen Perennial growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind, Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista None Known

tcanta ContainersA good evergreen ground cover supplying winter interest. Can be used on slope or Banks. Good in containers. Variegated forms available for foliage interest including Carex hachijoensis Evergold. Can make a good edging plant. Deer resistant and shade tolerant.

dwatta None Known

nrakta Native to low alpine areas in Japan. Most sedges are found in wetlands – such as marshes, calcareous fens, bogs and other peatlands, pond and stream banks, and riparian zones. ksacta E. Asia.

propta Propagate by plant division in spring or seeding in the fall.

nwatta Best grown in moist, fertile, medium to wet soils in part shade to full shade. Soils should not be allowed to dry out. In full sun and hot sites foliage tends to bleach to an unattractive yellow. Tolerates: Deer, Heavy Shade, Erosion, Wet Soil. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a 'clumping' habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

#### 6.2.770 Linum strictum

5tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.4 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Linum strictum is a ANNUAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta EmollientThe seeds are used as an emollient[240].

nrakta Central Europe to the Mediterranean and east to Afghanistan and Iran. ksacta Dry hills, sandy and rocky places, vineyards.

requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

## 6.2.706 Andropogon virginicus

Broomsedge Bluestem

5 tlin 9 cyuc 0 kcak 1 tcan 1 dwat 1.2 m hkuc

htut cyutli kyuctcup hwicli hras hpa7tli frusflatpriklwis hpa7tmwatli xre7t hionli

drutta Andropogon virginicus is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta A yellow dye is obtained from the stems[257]. Onion skins are sometimes added when making the dye[257]. Sometimes grown as an ornamental plant (but can be weedy).

dwatta Astringent SalveA decoction of the roots is used in the treatment of backaches[222]. A tea made from the leaves is used in the treatment of diarrhoea[222]. Externally, it is used as a wash for frostbite, sores, itching, piles and poison ivy rash[222, 257].

nrakta Eastern N. America - New York to Florida, west to Texas, Illinois and Ohio. ksacta Open ground, old fields, open woods, sterile hills and sandy soils[236].

propta Seed - surface sow in early spring in a greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on for the first winter in a cold greenhouse. Plant out in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Requires a light porous sandy soil in full sun[200]. Plants are often found in very acid soils in the wild[236]. This plant was inadvertantly introduced to the Hawain Islands in 1932 and has spread widely there. It is considered to be one of the most threatening of exotic species, invading native habitats and altering the fire and hydrology regimes[274].

## 6.2.707 Lobelia siphilitica

Great Blue Lobelia, Blue Cardinal Flower, Big Blue Lobelia, Great Lobelia

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

druttå Lobelia siphilitica is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pfr: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The plant is potentially poisonous[222]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274].

dwatta Analgesic Cathartic Diaphoretic Dysentery Emetic Homeopathy Poultice VDThe root is cathartic, diaphoretic and emetic[4, 46, 103]. It is used in the treatment of dropsy, diarrhoea, stomach complaints, syphilis and dysentery[4, 257]. A poultice of the root has been applied to sores that are hard to heal[257]. The leaves are analgesic and febrifuge[257]. An infusion has been used in the treatment of colds and fevers[257]. A poultice of the crushed leaves has been applied to the head to relieve the pain of headaches[257]. At one time in N. America the root of this plant was believed to be effective in the treatment of VD[103, 2221. When used in Europe, however, it was found to be ineffective[213]. This might have been because the N. American Indians used the fresh root (which still contained the volatile oils) and also used it in conjunction with Podophyllum peltatum and Prunus virginiana, and then dusted the ulcers with the bark of Ceanothus americanus[213]. It was believed by some native North American Indian tribes that if the finely

ground roots were secretly added to the food of an arguing couple then this would avert a divorce and they would love each other again[213]. A homeopathic remedy is made from the roots[4].

nrakta Eastern N. America - Maine to S. Dakota, south to Texas and Missouri, ksacta Moist woods and marshes[187].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200]. Basal cuttings in spring[1]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Layering in moist sand, it forms roots at the nodes[200].

nwatta Landscape Uses:Border, Massing, Woodland garden. Requires a moist soil, succeeding in full sun or parteal shade[111, 187, 200]. A very ornamental plant[1], but it is short-lived unless divided frequently[233]. Special Features:Attracts birds, North American native, Naturalizing, All or parts of this plant are poisonous, Wetlands plant, Attracts butterflies, Suitable for cut flowers.

#### 6.2.708 Knautia arvensis

Field Scabious, Field scabiosa

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Knautia arvensis is a PERENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

dwatta Antipruritic Astringent Diuretic Eczema HomeopathyThe whole plant is astringent and mildly diuretic[9]. An infusion is used internally as a blood purifier and externally for treating cuts, burns and bruises[9]. The fresh or dried flowering plant can be used, with or without the roots[9]. A homeopathic remedy is made from the plant[9]. It is used as a blood purifier and as a treatment for eczema and other skin disorders[9].

nrakta Europe, including Britain, north to latitude 69°, east to the Caucasus and W. Siberia. ksacta Meadows, pastures, hedgebanks and grassy hills, usually on dry soils and especially on limestone[9, 17, 187].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have enough seed it would be worthwhile trying a sowing in situ outdoors in the spring. The seed germinates in the spring in the wild. Division in the spring. Basal cuttings in late spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any well-drained soil[187]. Prefers a dry soil[9, 17]. Grows well on chalky soils[4]. Prefers a sunny position[188]. A very cold-hardy plant, tolerating temperatures down to at least -25°c[187]. Grows well in the summer meadow[24, 187]. The plant is an important source of nectar and pollen for bees and lepidoptera[24, 108]. The plants are sometimes dioecious, if this is the case then male and female plants will need to be grown if seed is required.

## 6.2.709 Scrophularia ningpoensis

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scrophularia ningpoensis is a PERENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antibacterial Antifungal Antiphlogistic Antipyretic Cardiac Diuretic Febrifuge Haemolytic Hypoglycaemic Restorative Sialagogue Tonic VasodilatorThis species has been used in Chinese herbal medicine for over 2,000 years[238]. The root is antibacterial, antifungal, antipyretic, antiphlogistic, cardiac, diuretic, febrifuge, haemolytic, hypoglycaemic, restorative, sialogogue, tonic and vasodilator[147, 176, 218]. Small doses act as a heart tonic, whilst large doses depress cardiac function[176, 238]. The root is used internally in the treatment of feverish illnesses with symptoms such as rashes, delirium and insomnia, dry cough, throat infections, abscesses and carbuncles[238]. The root is harvested in the autumn and dried for later use[238].

nrakta E. Asia - China. ksacta Gullies, thickets and wet waste places along the edges of rivers and streams[147]. Bamboo forests, along streams, thickets, tall grasses; below 1500 metres[266].

propta Seed - sow spring or autumn in a cold frame[238]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most moist to wet soils in full sun or partial shade[200, 238]. This species is hardy to at least -15°c[238].

## 6.2.710 Hypericum androsaemum

Tutsan, Sweet-amber, St. Johnswort 5 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Hypericum androsaemum is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. Sea above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

tcanta A good ground cover plant[208]. Although it is clump forming rather than spreading it increases freely by self-sowing[186, 200]. Plants are best spaced about 90cm apart each way[208].

dwatta Antiseptic Diuretic Stomachic VulneraryThe leaves are diuretic, stomachic and vulnerary[61, 186]. They have antiseptic properties and have been used to cover open wounds[245].

nrakta Western and southern Europe, including Britain, south and east to Algeria, W. Asia and the Caucasus. ksacta Damp woods and hedges[17].

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed usually germinates in 1 - 3 months at 10°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 12 cm with a heel, July/August in a frame. Plant out in the following spring[200] Careful division of old suckering shrubs in the dormant season.

nwatta Landscape Uses:Border, Erosion control, Ground cover, Massing, Rock garden. Easily grown in any reasonably

good well-drained but moisture retentive soil[1]. Tolerates a wide range of pH[186]. Succeeds in sun or semi-shade[1] but flowers better in a sunny position[200]. Succeeds in dry shade and is drought tolerant when established[190]. Hardy to about -20°c, but if cut back by cold weather plants can resprout from the base[184]. Plants often self-sow freely[208]. A number of named forms have been developed for their ornamental value[182]. Plants in this genus are notably resistant to honey fungus[200]. The leaves are covered in pellucid dots which, when touched, release a resinous smell somewhat like goats[245]. Special Features: Attractive foliage, Naturalizing, Attracts butterflies, Attractive flowers or blooms

#### 6.2.711 Hebe 'Great Orme'

Great Orme Hebe

5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 1.5 m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Hebe 'Great Orme' is an evergreen Shrub growing to 1.5 m (5ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

tcanta Hedge HedgeCan be used as a hedge in maritime areas, it is very resistant to salt winds[200]. Attractive flowers

nrakta A garden hybrid of uncertain origin[200]. ksacta Not known in the wild.

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse in spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species is a hybrid and will not breed true from seed. Cuttings of half ripe wood, 3 - 5cm with a heel, July/August in a frame. Cuttings of mature wood, late autumn or winter in a frame.

nwatta Prefers a position in full sun, succeeding in most well-drained soils with some shelter from cold winds[200]. Dislikes very dry soils and water-logged soils, but is somewhat drought tolerant when established[190]. Tolerant of atmospheric pollution and maritime exposure[200]. Plants are hardy to about -10°c. They grow well in a dry border in an Essex garden[190]. Hybridizes freely with other members of this genus[200]. Tolerant of pruning, plants can be cut back into old wood if required[188]. Closely related to H. 'Carnea' [200]. This species is very easy to transplant and, with care, it can even be moved when in flower. Plants in this genus are notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a 'clumping' habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

## 6.2.712 Veratrum nigrum

Black Hellebore

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Veratrum nigrum is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and

semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Succeeds in any fertile well-drained soil in a sunny position[233]. Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1, 233]. Succeeds in acid as well as alkaline soils[200]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

## 6.2.764 Erysimum capitatum

Coastal Wallflower, Sanddune wallflower, Contra Costa wallflower, San Luis Obispo wallflower, Pursh' 5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctcup hwicii hvishrasjlutnyik hpa7tli priklwis

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli priklw hpa7tmwatli xre7t hjonli

drutta Erysimum capitatum is a BIENNIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Antirheumatic Odontalgic Poultice SkinA preventative against sun burn, the plant was ground up then mixed with water and applied to the skin[213]. It relieves the pain caused by overexposure to heat[155]. A poultice of the whole pounded plant has been applied to open fresh wounds and rheumatic joints[257]. An infusion of the whole plant has been used as a wash on aching muscles[257]. The crushed leaves have been sniffed as a treatment for headaches[257]. A poultice of the warmed root has been applied to treat the pain of toothache[257]. An infusion of the crushed seed has been drunk and used externally in the treatment of stomach or bowel cramps[257].

nrakta Western N. America - British Columbia to Indiana, south to Texas and California. ksacta Found in many habitats from southern British Columbia to California at 750 - 3600 metres[155]. Open dry flats and hillsides, from the lowest valleys to about 3,000 metres in the mountains[212].

propta Seed - sow spring in an outdoor seedbed. Germination usually takes place within 3 weeks. Plant the seedlings into their permanent positions when they are large enough to handle. If seed is in short supply, it can be sown in spring in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer.

nwatta Requires a well-drained soil and a sunny position[200]. Dislikes acid soils[200]. Tolerates poor soils[200]. Grows well on a sunny wall and is indeed longer lived in such a position[166]. A polymorphic species[155], it is possibly a form of E. asperum[1].

## 6.2.765 Senecio erucifolius

Hoary Groundsel, Hoary ragwort 5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Senecio erucifolius is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy (clay) soils, prefers well-drained soil and can grow in heavy (clay) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous to many mammals, including humans. The toxin affects the liver and has a cumulative affect[9, 65]. Some mammals, such as rabbits, do not seem to be harmed by the plant, and will often seek it out[4]. Various birds also eat the leaves and seeds[4].

dwatta Anthelmintic Antiscorbutic Diaphoretic Diuretic Emmenagogue Poultice PurgativeThe plant is used in plasters, ointments and poultices[4]. This species is related to groundsel, S. vulgaris, and is said to have similar properties[4]. These are: The whole herb is anthelmintic, antiscorbutic, diaphoretic, diuretic, emmenagogue and purgative[4, 9, 21, 54]. It is often used as a poultice and is said to be useful in treating sickness of the stomach, whilst a weak infusion is used as a simple and easy purgative[4]. The plant can be harvested in May and dried for later use, or the fresh juice can be extracted and used as required[4]. Use with caution[21], see notes above on toxicity.

nrakta Central and southern Europe, including Britain, north to Denmark and Lithuania, east to W. Asia.. ksacta Dry banks, field borders, grassy slopes and roadsides, in limestone and chalky districts and especially on heavy soils[4, 17]

propta Seed - sow spring in situ. Division in spring, nwatta We have very little information on the cultivation needs of this plant but, judging by its native habitats, it is likely to require a sunny position and to succeed in most moderate to heavy soils, including those of an alkaline nature[K]

#### 6.2.766 Dianthus chinensis

Chinese Pink, Rainbow pink, Annual Pink, China Pink 5 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 0.7 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Dianthus chinensis is a PERENNIAL growing to 0.7 m (2ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterfies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Anthelmintic Antibacterial Antiphlogistic Diaphoretic Diuretic Emmenagoue Febrifuge Haemostatic Ophthalmic Tonic UrinaryThe Chinese pink has been used for over 2,000 years in Chinese herbal medicine[238]. The whole plant is a bitter tonic herb that stimulates the digestive and urinary systems and also the bowels[238]. It is also anthelmintic, antibacterial, antiphlogistic, diaphoretic, diuretic, emmenagogue, febrifuge and haemostatic[218, 238, 279]. It is used internally in the treatment of acute urinary tract infections (especially cystitis), urinary stones, constipation and failure to menstruate[238]. It is used externally to treat skin inflammations and swellings[238]. The old leaves are crushed and used for clearing the eyesight[218]. The plants are harvested just before the flowers open and are dried for later use[238].

nrakta E. Asia - China. ksacta A wide variety of habitats including sandy forest margins, dry hillsides and summits, forest and hillside grasslands, scrub on mountain slopes, rocky ravines, meadows and streamsides[266].

propta Seed - sow May/June in a cold frame. The seed usually germinates in 2 - 3 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer or autumn[1]. The seed can also be sown thinly in an outdoor seedbed in late spring, the young plants being planted out in late spring or the autumn1]. Cuttings of half-ripe shoots, July in a frame[1]. Division in September[1]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden. Prefers a rich well-drained loamy neutral to alkaline soil in a sunny position[1, 238], but succeeds in most soils including dry ones[1]. A very ornamental plant[1], it is usually biennial in habit, but can

propta Root Division, Seeds, Softwood Cuttings. Seed sown in spring or fall, cuttings, and root division are methods of propagation.

nwatta An herbaceous creeping annual or perennial plant. Prefers full to partial sun and mesic (requiring a moderate amount of moisture) to dry conditions. The soil can contain rocky material, gravel, sand, loam, or clay-loam. Avoid wet, poorly drained soils. Bloom Time: May to August. Bloom Description: Rose-pink to rose-purple. Flower: Showy. Purple flowers in the spring, which can persist until fall. Tolerate: Drought, Dry Soil, Shallow-Rocky Soil. May be grown as an annual throughout the normal range for the species, and in particular in the northern parts of USDA Zone 5 where it is not reliably winter hardy and appreciates some winter protection [1-6]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

#### 6.2.761 Lysimachia nemorum

Yellow Pimpernel

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lysimachia nemorum is an evergreen Perennial growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta AstringentAn astringent herb, yellow pimpernel is used as a wound herb to staunch bleeding[254].

nrakta Western and central Europe, including Britain from Norway to Spain, east to the Carpathians. ksacta Woods and shady hedgebanks[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Basal cuttings. March to April in a cold frame. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the

nwatta An easily grown plant, succeeding in a moist or wet loamy soil in sun or partial shade[200]. Hardy to at least -25°c[187]. Most species in this genus seem to be immune to the predations of rabbits[233].

#### 6.2.762 Jeffersonia diphylla

Twinleaf, Rheumatism Root

5 tlin 8 cyuc 0 kcak 0 tcan 2 dwat 0.2 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta leffersonia diphylla is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

dwatta Antispasmodic Cancer Diuretic Emetic Expectorant Poultice Tonic UrinaryThe whole plant is antispasmodic, diuretic, emetic, expectorant and tonic[21, 46, 218, 222]. An infusion is used in the treatment of diarrhoea, dropsy, gravel and urinary problems[257]. The root is emetic in large doses and expectorant in smaller doses[207]. The root contains

berberine, which has been shown to have anti-tumour activity[218]. A poultice of the plant is applied to sores, ulcers and inflamed parts[257].

nrakta Eastern N. America - New York and Ontario to Alabama and west to Wisconsin. ksacta Very rare in the wild, it is found in limestone soils and rich woods near rivers[43,

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Sow stored seed as soon as possible in late winter or the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early

nwatta Landscape Uses:Rock garden, Woodland garden. Prefers a light sandy, peaty or humus-rich woodland soil and a rather shady situation[1, 130, 280]. Suitable for a choice position in a cool leafy soil[187]. Plants are hardy to at least -20°c[187]. A slow-growing plant[188]. Plants have an extensive root system and resent disturbance[188]. They should be pot-grown and planted into their permanent positions as soon as possible. Special Features: North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 7 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

## 6.2.763 Clematis douglasii

Hairy Clematis

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Clematis douglasii is a deciduous Perennial growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

tcanta Insulation Miscellany TinderThe seed floss makes an excellent tinder for starting fires, a spark from a flint will quickly ignite it[212]. The seed floss can be used as an insulation in shoes etc[212]

dwatta MiscellanyA decoction of the leaves has been used to treat headaches[257]. The root has been used in the treatment of congested nose pain[257].

nrakta Western N. America - British Columbia to Washington, east to Montana and Wyoming. ksacta Moist open areas of plains, hills and woods, up to 2,500 metres[212].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to

basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are highly poisonous[178,

tcanta InsecticideThe dried and powdered root is used as an insecticide and a parasiticide[172]. It is also effective against caterpillars and mammals so great caution is advised[1, 19, 20].

dwatta Analgesic Anthelmintic Emetic Errhine Expectorant Laxative VermifugeThe root is anthelmintic, emetic, errhine, expectorant, laxative and vermifuge[178, 218]. This herb is highly toxic and should not be used internally, or even externally, without expert guidance[K]. The whole plant is analgesic[218].

nrakta S. Europe to E. Asia. ksacta Dry glades and water meadows, mountain slopes, scrub and rarely in broad-leaved woods in Siberia[74].

propta Unless stored in damp sand at around 4°c the seed has a short viability[200]. Where possible it is best to sow the seed in a lightly shaded position in the greenhouse as soon as it is ripe[200]. Stored seed needs to be stratified but can be very slow to germinate. Germination can be erratic even for seed sown when it was fresh it usually takes place within 3 - 12 months at 15°c but can be much longer[200]. The plant produces just one seedleaf in its first year, this forms an over-wintering bulb. It takes up to 10 years for the plant to reach maturity[200]. Sow the seed thinly so there is no need to thin or transplant them, and grow the seedlings on undisturbed in the pot for their first two years of growth. Apply a liquid feed at intervals through the growing season to ensure the plants do not become nutrient deficient. At the end of the second year plant out the dormant plants into individual pots and grow them on in light shade in the greenhouse for a further year or two before planting them out into their permanent positions in late spring or early summer. Division in March/April or in October. Establish the plants in pots in a shaded frame before planting them out[200]. Division is best carried out in the autumn because the plants come into growth very early in the spring[233]. Root cuttings, 6mm long with a bud, rooted in a sandy soil in a cold frame[200].

nwatta Requires a deep fertile moisture retentive humus-rich soil[200]. Succeeds in full sun if the soil does not dry out but prefers a position in semi-shade[200]. Dislikes dry soils[42]. Grows best in a cool woodland garden or a north facing border[42]. Plants are hardy to about -25°c[187], especially if they are given a protective mulch in the winter. The flowers smell of rotten fruit and are visited by flies[187]. Members of this genus are rarely if ever troubled by browsing deer[233]. Plants are long-lived and can be left in the same position for years without attention[233].

#### 6.2.713 Phoradendron leucarpum

False Mistletoe, Oak mistletoe 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Phoradendron leucarpum is an evergreen Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to April, and the seeds ripen from November to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There are recorded cases of the berries poisoning people[213]. Contact with the plant can cause dermatitis in some people[222].

dwatta Abortifacient Contraceptive OxytoxicA tea made from the leaves is said to procure abortions and also to prevent conception[213]. It causes an increase in uterine contractions and helps to stop bleeding after parturition[213]. When injected into the blood it increases blood pressure[213].

nrakta N. America - New Jersey to Florida, west to Illinois and Texas. ksacta A parasite growing on deciduous

trees, especially Acer rubrum and Nyssa spp[235].

propta This is a parasitic plant that grows entirely on the host tree. To grow it you need to obtain berries and squash them onto the branches of host trees in late autumn and early winter[11]. This is best done on the lower side of the branch[1]. It is then simply a matter of waiting and hop-

nwatta A parasitic plant, growing on the branches of several deciduous species of trees. It has a wide range of hosts. though it is usually only found on one species in any given area[200]. The host tree must be at least 20 years old[200]. This species is seldom cultivated since it can severely weaken its host[200].

#### 6.2.714 Helianthemum nummularium

Common Rockrose, Sun Rose, Rock Rose 5 tlin 8 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hna7tmwatli fyifxre7t hionli

drutta Helianthemum nummularium is an evergreen Shrub growing to 0.5 m (1ft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta A prostrate growing plant, it can be used as a ground cover[11].

dwatta BachThe plant is used in Bach flower remedies the keywords for prescribing it are 'Terror', 'Panic' and 'Extreme fright'[209]. It is also one of the five ingredients in the 'Rescue remedy'[209].

nrakta Europe, including Britain, south and east to Spain and Iran in W. Asia. ksacta Basic grassland and scrub, to 600 metres[17]

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 6 - 8cm with a heel, late summer in a sandy soil in a frame[200].

nwatta Landscape Uses:Alpine garden, Border, Ground cover, Rock garden, Specimen, Requires an open sunny position in a light well-drained soil with a pH between 5.5 and 8[200]. Plants are hardy to at least -10°c[200]. A vigorous plant suitable for the rock garden, crevices in walls or gravel beds[200]. Plants are short-lived, though, soon becoming leggy or sparse, and require fairly frequent replacement[200]. The flowers only open in bright sunshine[200]. Plants resent root disturbance and should be placed in their permanent positions as soon as possible[200]. A polymorphic species[11], there are some named forms that have been selected for their ornamental value[200]. Plants are generally pest and disease-free[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Attracts butterflies.

#### 6.2.715 Geranium robertianum

Herb Robert, Robert geranium

5 tlin 9 cyuc 0 kcak 2 tcan 2 dwat 0.4 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Geranium robertianum is a ANNUAL/BIENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insect. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Dye RepellentFreshly picked leaves are rubbed on the body to repel mosquitoes[53]. They impart their own peculiar odour. A brown dye is obtained from the whole plant[168].

dwatta Antidiarrhoeal Antirheumatic Astringent Diuretic Homeopathy VulneraryHerb Robert is little used in modern herbalism, but is occasionally employed as an astringent to halt bleeding, treat diarrhoea etc in much the same way as G. maculatum[254]. The leaves are antirheumatic, astringent, mildly diuretic and vulnerary [7, 9, 21, 222, 238]. Modern research has shown that the leaves can lower blood sugar levels and so it can be useful in the treatment of diabetes[244]. An infusion of the leaves is used in the treatment of bleeding, stomach ailments, kidney infections, jaundice etc[222]. Externally, a wash or poultice is applied to swollen and painful breasts[222], rheumatic joints[7], bruises, bleeding etc[9]. It is best to use the entire plant, including the roots[9]. The plant can be harvested at any time from late spring to early autumn and is usually used fresh[9, 238]. A homeopathic remedy is made from the plant[9]. Details of uses are not given in this report[K].

nrakta Europe, including Britain, from Scandanavia to N. Africa, east to Japan and the Himalayas ksacta Moist shady positions in undergrowth[7], rocks and walls, hedge banks, roadsides and waste places[9].

propta Seed - sow spring in situ.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200], succeeding in dry soils[238]. Grows well on woodland edges[24]. The whole plant has an unpleasant aroma[244]. The foxy smell is particularly pronounced after rain[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

#### 6.2.716 Adonis aestivalis

Pheasant's Eye, Summer pheasant's eye 5 tiin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Adonis aestivalis is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista A toxic principle is present in very small quantities in the plant[13, 19, 65]. It is poorly absorbed so poisoning is unlikely[65]. The plant is poisonous to horses[240].

dwatta Cardiotonic Diuretic Laxative LithontripicThe plant is a cardiotonic, diuretic and stimulant[13, 46, 61]. Some caution is advised in the use of this remedy, see the notes above on toxicity. The flowers are considered to be diuretic, laxative and lithontripic[240].

nrakta S. Europe, N. Africa. ksacta Cornfields, usually on calcareous soils.

propta Seed - best sown in situ as soon as it is ripe in the autumn[1], though it can also be sown in situ in the spring[134].

nwatta Grows well in ordinary garden soil[1]. Prefers a moist well-drained soil in sun or semi-shade[200]. A greedy plant inhibiting the growth of nearby plants, especially lequmes[54]. Very closely related to A. annua[200].

## 6.2.717 Eryngium planum

Plains eryngo, Blue Cap, Eringoe, Eryngo, Flat Sea Holly 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.7 m hkuc htut cyutli hgatkyuctcup hwicii hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Eryngium planum is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4. It in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both

male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

dwatta DiureticThe plant is diuretic[61]. It is used in the treatment of whooping cough[238].

nrakta E. Europe through Russia to central and southwestern Asia. ksacta Dry soils in E. Europe[50]. Locally common in orchards and cultivated areas in Kashmir at 1700 metres[145]. A weed of disturbed habitats at 500 - 1500 metres in Tibet/2661

propta Seed - best sown as soon as it is ripe in early autumn on the surface of a well-drained compost in a cold frame[200]. The seed can also be sown in spring. It usually germinates in 5 - 90 days at 20°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring or autumn. Take care since the plant resents root disturbance[200]. Root cuttings in autumn or winter[200].

nwatta Landscape Uses:Border, Rock garden, Seashore, Specimen. Requires a well-drained soil and a sunny position[1]. Prefers a light sandy soil but tolerates most soil types including lime and poor gravels[200]. When grown in soils that are too rich the stems will need staking before they flop[187]. Established plants are drought tolerant[190]. Plants are hardy to about -25°c[187]. Plants should be put in their final position whilst small since they resent root disturbance[200]. A very ornamental plant[1], there are some named varieties[233]. A good bee plant. Special Features:Not North American native, Naturalizing, Suitable for cut flowers, Suitable for dried flowers, Extended bloom season in Zones 9A and above, Attractive flowers or blooms.

## 6.2.718 Chrysogonum virginianum

Golden-knee, Green and Gold, or Goldenstar 5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.2 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Chrysogonum virginianum is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta C. virginianum spreads slowly via stolons to form a groundcover. Wildlife Habitat: A host wildlife such as reptiles, mammals, and songbirds. Insectary: The flowers provide nectar to pollinators. Ornamental Green and Gold is often planted ornamentally for its light green triangular foliages and golden star-shaped flowers. There are a number of named cultivars selected for ornamental properties[318-1].

nrakta Native to the eastern United States from New York to Florida and Louisiana. ksacta Native to woodland areas from Pennsylvania to Florida and Louisiana in moist well drained soils in part sun or part shade often growing as a natural groundcover.[368-1]. Indigenous to mesic to dry woodlands and open rocky woodlands. Plants are more likely to be found in forest edges and clearings with bright filtered light rather than in densely shaded interiors.

propta Easily grown from seed and may self-seed in the garden.

nwatta A low growing herbaceous perennial with starry golden daisy-like flowers native to the USA. Easily grown in average, medium moisture, well-drained soils in part shade to full shade. Prefers moist, acidic, organically rich soils in sun-dappled part shade. Tolerates full sun only if grown in consistently moist soils. Spreads by rhizomes to form an attractive ground cover, but is easily controlled[368-1]. Growth Rate: Moderate to Fast. Stand Persistence: Long. Form: Spreading, Texture: Medium. Sun: Full Sun, Partial

nwatta Requires a warm sunny position in a moderately fertile well-drained soil[1, 200]. Prefers a neutral to alkaline soil and also succeeds in partial shade[238]. Plants are hardy to at least -15°c[238]. This species is cultivated in Japan[46] (as a dve plant?).

## 6.2.757 Dryopteris oreades

Mountain Male Fern

5 tlin 9 cyuc 0 kcak 0 tcan 4 dwat 0.6 m hkuc

hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Dryopteris oreades is a FERN growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. The seeds ripen from July to September. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caution is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised.

dwatta AnthelminticThe root contains 'filicin', a substance that paralyses tapeworms and other internal parasites and has been used as a worm expellent[4, 172, 238]. It is one of the most effective treatments known for tapeworms its use should be immediately followed by a non-oily purgative such as magnesium sulphate in order to expel the worms from the body[238]. An oily purge, such as caster oil, increases the absorption of the fenr not and can be dangerous[238]. The root is harvested in the autumn and can be dried for later use, it should not be stored for longer than 12 months[238]. This remedy should be used with caution and only under the supervision of a qualified practitioner[238]. The root is toxic and the dosage is critical[238]. See also the notes above on toxicity. The root is also used in the treatment of dandruff 4. 1721.

nrakta Western and central Europe, including Britain. ksacta Rocky places on mountains, in open or slight shade, scree slopes.

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at 20°c. Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant[233], it prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position[175, 200]. Prefers a moist soil[188], but is drought tolerant when well established[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 6.2.758 Ageratina occidentalis

Western Snakeroot

hpa7tmwatli fyifxre7t hjonli

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

drutta Ageratina occidentalis is a PERENNIAL growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta AntirheumaticThe plant is used externally in the treatment of rheumatism and swellings[254, 257].

nrakta Western N. America. ksacta Yellow Pine Forest, Red Fir Forest, Lodgepole Forest, Redwood Forest and Douglas-Fir Forest at elevations of 1900 - 3300 metres in California[276].

propta Seed - sow spring in a cold frame, only just covering the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring.

nwatta Succeeds in an ordinary well-drained but moisture retentive garden soil in sun or part shade[200].

## 6.2.759 Pinellia tripartita

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pinellia tripartita is a CORM growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have no record of toxicity for this species, all parts of the plant probably contain calcium oxylate. This is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it[K]. However, calcium oxylate is easily destroyed by thoroughly cooking or drying the plant[172].

dwatta Antiemetic Antitussive Cardiotonic Diuretic ExpectorantThe root is antiemetic, antitussive, cardiotonic, diuretic, expectorant[218].

nrakta E. Asia - S. Japan. ksacta Not known

propta Seed - we have no information but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division as new growth begins in spring. Bulbils from the leaf axils.

nwatta Easily grown in a rich soil, it requires plenty of water in the growing season[1]. Succeeds in full sun or partial shade[188]. Plants can be naturalized in woodland[1]. Plants produce bulbils in their leaf axils[188].

#### 6.2.760 Glandularia canadensis

Rose Verbena

5 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Glandularia canadensis is a PERENNIAL growing to  $0.3~\mathrm{m}$  (1ft) by  $0.4~\mathrm{m}$  (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known kcakta None Known

tcanta A medium density groundcover. Nectary: provides nectar or pollen for beneficial insects [1-2]. Garden Uses include rock gardens or border fronts. Spreads to form an attractive ground cover with a long and floriferous summer bloom. Edging. Containers. Hanging baskets [368-1]. Both the flowers and foliage are fragrant. Landscape restoration

nrakta Native to the eastern and south-central areas of the United States. ksacta Mesic to dry black soil prairies, sand prairies, hill prairies, pioneer cemeteries, thinly wooded slopes, openings in rocky upland woodlands, thinly wooded bluffs, limestone and sandstone glades, pastures, abandoned fields, and roadside embankments [1-6].

Spain as an antiscorbutic[240]. The seeds are used in the treatment of fevers[240].

nrakta Central and Southern Europe. A casual in Britain. ksacta A weed of cultivated ground[200]. Railrads and roadsides, in various soils[274].

propta Seed - sow spring in situ[200]. Germination should take place within 3 weeks. The flowering season can be extended by making a succession of sowings from spring to early summer[200]. An autumn sowing should overwinter in many parts of the country and would provide flowering plants in the spring.

nwatta Requires a position in full sun in a well-drained approximately neutral soil[200]. Acid soils should be given some lime[200]. Plants are generally tolerant of poor soils[200].

#### 6.2.754 Senecio viscosus

Sticky Groundsel, Sticky ragwort

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.4 m hkuc

htut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Senecio viscosus is a ANNUAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime

pcista All parts of the plant are poisonous to many mammals, including humans. The toxin affects the liver and has a cumulative affect[9, 65]. Some mammals, such as rabbits, do not seem to be harmed by the plant, and will often seek it out[4]. Various birds also eat the leaves and seeds[4].

dwatta Carminative EmeticThe leaves are carminative and emetic[4].

nrakta Europe, including Britain, south and east from Scandanavia to Spain and W. Asia. ksacta Dry banks of ditches, dry waste ground, railway banks and tracks, sea shores[4, 17].

propta Seed - sow spring in situ.

nwatta See the plants native habitat for ideas on its cultivation needs. The plant has an unpleasant odour[4].

### 6.2.755 Aristolochia clematitis

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.7 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Aristolochia clematitis is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from May to November, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista The root and stem are poisonous[19]. The plant contains aristolochic acid, this has received rather mixed reports on its toxicity. According to one report aristolochic acid stimulates white blood cell activity and speeds the healing of wounds, but is also carcinogenic and damaging to the kidneys[254]. Another report says that it is an active antitumour agent but is too toxic for clinical use[218]. Another report says that aristolochic acid has anti-cancer properties and can be used in conjunction with chemotherapy and radiotherapy and that it also increases the cellular immunity and phagocytosis function of the phagocytic cells[176].

dwatta Abortifacient Antiinflammatory Antispasmodic Diaphoretic Eczema Emmenagogue Febrifuge Oxytoxic StimulantBirthwort has a very long history of medicinal use,

dwatta Antiscorbutic FebrifugeThe plant is used in though it has been little researched scientifically and is little used by present-day herbalists[254, 268]. It is an aromatic tonic herb that stimulates the uterus, reduces inflammation, controls bacterial infections and promotes healing[238]. The juice from the stems was used to induce childbirth[268]. The plant contains aristolochic acid which, whilst stimulating white blood cell activity and speeding the healing of wounds, is also carcinogenic and damaging to the kidnevs[254]. The flowering herb, with or without the root, is abortifacient, anti-inflammatory, antispasmodic, diaphoretic, emmenagogue, febrifuge, oxytocic and stimulant[7, 9, 21, 100, 2001. Another report says that the root is used on its own[238] whilst a third says that either the fresh flowering herb or the dried rootstock can be used[268]. The plant should not be used internally without experienced supervision, externally it is used in the treatment of slow-healing cuts, eczema, infected toe and finger nails etc[9]. Use with caution, internal consumption can cause damage to the kidneys and uterine bleeding[7, 9, 21]. It should not be used by pregnant women[238].

nrakta E. and S.E. Europe. Naturalized in Britain[17]. ksacta Waste ground, gardens, orchards etc[9].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Pre-soak stored seed for 48 hours in hand-hot water and surface sow in a greenhouse[134]. Germination usually takes place within 1 - 3 months at 20°c[134]. Stored seed germinates better if it is given 3 months cold stratification at 5°c[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer after the last expected frosts. Division in autumn[200]. Root cuttings in winter[200].

nwatta Prefers a well-drained loamy soil, rich in organic matter, in sun or semi-shade[1, 134]. Succeeds in ordinary garden soil[134]. The plant has an invasive root system[233]. Most species in this genus have malodorous flowers, often smelling like decaying flesh[245], that are pollinated by flies[200]. The insects that pollinate this plant become trapped in the hairy throat of the flower[233]. Birthwort was formerly cultivated as a medicinal plant in most of Europe[50].

## 6.2.756 Lithospermum erythrorhizon

Lithospermum

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.7 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lithospermum erythrorhizon is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta DyeA purple dye is obtained from the root[46, 61, 218]. It is harvested in the spring[178]. It is much liked but the colour is fugitive and production costs high[174].

dwatta Antitumor Contraceptive Depurative Eczema Febrifuge SalveAll parts of the plant are antitumor, cardiotonic, contraceptive, depurative and febrifuge[147, 174, 176, 218, 238]. It is used internally in the treatment of irritant skin conditions, measles, chicken pox, boils, carbuncles, hepatitis and skin cancer[238]. Externally it is used to treat nappy rash, burns, cuts, wounds, abscesses, eczema and haemorrhoids[147, 174, 176, 218, 238]. The plant is an ingredient of commercial skin care creams[238]. The plants are harvested when in flower, the roots in the autumn[238]. They are dried for later use[238].

nrakta E. Asia - Eastern China, Japan and Korea. ksacta Grassy slopes in mountains and hills all over Japan [58].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings. Division in the autumn[238].

Shade. Soil Type: Sandy, Loamy, Silty, Clay. Soil Moisture: Moderate. Root Type: Stolon, Fibrous Shallow. Bacteria-Fungal Ratio: 10:1-100:1. Seasonal Interest: Spring-Fall. In the US it grows more upright in northern climates and more prostrate in southern climates. Recommended to naturalize in rain gardens. Best in well-drained soils. Blooms sparsely during the heat of summer. Fruit Type: Achene. Flower Color: Yellow. Soil pH preference: 6.0 - 6.8. Drought: Moderate. Flood: Tolerant. Salt: Intolerant. Soil Compaction: Intolerant. Cold Injury: Moderate. Wind Storm Damage: Infrequent. Disease Issues: Minor. Insect/Pest Damage: Minor, Animal Damage: Deer, Rabbits, Growing Season: Bloom Time: Spring - Fall. Fruit Time: Spring - Fall [318-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc., and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. An evergreen. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]. Used in the Beach Plum Tree Guild: (Polycultures: Permaculture Activist Magazine Februa ary 2013, Eric Toensmeier.) Beach Plum (Prunus maritima) This fruiting shrub can grow to over 12 feet (4 meters) and produces small, delicious plums. Niche: deciduous shrub. Habitat: average water needs, Full to partial sun, Prefered soil types UNKNOWN (assume loamy soil is good?). Notable Products: Edible fruit, Green and Gold (Chrysogonum virginianum) This is a beautiful groundcover that attracts beneficial insects and can grown in partial shade and moist soils. Niche: Ground cover. Habitat: Requires consistently moist soil that drain, Full sun to partial shade, Notable Products: Nectar. Dwarf Coreopsis (Coreopsis auriculata nana) This is another beautiful groundcover that attracts beneficial insects. Niche: Herbaceous perennial. Habitat: Full sun, medium water needs, said to be native to open woods in South Eastern US, so it probably can survive in a variety of soil types. Notable Products: Nectar, pollen. Ramps (Allium tricoccum) a.k.a. Wild Leeks, are early Spring vegetables and grows well in the shade. Niche: Herbaceous perennial. Habitat: Shaded woodlands, average water needs, preferes wet and acid soils. Tolerats juglone. Notable Products: Edible leaves and bulbs. Camas (Camassia quamash) has edible bulbs and has flowers that attract beneficial insects. Niche: Small Herbaceous Plant, Habitat: Full sun to light shade. prefers moist soil, pH: 5.1-7.5 (tolerates a wide range of soil conditions). Notable Products: Nectar, pollen, edible bulb. Notes: This is a polyculture with flowering plum and ground cover, edible Spring vegetables, and edible Camas bulbs.

#### 6.2.719 Gentiana andrewsii

Closed Bottle Gentian, Dakota gentian 5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana andrewsii is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clav) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antidote Appetizer Bitter Digestive Ophthalmic Poultice Stomachic TonicThe root is said to be an antidote to snakebites[61, 254]. An infusion of the roots has been used as a wash and also taken internally in the treatment of pain and headaches[257]. An infusion of the roots has been used as drops for sore eyes[257]. This N. American species has medicinal properties practically identical with the European gentians[4]. The following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal proper-

nrakta Eastern N. America - Quebec to Manitoba, Georgia and Nebraska. ksacta Meadows, damp prairies and low thickets[43].

propta Seed - best sown in early January in a light position in a cold frame[239]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay nots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200] 239]. Most species will grow well in the rock garden[200]. This species is fairly easy to grow, succeeding in most humusrich soils[239]. It tolerates more shade (but not full shade) than most members of the genus, growing well in a woodland garden[200, 239]. Plants are intolerant of root disturbance[200]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1].

#### 6.2.720 Gentiana puberulenta

Downy gentian

5 tlin 9 cvuc 0 kcak 0 tcan 3 dwat 0.4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Gentiana puberulenta is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antidote Appetizer Bitter Digestive Stomachic TonicThe root is said to be an antidote to snakebites[61]. This N. American species has medicinal properties practically identical with the European gentians[4]. The following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter com-

pounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal proper-

nrakta Central N. America - Manitoba to Ontario, south to Kansas and Arkansas. ksacta Prairies and other grassy places[200, 239].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept. in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species requires a fairly dry site with good drainage[239]. Plants are intolerant of root disturbance[200]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. This species is closely related to G. affinis[239].

## 6.2.721 Iris sanguinea

Blood iris

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Iris sanguinea is a PERENNIAL growing to 0.8 m (2ft 7in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in June, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Many plants in this genus are thought to be poisonous if ingested, so caution is advised[65]. The roots are especially likely to be toxic[238]. Plants can cause skin irritations and allergies in some people[238].

tcanta InsecticideAn insecticide is obtained from the plant[218], (from the root?)

dwatta ExpectorantExpectorant[218].

nrakta E. Asia - Korea, Japan. ksacta Damp meadows, sunny pond banks, mountain stream banks and hillsides around 500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be sown as early in the year as possible in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in August/September after flowering but can also be done in April. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, it prefers a humus-rich soil[79, 200], succeeding in a moist border or by water[42, 79]. Grows well in heavy clay soils. Plants are very cold tolerant, but they can be damaged when dormant if the soil is to moist[79]. A very ornamental plant, there are some named varieties[200]. Plant the bulbs out very shallowly[79]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

## 6.2.722 Globularia vulgaris

5 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Globularia vulgaris is an evergreen Perennial growing to 0.2 m (oft 8in). See above for USDA hardiness, It is hardy to UK zone 6. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Anthelminitic Laxative StimulantThe leaves are antirheumatic, laxative and stimulant[7]. The plant is a mild laxative, but it also has a beneficial effect on the stomach and is therefore preferable to many other laxatives[7].

nrakta Western Europe in Sweden, France and Spain. ksacta Dry calcareous soils[7].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Cuttings of semi-ripe wood, June/July in a cold frame[200].

nwatta Requires a gritty well-drained circumneutral or slightly alkaline soil in full sun[200]. Grows well in a dry sunny position in the rock garden[200].

## 6.2.723 Helleborus viridis

Green Hellebore

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc

hmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Helleborus viridis is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) begins in flower from the species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are poisonous[9, 10, 65], this poison can possibly be absorbed through the skin[76].

tcanta ParasiticideA decoction of the roots is used as a parasiticide against body lice, fleas etc[76, 213]. This use is somewhat dangerous, see the notes above on toxicity. Plants

that controls bacterial and viral infections, relaxes spasms, lowers fevers and stimulates the circulation[238]. It is one of the most frequently used herbs in prescriptions for the treatment of diabetes mellitus[218]. The root is analgesic locally anaesthetic, antibacterial, antidote, antipyretic, bitter, blood tonic, carminative, cholagogue, digestive, sedative, stomachic, tonic and vasodilator [46, 61, 147, 176]. It is particularly helpful in the treatment of diarrhoea, acute enteritis and dysentery, whilst it is also used in the treatment of insomnia, fidget, delirium due to high fever, leukaemia and otitis media[176]. Externally it is used to treat various skin problems such as acne, boils, abscesses and burns whilst it is also used as a gargle for mouth and tongue ulcers, swollen gums and toothache[254]. As an eyewash it is used to treat conjunctivitis[254]. The root is harvested in the autumn and used fresh or dried[238].

nrakta E. Asia - China. ksacta Damp coniferous woods and bogs[238]. Forests, shaded places in valleys at elevations of 500 - 2000 metres[266].

propta Seed - best sown in a greenhouse as soon as it is ripe in an ericaceous compost [64]. Seal the pot in a polythene bag until germination takes place, which is usually within 1- 6 months at  $10^{\circ}\text{c}[164]$ . Stored seed should be sown as early in the year as possible. Four weeks cold stratification may be beneficial[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a shady part of the greenhouse for at least their first winter. Plant them out in mid-autumn or in spring. Division in spring[200].

nwatta Succeeds in a light moist humus-rich slightly acidic soil with a northerly aspect or light shade[1, 200]. Plants are hardy to at least -15°c[238].

## 6.2.750 Asplenium adiantum

Black Spleenwort

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Asplenium adiantum-nigrum is an evergreen Fern growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, and the seeds ripen from June to October. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

tcanta HairA decoction of the herb is a good hair wash[17]

dwatta Bitter Contraceptive Diuretic Emmenagogue Expectorant Laxative Ophthalmic PectoralThe plant is bitter, diuretic, laxative and ophthalmic[240]. It is taken internally to treat diseases of the spleen, jaundice and ophthalmia[240]. It is said to produce sterility in women[240]. A decoction or syrup made from the fronds is emmenagogue, expectorant and pectoral[240]. It is used to relieve troublesome coughs[4].

nrakta Most of Europe south of the Faroes, including Britain, to the Himalayas, N. and S. Africa. ksacta Rocky woods, hedgebanks, shady walls and rocks[17].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Germinates in spring[1]. Spring sown spores germinate in 1- 3 months at  $15\,^\circ$ c[134]. Pot on small clumps of plantlets as soon as they are large enough to handle and grow them on in light shade in a cold frame or greenhouse. Keep them humid until they are well established. When they are at least  $15\mathrm{cm}$  tall, plant them out into their permanent positions in late spring or early summer.

nwatta Requires a partly shaded site with preferably less than 3 hours sunshine daily[200]. Plants can be grown in old

brick walls[219]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 6.2.751 Ajuga australis

Australian Bugle

5 tlin 9 cyuc 0 kcak 3 tcan 1 dwat 0.2 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ajuga australis is an evergreen Perennial growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Plants can be used for ground cover[200].

dwatta SalveThe leaves are used as a salve for wounds[238] and also in the treatment of boils and sores[152, 238].

nrakta E. Australia - New South Wales, Tasmania and Victoria. ksacta Most habitats, especially in open forests, in sandy soils in the montane zone[152, 154].

propta Seed - sow spring or autumn in the open border[1]. Division in spring.

nwatta Prefers a humus-rich, moisture retentive soil and a sunny position[200]. Easily grown in the rock garden[1], it spreads rapidly by root suckers[157].

## 6.2.752 Semiaguilegia adoxoides

m. ...

5 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Semiaquilegia adoxoides is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Depurative Diuretic Febrifuge Skin UrinaryThe root is specifically recommended in the treatment of dry scabby skin and urinary disorders[218]. The tubers are depurative, diuretic and febrifuge[218].

nrakta E. Asia - China, Japan, Korea. ksacta Mountains, C. and S. Japan[58]. Damp and shady waste places in China[147]. Forests and roadsides at elevations of 100 - 1100 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. It can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

iwatta Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sunny position[1]. Intolerant of heavy clay[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 6.2.753 Erysimum repandum

Bushy Wallflower, Spreading wallflower 5 tiin 9 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Erysimum repandum is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

2 - 3 weeks. Sow stored seed in late winter in a cold frame. Germination takes about 1 - 6 months at 15°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in the spring. Root cuttings, 4cm long taken in early winter, potted up in a mixture of peat and sand[175]. They can also be taken in July/August, planted vertically in pots in a greenhouse or frame

nwatta Requires a well-drained humus-rich gritty soil and a sunny position[200]. Tolerant of alkaline soils[200]. This species is closely related to P. cernua[200]. Large plants have a deep woody rootstock and transplant badly[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

## 6.2.747 Asplenium ruta

Wall Rue, Lance asplenium 5 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 0.1 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli lwisslip hpa7tmwatli

drutta Asplenium ruta-muraria is an evergreen Fern growing to 0.1 m (0ft 4in) by 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, and the seeds ripen from July to October. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

dwatta Astringent Deobstruent Emmenagogue Expectorant OphthalmicThe fronds are astringent, deobstruent, emmenagogue, expectorant and ophthalmic[4, 7, 240]. A distilled water made from the fronds has proved of benefit in the treatment of many eye complaints [7]. The plant is also considered to be useful in the treatment of coughs and ruptures in children[4]. It was at one time used as a herbal remedy for rickets[219] and its tannin content renders it suitable for stopping bleeding from small wounds[7]. The fronds are harvested in late spring and dried for later use[7].

nrakta Most of Europe, including Britain, Mediterranean, N. and S. Asia to the Himalayas, E. North America. ksacta Old walls and basic rocks in hilly areas[7, 17].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Germinates in spring[1]. Spring sown spores germinate in 1 - 3 months at 15°c[134]. Pot on small clumps of plantlets into individual pots as soon as they are large enough to handle and grow them on in light shade in a cold frame or greenhouse. Keep the plants humid until they are well established. Once the plants are 15cm or more tall, plant them out into their permanent positions in the spring. Division in spring.

nwatta Requires a well-drained position and lots of old mortar rubble in the soil[1]. Requires a humid atmosphere and some shade[28, 31]. A good plant for growing on a shady part of an old dry-stone or brick wall[K], also succeeding in full sun[219]. A very ornamental fern[1], it is very tough but slow to establish[219]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 6.2.748 Paris quadrifolia

5 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Paris quadrifolia is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to August. The species is

hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The plant is poisonous in large doses[9, 13, 19, 65]. This refers to the fruit[200].

tcanta DyeA red dye is obtained from the berries[13]. A vellow dye is obtained from the leaves[137].

dwatta Antianxiety Antidote Antirheumatic Aphrodisiac Detergent Homeopathy Narcotic OphthalmicThe entire plant, harvested just as it is coming into flower, is antirheumatic and detergent[13, 61, 178]. In large doses the herb is narcotic, producing nausea, vomiting, vertigo etc[4]. It should be used with great caution, overdoses have proved fatal to children[4]. In small doses it is of benefit in the treatment of bronchitis, spasmodic coughs, rheumatism, colic etc[4]. The plant is also used in the treatment of headaches and neuralgia[61, 178]. The seeds and the berries have something of the nature of opium, they have been used as an aphrodisiac[4]. A tincture of the fresh plant is useful as an antidote to poisoning by mercurial sublimate and arsenic[4]. A cooling ointment made from the seeds and juice of the leaves is applied externally to wounds, tumours and inflammations[4]. The juice of the berries is used to treat eve inflammations[4]. A homeopathic remedy is made from the

nrakta Europe, including Britain, from Iceland south and east to Spain, Macedonia, Siberia and the Caucasus ksacta Damp woods on calcareous soils[13, 17].

propta Seed - best sown as soon as it is rine in late summer in a cold frame. Sow stored seed in a cold frame as soon as it is received. The seed is very slow to germinate. It produces a primary root about 7 months after sowing, this pulls the seed deeper into the soil. Leaves are produced about 4 months later[137]. Sow the seed thinly so that it does not need to be thinned and grow the young plants on undisturbed in a shady part of the greenhouse for their first two years of growth. Give an occasional liquid feed in the growing season to ensure the plants do not become nutrient deficient. At the end of the second year's growth prick out the young plants into individual pots and grow them on for another year or two in a shady part of the greenhouse before planting them out in the spring. Division.

nwatta Easily grown in a humus-rich soil in woodland conditions[200]. Prefers a light sandy loam[42, 90]. Plants are hardy to about -15°c[200]. The presence of this plant in a truly wild state in Britain is an indicator of ancient woodland[200]. Plants are very slow to flower from seed[137]. The flowers are very long-lived[200]. The flowers emit a strong unpleasant smell rather like decaying meat[245].

#### 6.2.749 Coptis chinensis

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.3 m hkuc

hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat hpa7tmwatli xre7t hionli

drutta Coptis chinensis is an evergreen Perennial growing to 0.3 m (1ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from February to March, and the seeds ripen from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista Although no specific mention of toxicity has been found for this species, it belongs to a family that contains many species that are mildly toxic and so it is wise to treat this plant with some caution.

tcanta DyeA bright yellow pigment found in the roots can be used for dyeing[238]. Can be grown as a ground cover plant in the peat garden[200].

dwatta Anaesthetic Analgesic Antibacterial Antidote Antipyretic Antispasmodic Bitter Blood tonic Carminative Cholagogue Digestive Dysentery Sedative Skin Stomachic Tonic VasodilatorHuang Lian is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. The root is a pungent, very bitter, cooling herb

are suitable for ground cover when spaced about 45cm apart 6.2.725 Filipendula vestita

dwatta Anthelmintic Antiemetic Cardiac Cathartic Diuretic Emetic Emmenagogue Hypotensive Irritant Narcotic Parasiticide PurgativeThe root is anthelmintic, cardiac, cathartic, diuretic, emetic, emmenagogue, irritant, violently narcotic and a drastic purgative[4, 9, 21, 46]. The dried root is used, it contains the alkaloids nervine, pseudo-nervine and veratridine[213]. It is best to harvest the root in the autumn[213]. The plant is useful for reducing blood pressure in various conditions of hypertension[213].

nrakta Central and western Europe, including Britain. ksacta Woods, scrub and sunny banks on moist chalk and limestone soils[9, 17, 187].

propta Seed - best sown as soon as it is ripe in a cold frame[1, 134]. Sow stored seed as early in the year as possible[1], it usually germinates in the autumn to spring. Seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species produces flowering plants in 2 - 3 years from seed[200]. Division after flowering or in autumn. Take care since the plant resents disturbance[111,

nwatta Cultivation of this plant is not always easy, it prefers a rich limy soil in partial shade[187]. One report says that the plant requires an alkaline soil[17]. Succeeds in any good garden soil[1], preferring a moist well-drained rich loam in a sheltered position in partial shade[1, 4, 31, 1111. Succeeds when grown in the shade of a north-facing wall[233]. Does not object to lime[1]. Grows well in heavy clay soils[200]. Dislikes drought. Slugs are very fond of this plant and it will probably require some protection from them[187]. The various species in this genus hybridize freely[95]. Plants resent root disturbance and should be placed in their permanent positions whilst still small[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

## 6.2.724 Polygala amara

Bitter Milkwort

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Polygala amara is a PERENNIAL growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, at least one member of this genus is said to be poisonous in large quantities.

dwatta Bitter Diaphoretic Diuretic Emollient Expectorant GalactogogueThe herb is bitter, diaphoretic, diuretic, emollient, mildly expectorant, galactogogue[9, 21]. An infusion is used to treat stomach upsets, bladder and kidney disorders etc[9]. The plant is harvested as it comes into flower and dried for later use[9].

nrakta Europe, including Britain, south and east from Norway, ksacta Grassland and damp mountain pastures, especially on chalk and limestone[9, 17].

propta Seed - sow spring or autumn in a cold frame[214]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Cuttings of young shoots in a frame in late spring[1].

nwatta Prefers a moderately fertile moisture-retentive well-drained soil, succeeding in full sun if the soil remains moist throughout the growing season, otherwise it is best in semi-shade[200]. Dislikes shade according to another re-

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Filipendula vestita is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to August, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or

dwatta MiscellanyOne report says that the plant has medicinal properties but gives no details[145].

nrakta E. Asia - Himalayas from Afghanistan to Nepal and western China. ksacta Along mountain drains and in taller herbaceous vegetation, 2200 - 2900 metres[145]. Alpine meadows and riverbanks at elevations of 3000 - 3200 metres in Yunnan Povince, China[266].

propta Seed - best sown in the autumn in a cold frame[1]. The seed can also be sown in a cold frame in spring, germinating best at a temperature of 10 - 13°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have grown enough. If not, keep them in a cold frame for the winter and plant them out in late spring. Division in autumn or winter[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a humus-rich moist soil in semishade[200]. Succeeds in full sun only if the soil is reliably moist throughout the growing season[200]. Dislikes dry or acid soils. Does well in marshy soils. Grows well in heavy clay soils. Members of this genus are rarely if ever troubled by browsing deer[233].

## 6.2.726 Pinellia pedatisecta

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pinellia pedatisecta is a CORM growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have no record of toxicity for this species, all parts of the plant probably contain calcium oxylate. This is toxic and if consumed makes the mouth and digestive tract feel as though hundreds of needles are being stuck into it[K]. However, calcium oxvlate is easily destroyed by thoroughly cooking or drying the plant[172].

dwatta Antiemetic Antiphlogistic Cancer Expectorant Febrifuge Sialagogue Styptic UrinaryThe poisonous tubers are used as a medicine for the treatment of enlargement of the lymph node and urinary tract infections[266]. The following notes for P. ternata almost certainly also apply to this species[218]. The root is antiemetic, antiphlogistic, expectorant, febrifuge, sialagogue, styptic. Strengthens the spleen[147, 174, 176, 178]. Modern research has shown that this remedy is very effective in controlling nausea and vomiting[238]. It is also an ingredient of a Chinese prescription for removing gallstones without surgery, a process that usually causes severe nausea[238]. The root is also used internally in the treatment of coughs with thin watery phlegm and gastritis[238]. The fresh root is extremely acrid and contains toxins, these are neutralized upon drying or by soaking in tea or vinegar[238]. The root is harvested in the summer and dried for later use, it should not be used fresh[174, 238]. Extracts of the plant have been shown to have analgesic, antiemetic, anticancer and sedative activity[218].

nrakta E. Asia - N. and W. China ksacta Forests, in valleys or shady places below elevations of 1000 metres[266].

propta Seed - we have no information but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division as new growth begins in spring. Bulbils from the leaf axils.

nwatta Easily grown in a rich soil, it requires plenty of water in the growing season[1]. Succeeds in full sun or partial shade[188]. Plants can be naturalized in woodland[1]. Plants produce bulbils in their leaf axils[188].

## 6.2.727 Myosotis scorpioides

Water Forget-Me-Not, True forget-me-not 5 tin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicil hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Myosotis scorpioides is an evergreen Perennial growing to 0.3 m (1ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

dwatta Used in the treatment of whooping cough and bronchitis[61].

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa and the Himalayas N. America ksacta Wet places by streams and ponds[17].

propta Seed - sow outdoors in situ in late spring or early summer. Germination usually takes place within 2 - 4 weeks at  $20^{\circ} c$ . Division in spring[111]. Large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of young shoots, summer in a shady border[111]

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Specimen, Woodland garden. Prefers a wet soil but thrives in a moist shady border[111]. Grows well in heavy clay soils. Does well on pond edges[200]. Prefers a sunny position[1]. Plants are hardy to about - 20°c[187]. A long-lived species[187], it spreads freely when growing in marshy ground[233]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, North American native, Naturalizing, Wetlands plant, Suitable for cut flowers, Fragrant flowers.

#### 6.2.728 Morina longifolia

Whorlflower

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Morina longifolia is an evergreen Perennial growing to  $0.6~\mathrm{m}$  (2ft) by  $0.3~\mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone  $6.~\mathrm{It}$  is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Moths. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

tcanta Essential IncenseThe plant is used as an incense[145, 240, 272]. The roots yield 0.34% essential oil[240].

dwatta Digestive Emetic StomachicThe stem, leaves and flowers are used in Tibetan medicine, they are said to have

a sweet and astringent taste with a heating potency[241]. They are digestive, emetic and stomachic, and are used in the treatment of stomach disorders such as indigestion giving rise to vomiting and nausea[241].

nrakta E. Asia - Himalayas - Kashmir to Bhutan. ksacta Open slopes and alpine shrubberies, 3000 - 4000 metres[51].

propta Seed - best sown as soon as it is ripe in individual pots to minimize disturbance to the tap root. Overwinter in a well ventilated cold frame[200]. Sow stored seed in early spring in a cold frame[111]. Plant out into their permanent positions in the summer when the plants are at least 15cm tall. Division in spring is possible but very difficult. Divided plants are often extremely slow to re-establish[200]. It is best carried out immediately after the plant flowers[188]. Root cuttings in individual pots in November. Plants are quick to produce foliage but slow to form roots. They are best left in pots for 12 months before planting out[175].

nwatta Requires a fertile, humus-rich, moisture retentive but well-drained sandy or gritty soil in a sunny position[1, 111, 200]. It grows best with a little shade and shelter from high winds[1]. Prefers a slightly acid soil[175]. A very ornamental plant[1], the leaves are spicily aromatic[187]. A fairly easy plant to grow, though it tends to be short-lived[187]. It is hardy to about -17°c when growing in a perfectly drained soil[187, 200]. It grows best in the western side of Britain, sometimes succumbing to cold in the south-east of the country[233]. Requires protection from slugs[K]. The flowers open in the evening and are pollinated by moths. If pollination does not take place by morning then the top of the pistil curves over and effects self-pollination[211]. Resents root disturbance[200].

## 6.2.729 Anacyclus pyrethrum

Mount Atlas Daisy, Chamomile Spanish, Pellitory 5 tlin 7 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Anacyclus pyrethrum is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers

dwatta Acrid Antirheumatic Epilepsy OdontalgicThe root is a pungent acrid herb that stimulates the salivary glands and irritates the tissues, thereby increasing blood flow to the area[238]. It is used externally to treat toothache, facial neuralgia and chronic catarrh[238]. A gargle is used to soothe sore throats[254]. The root is harvested in the autumn and dried for later use[238]. In Ayurvedic medicine the root is considered to be tonic and is used in the treatment of paralysis and epilepsy[254]. The diluted essential oil in the root is used in mouthwashes and to treat toothaches[254]. This oil should not be used internally, except under professional supervision[254].

nrakta Mediterranean - Spain, Morocco and Algeria. ksacta Not known

propta Seed - requires about 3 weeks cold stratification. Germination is best at a temperature around 13 - 16°c[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer[200]. Cuttings of softwood in the spring[200, 238].

nwatta Landscape Uses:Alpine garden, Rock garden. Requires a well-drained soil in full sun[200]. Plants are intolerant of excessive wet, especially in the winter, and will do better if covered by a pane of glass in the winter[200]. This species is hardy to at least -5°c, probably more if the ground is very well-drained[200]. Special Features:Not North American native, Extended bloom season in Zones 9A and above.

## 6.2.730 Delphinium semibarbatum

Zalil

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli Plant the tubers no more than 5cm deep in the soil[233]. Special Features:Not North American native.

## 6.2.743 Geranium sibiricum

Siberian geranium

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geranium sibiricum is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Astringent Diuretic VulneraryThe plant is used as an astringent, diuretic and vulnerary[240].

nrakta Eastern and Central Europe. ksacta Not known propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

## 6.2.744 Galax urceolata

Beetleweed, Wandflower

5 tlin 8 cyuc 0 kcak 2 tcan 1 dwat 0.2 m hkuc

pcimhmim cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Galax urceolata is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is neaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

tcanta An attractive ground cover, the leaves turn bronze-red in winter[200]. Plants should be spaced about 25cm apart each way[208].

dwatta Kidney VulneraryThe plant is used for healing all kinds of wounds and cuts[207]. An infusion of the root is used to treat kidney problems[257].

nrakta South-eastern N. America. ksacta Moist open woodland, particularly in montane areas, to altitudes of 1500 metres[200].

propta Seed - sow early spring or autumn in a shaded cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division with care in early spring[200].

nwatta Landscape Uses:Border, Container, Ground cover, Rock garden, Specimen, Woodland garden. Requires a moist humus-rich lime-free soil with part day shade[200]. Succeeds in full shade[208]. Plants can succeed in the dry shade of trees[233]. Succeeds in the woodland garden, large rock gardens or as an edging for shady paths[200]. Plants like an annual mulch of pine needles or other acid organic matter each spring[200]. Special Features: Attractive foliage. Naturalizing, Suitable for cut flowers. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat

days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 6.2.745 Ajuga chamaepitys

Ground Pine, Yellow bugle

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.2 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Ajuga chamaepitys iš a ANNUAL growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

dwatta Antirheumatic Diuretic Emmenagogue Stimulant Urinary Women's complaintsThe leaves are diuretic, stimulant and emmenagogue[4]. The plant acts mainly on the urinary system and uterus[238]. It once had a high reputation in the treatment of rheumatism, dropsy, jaundice etc and has also proved of worth when used in conjunction with other herbs in the treatment of women's complaints[4]. The leaves are harvested in the summer and can be dried for later use[238].

nrakta CentraL and souther Europe, including Britain, to N. Africa and E. Asia. ksacta Very local in sandy and chalky arable fields and in open habitats in chalky grassland in southeastern England[4, 17].

propta Seed - sow spring in situ. Germination can be erratic[238].

nwatta Thrives in a poor dry soil in full sun[238]. Prefers a humus-rich moisture-retentive soil[200]. Plants are usually annual, but are sometimes short-lived perennials[200]. The whole plant smells of pine trees when crushed[17, 238].

#### 6.2.746 Pulsatilla dahurica

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Pulsatilla dahurica is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no mention has been seen for this species, at least one member of the genus is slightly toxic, the toxins being dissipated by heat or by drying the plant[65].

dwatta Analgesic Antiinflammatory Antispasmodic Cardiotonic Dysentery Hypnotic SedativeThe root is anodyne, anti-inflammatory, antispasmodic, astringent and sedative[174, 176, 218]. The root is an effective cure for bacterial and amoebic dysentery[176, 218]. It is also used in the treatment of nose bleeds and haemorrhoids and is used externally to treat Trichomonas vaginitis[176]. The fresh herb is a cardiac and nervous sedative, producing a hypnotic state with a diminution of the senses followed by a paralysing action[218]. A constituent similar to digitalis can be extracted from the whole herb with the roots removed[176]. This is cardiotonic[176].

nrakta E. Asia - N. China, Japan, E. Siberia. ksacta River pebbles, open or shrub-covered[74]. Alpine meadows[200].

propta Seed - best sown as soon as it is ripe in early summer in a cold frame. The seed usually germinates in about

woodland) or no shade. It prefers dry or moist soil.

dwatta A cold infusion of the leaves has been used to improve the appetite and also in the treatment of colds and kidney problems[257]. A poultice of the wilted leaves has been used to 'draw out burns' [257]. The infusion can be held in the mouth as a treatment for toothache[257]. The root and the leaves have been used in the treatment of bladder problems[257]. The roots and the leaves have been used in the treatment of stomach problems and female disorders[257], A poultice of the chewed leaves, and the swallowed juice, has been used in the treatment of snake bites[257]. The plant ooze has been used as drops to treat sore eyes[257].

nrakta Europe, including Britain, Scandanavia south and east to the Pyrenees, Siberia, Japan and Himalayas. ksacta Locally in pine woods, rarely under birch or on moist fixed dunes in northern Britain[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move.

nwatta Requires a somewhat shady site and a welldrained compost of peat, leafmold and sand[1]. Does well in the woodland garden[42, 230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

## 6.2.741 Primula reticulata

5 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Primula reticulata is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is one report that the leaves are toxic to

dwatta AnodyneThe herb is used externally as an anodyne[240].

nrakta E. Asia - Himalayas from C. Nepal to S.E. Tibet. ksacta Shrubberies and open slopes, 3300 - 4800 metres[51]. Thickets on mountain slopes around 3000 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[133]. Sow stored seed in early spring in a cold frame[1]. Germination is inhibited by temperatures above 20°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in autumn. This is best done every other year[200].

nwatta Prefers a deep moist humus-rich soil, succeeding in full sun if the soil is reliably moist throughout the growing season, otherwise it requires some shade[1, 200]. Grows well in heavy clay soils. Succeeds along the sides of streams and in woodland gardens[200]. Plants self-sow when in suitable conditions[200].

#### 6.2.742 Bletilla striata

Hyacinth Orchid, Urn orchid, Hyacinth Bletilla, Hardy Orchid Chinese Ground Orchid

5 tlin 8 cyuc 0 kcak 0 tcan 3 dwat 0.4 m hkuc

hmim cyutli tcup hwicli jlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bletilla striata is a BULB growing to 0.4 m (1ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland). It prefers moist soil.

tcanta Gum Ink SizeThe bulb is mucilaginous, it is used as a size to impart a glossiness to ink and also to make an invisible ink (seen by wetting the paper and holding it up to

dwatta Antibacterial Antiinflammatory Antiphlogistic Demulcent Pectoral Skin Styptic VulneraryThe hyacinth orchid is an important wound herb in China, where it has been used medicinally for over 1,500 years[238]. The root (actually a pseudobulb) is antibacterial, anti-inflammatory, antiphlogistic, demulcent, pectoral, skin, styptic and vulnerary[147, 176, 178]. It is taken internally in the treatment of haemorrhages of the stomach or lungs, uterine bleeding and nose bleeds[238]. It is particularly effective against the endotoxin produced by Haemophilus pertusis in whooping cough[176]. Externally, it is mixed with sesame oil and applied as a poultice to burns, cuts, abscesses and sores[238]. The pseudobulbs are harvested when the plant is dormant and are dried for use in decoctions and powders[238].

nrakta E. Asia - China, Japan. ksacta Grassy slopes in foothills, C. and S. Japan [58]. In sandy soils amongst grassy patches on cool mountain slopes in China[147]. Margins of woods and thickets[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division in autumn. Make sure that you keep plenty of soil with each plant. It is also said to be possible to transplant orchids after they have flowered but whilst they are still in leaf. Division is best carried out in the spring[230]. Each division should have a leading point and two, or preferably three, pseudobulbs/joints of the rhizome[230]. More propagating material can be obtained by cutting halfway through the rhizome during the previous growing season at the point where you wish to divide[230]. This will stimulate the production of growth buds at the point of division[230].

nwatta Landscape Uses:Border, Container, Rock garden, Specimen, Woodland garden, Requires a friable, damp but well-drained soil enriched with leafmold[200]. Dislikes wet soils[200]. Requires shade from the midday sun[1]. Plants prefer a sheltered position in light shade, also succeeding in full sun in humus-rich soils[230]. Plants are hardy in favoured localities in Britain but they usually require greenhouse protection in this country[1]. Plants have grown well at Kew Botanical gardens, where they have formed large colonies[230]. Apply a good organic mulch in the late autumn or lift the bulbs and store them dry in a frost free place[200]. Plant out in spring and only just cover the bulb[200]. This species is cultivated in China as a medicinal plant[238]. Grows well with ferns in a woodland setting[200]. Orchids are, in general, shallow-rooting plants of well-drained lowfertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

drutta Delphinium semibarbatum is a PERENNIAL or early summer. Division in March[111]. Most members of growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[65, 172]. The plant is most toxic when it is young[200].

dwatta Anodyne Detergent Diuretic PoulticeThe plant is considered to be anodyne, detergent and diuretic[240]. It is used in the treatment of jaundice, dropsy and troubles of the spleen[240]. It is used externally as a poultice for swellings[240].

nrakta W. Asia - Afghanistan and Iran, ksacta Not known propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°c[200]. Temperatures above 15°c inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Prefers a rich well-drained soil that stays moist in the summer[111, 187]. Dislikes water-logged soils[200], it is liable to die out in heavy soils over winter[111]. Requires an open sunny position[188]. This species is not reliably hardy in cool temperate zones[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 6.2.731 Gentiana tubiflora

5 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Gentiana tubiflora is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antidote Antiinflammatory FebrifugeThe entire plant is used in Tibetan medicine, it is said to have a bitter taste and a cooling potency[241]. Antidote, antiinflammatory and febrifuge, it is used in the treatment of headaches and redness of the eyes, inflammation of the throat and inflammation of the gall bladder giving rise to yellowish skin[241].

nrakta E. Asia - Himalayas from Himachel Pradesh to south-east Tibet. ksacta Grassy hillsides, dry hillsides and alpine meadows at elevations of 4200 - 5300 metres[266].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored. with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring

this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200].

#### 6.2.732 Senecio sylvaticus

Mountain Groundsel, Woodland ragwort

5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Senecio sylvaticus is a ANNUAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista All parts of the plant are poisonous to many mammals, including humans. The toxin affects the liver and has a cumulative affect[9, 65]. Some mammals, such as rabbits, do not seem to be harmed by the plant, and will often seek it out[4]. Various birds also eat the leaves and seeds[4].

dwatta Antiscorbutic DetergentThe plant is detergent and antiscorbutic[4].

nrakta Europe, including Britain, south and east from Scandanavia to Spain the Balkans and W. Asia. ksacta In open vegetation on non-calcareous sandy or gravelly soils, dry heaths and commons[4, 17].

propta Seed - sow spring in situ.

nwatta See the plants native habitat for ideas on its cultivation needs. The plant has an unpleasant odour[4].

## 6.2.733 Inula royleana

5 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Inula royleana is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from August to October. and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta Disinfectant Insecticide ParasiticideUsed as a parasiticide[145]. The plant is insecticidal[240].

dwatta Disinfectant ParasiticideThe plant is disinfectant[240]. It is also considered to be poisonous[240]. The root has been used to adulterate the roots of Saussurea lappa[240]. It contains 3% of an alkaloid that produces a fall in blood pressure and stimulates tone and peristaltic movements in the intestines[240].

nrakta E. Asia - Himalayas from Pakistan to Kashmir. ksacta Scrub and grassy clearings in forests, 2100 - 4000 metres[187]. Exposed dry slopes, 3100 - 3600 metres in Kash-

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[111].

nwatta Succeeds in a sunny position in ordinary garden soil[1]. Requires a moist well-drained soil in sun or partial shade[187]. Grows well in heavy clay soils. This species is hardy to about -20°c[187]. Plants take some years to become fully established[233].

## 6.2.734 Corydalis aurea

Scrambled Eggs 5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Corydalis aurea is a ANNUAL/BIENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Corydalis species are potentially toxic in moderate doses[222].

dwatta Cardiac Stomachic Women's complaintsA tea made from the plant is used in the treatment of painful or irregular menstruation, diarrhoea, bronchitis, heart diseases, sore throats and stomach aches[222, 257]. Externally, it is used as a lotion on backaches, hand sores etc and as a gargle for sore throats[257]. Caution is advised in the use of this plant, see the note above on toxicity.

nrakta N. America - mainly in the west and central areas, from Alaska to California, also east to New York. ksacta Talus slopes, ledges, rocky hillsides, forest clearings, open shores, creek bottoms, gravel pits, road cuts, and burned-over areas, in loose often gravelly soil at elevations of 100 - 3400 metres[270]

propta Seed - surface sow in situ in the spring[222]. mwatta Prefers a moist, well-drained rather light soil, thriving in semi-shade[1]. Grows well in a woodland garden or peat bed. Plants seem to be immune to the predations of rabbits[233].

#### 6.2.735 Dicentra cucullaria

Dutchman's Breeches

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.1 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Dicentra cucullaria is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista The plant is potentially poisonous and can also cause skin rashes[222].

dwatta Alterative Diaphoretic Diuretic Poultice Tonic VDAlterative, tonic[46, 61]. The dried tubers were used as a tonic and were recommended in the treatment of VD[213]. A tea made from the roots is diaphoretic and diuretic[222]. A poultice made from the leaves has been used in the treatment of skin ailments and as a muscle rub to make them more limber[222]. The plant contains an alkaloid that depresses the central nervous system - it is used in the treatment of paralysis and tremors[222].

nrakta Eastern N. America - Nova Scotia to N. Carolina and west to Kansas. ksacta Cool places in rich mountain woods[43, 187]. Deciduous woods and clearings, in rich loam soils from sea level to 1500 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[134]. Stored seed should be sown in March[175]. Germination usually takes place within 1 - 6 months at 15°c[175]. Two weeks warm stratification at 18°c followed by six weeks at 2°c can shorten up the germination time[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in early spring[200]. Best done when the plant is dormant in late winter[188]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Root cuttings 7 - 10cm long in sandy soil in a cold frame[200].

nwatta Landscape Uses:Alpine garden, Seashore, Woodland garden. Easily grown in a rich light soil[1], preferably neutral to slightly acid[200]. Prefers light shade and a sheltered position[175] but also succeeds in heavier shade[200]. Plants are hardy to at least  $\cdot 20^{\circ}c[187]$ . The seed is difficult to harvest, it ripens and falls from the plant very quickly[134]. The plant becomes dormant in the summer[188]. After fruit set, the bulblets of Dicentra cucullaria remain dormant until the autumn, when stored starch is converted to sugar. At this time also, flower buds and leaf primordia are produced below ground; these then remain dormant until spring[270]. This species is closely related to D. canadensis[270]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, North American native.

#### 6.2.736 Tanacetum cinerariifolium

Dalmation Pellitory, Pyrethrum 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Tanacetum cinerariifolium is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista Some people are highly allergic to this plant[160]. Prolonged contact with the dried flowers can lead to allergic dermatitis, allergic rhinitis and asthma in humans[268].

tcanta Insecticide RepellentThe dried flower buds are the source of the insecticide 'Pyrethrum'[1, 4, 14, 18, 46, 57, 61]. The pyrethrins are produced in the yellow disc florets[169]. The highest pyrethrin content is from the flowers when they are in full bloom (1.22%) and lowest in the preceding period (0.71%)[240]. This insecticide also kills many beneficial insects, though it is relatively harmless to mammals[4]. Another report says that it is non-toxic to mammals[238]. It is best used in the evening so that it will have lost much of its virulence by the morning[201]. Steep two handfuls of the dried powdered flowers in one litre of hot water for an hour. This mixture can be either pureed or strained and then used as a spray[201]. Once dried, the flowers or the powder retain their insecticidal properties almost indefinitely[238]. The growing plant can be used as an insect repellent in the garden[14, 18, 20]. Effective against mosquitoes and ants[201].

dwatta VermifugeDalmatian pellitory is not used medicinally, though research has shown that the flowers possess weak antibiotic activity[268]. The flowers are the main source of the insecticide pyrethrum, which is toxic to insects but not to mammals. It has sometimes been used as a vermifuge in China[147].

nrakta Europe - Dalmatia, Yugoslavia. ksacta Rocky ground[50], usually by the seashore[4].

propta Seed – sow spring in a greenhouse. Only just cover the seed and do not allow the pot to dry out. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Industrial Crop: Pesticide Management: Hay Minor Global CropSucceeds in an ordinary garden soil[11]. Prefers a rich soil with plenty of humus[147]. Prefers a pebbly, calcareous dry soil in a sunny position[4]. When grown in moist climates the plants often die after flowering[4]. Tolerates a pH in the range 5.2 to 7.5. Pyrethrum is widely cultivated as a source of an insecticide[57, 61], the growing plant is also said to repel insects from plants growing nearby[14, 18, 20].

#### 6.2.737 Veronicastrum sibiricum

Blackroot

5 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Veronicastrum sibiricum is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta The root is antimicrobial and hepatic [279]. It is used in Korea in the treatment of the common cold and as a liver tonic [279].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Grassy areas in mountains and lowlands[279]. Trailsides, grassy slopes and thickets at elevatins below 2500 metres in northern China[266]

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient quantity the seed can be sown outdoors in situ in the autumn or the spring. Division in autumn or spring[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Easily grown in a moderately fertile moisture retentive well drained soil[200]. Prefers cool summers[200]. Prefers a sunny position[188].

## 6.2.738 Potentilla hippiana

Woolly Cinquefoil 5 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli fyifxre7t hjonli

drutta Potentilla hippiana is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers mait real

dwatta Oxytoxic Poultice SalveThe whole plant is oxytocic, poultice and salve[155]. An infusion of the plant has been used to expedite childbirth[257]. The plant has been used as a lotion on burns and a poultice of the fresh leaves applied to injury[257]. The plant is dried, powdered and applied to sores[257].

nrakta Western N. America - Minnesota to British Columbia, south to New Mexico and Arizona. ksacta Dry soils[235]. Open grassland sagebrush, often on saline soils, to juniper scabland and pine forests of the foothills and lower elevations in the mountains[60].

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 6.2.739 Corydalis cava

5 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.2 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Corydalis cava is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from March to June, in flower from February to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention has been seen for this species, there is a report that Corydalis species are potentially toxic in moderate doses[222].

dwatta Analgesic Antianxiety Antidepressant Antiseptic Antispasmodic Antitussive Cancer Cardiotonic Hallucinogenic Hypotensive SedativeThe tuber is antispasmodic, hallucinogenic and also slows the pulse[9]. It is harvested in the spring before the plant comes into flower and dried for later use[9]. The plant should only be used under the guidance of a trained herbalist, it is used in the treatment of Parkinson's disease and other neurological disorders[9]. One report says that the plant is cultivated for its medicinal uses in Sweden, but gives no more details[175]. The following reports are for C. vanhusuo which, according to one authority, is the correct name for this species[218]. It is treated as a separate species here[K]. The tuber is analgesic, antiseptic. antispasmodic and sedative[176]. The root has traditionally been used to lower pain and strengthen the circulation[218]. It also has sedative properties and is used in the treatment of a wide range of ailments[218]. Various extracts from the plant have shown antitussive, cardiotonic, hypotensive and anticancer activity[218].

nrakta E. Europe. A rare garden escape in Britain[17]. ksacta Shady forests, rarely amongst shrubs[74].

propta Seed - best sown as soon as it is ripe, the seed rapidly loses viability if it is allowed to become dry[129]. Surface sow and keep moist, it usually germinates in 1 - 3 months at 15°c[164]. Germinates in spring according to another report[129]. Two months warm, then a cold stratification improves the germination of stored seed[134, 164]. Sow the seed thinly so that the seedlings can be allowed to grow undisturbed in the pot for their first year. Apply liquid feed at intervals during their growing season to ensure they are well fed. The seedlings only produce one leaf in their first year of growth[175] and are very prone to damping off[129]. Divide the seedlings into individual pots once they have become dormant and grow them on in a partially shaded area of a greenhouse for at least another year. Plant them out into their permanent positions when they are dormant. Division after flowering.

nwatta Prefers a moist, well-drained rather light soil, thriving in semi-shade[1]. Grows well in a woodland garden or peat bed. There is at least one named variety, selected for its ornamental value[200]. There is some possible confusion over the name of this species. 'Flora Europaea' says that it is a synonym of C. bulbosa[50] but the RHS 'Dictionary of Gardening' gives C. bulbosa as a synonym of this species[200]. In another report this species is said to be no more than a synonym for C. yanhusuo[218]. Closely related to C. solida[200], differing mainly in its solid tubers, rather than hollow as in C. solida[238]. Plants seem to be immune to the predations of rabbits[233].

#### 6.2.740 Goodyera repens

Creeping Lady's Tresses, Lesser rattlesnake plantain 5 tin 9 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Goodyera repens is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Humble bees. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light

it[85]. The dried fruit can be dissolved in water to make a drink[257]. Flower buds - cooked[2, 62, 95, 183]. A soapy taste[85]. The older flowers are best[85], they are rich in sugar[94]. The flowers, harvested before the summer rains (which turn them bitter), have been used as a vegetable[257]. Flowering stems - cooked[257]. Harvested before the flowers open then roasted[257]. Seed - cooked. It can be roasted and then ground into a powder and boiled[62, 85]. The tender crowns of the plants have been roasted and eaten in times of food shortage[257]. The young leaves have been cooked as a flavouring in soups[257].

tcanta Basketry Brush Fibre Hair Needles Soap String Waterproofing WeavingA fibre obtained from the leaves is used for making ropes, baskets and mats[21, 46, 57, 85, 92, 94, 95]. The fibre can be braided into a good guality rope[257]. The leaves can be reduced into fibre and then made into cloth[257]. To obtain the fibre, the terminal spine and a section of the back of the leaf are removed and pounded to free the fibre from the fleshy portion of the leaf[257]. Another method of obtaining the fibre was to fold the leaves into sections about 10cm long. The leaves were then boiled with a small quantity of cedar ashes. When sufficiently cooked, the leaves were placed in a bowl or basket and cooled, then youths and young women would peel off the epidermis and chew the leaves, starting at one end and finishing at the other. After chewing the leaves, the fibres were separated, straightened out and hung to dry. When required for weaving, they would first be soaked in water to soften them[257]. The whole leaf is sometimes split into sections and then tied together by square knots to make a rope[92, 257]. The leaf can be used as a paint brush[92]. Leaf slivers are used, the end being pounded to reveal the fibres[257]. The leaves have also been used to make small brushes for pottery decoration[257]. The leaf is used in basket making[216, 257]. Small roots have been used in making baskets[257]. They have been used to produce a red pattern in baskets[257]. The leaves can be split and then woven into mats[257]. The leaves can be split and used as a temporary string[257]. The leaf fibre has been braided into ropes[257]. The terminal spines have been used as needles[257]. The dried leaves have been boiled with gum, hardened, ground into a powder then mixed with water and used to make baskets waterproof[257]. The roots are rich in saponins and can be used crushed and then soaked in water to release the suds for use as a soap[21, 85, 95, 216, 257]. It makes a good hair wash[85, 94, 257] and can also be used on the body and for washing clothes[257]. A soap can also be obtained from the leaves and stems[257].

dwatta Antiemetic LaxativeAn infusion of the pulverized leaves has been used as an antiemetic to prevent vomiting[257]. The fruits have been eaten raw as a laxative[257].

nrakta South-western N. America - Colorado to Texas, California and Mexico. ksacta Rocky slopes, pinyon, oak, and juniper woodlands, grasslands at elevations of 400 - 2500 metres[270].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept at a temperature of 20°c. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established [78]. Division of suckers in late spring[3]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Agroforestry Services: Living fence Historic Crop Industrial Crop: Fiber Management: StandardLandscape Uses:Border, Massing, Specimen. Thrives in any soil but prefers a sandy loam and full exposure to the south[11]. Plants are hardier when grown on poor sandy soils[200]. Prefers a hot dry position[166], disliking heavy rain[3]. Exablished plants are very drought resistant[11]. Only hardy

1080

in the milder areas of Britain[3, 200]. Another report says that plants are hardy to at least -30°c[164]. A plant at Kew (1992) has survived the last 3 winters outdoors [K]. This plant is still thriving in 1999, though it has not grown much and has not flowered[K]. Another plant is thriving in an open sunny position at Cambridge Botanical Gardens and must have experienced temperatures of at least -10°c, probably somewhat lower[K]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush. Individual crowns are monocarpic, dving after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in later years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]. Special Features: North American native, Fragrant flowers, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. An evergreen. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 7.2.71 Ouercus ithaburensis macrole

/alonia Oak

6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus ithaburensis macrolepis is a deciduous Tree growing to 15 m (49ft) by 13 m (42ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Manna SeedEdible Uses: CoffeeSeed - raw or cooked[2, 63, 89, 100]. The seed is quite big, about 4cm x 3cm[200] and is very low in tannin[183]. Any bitter seeds can be leached by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. Roasted seed is a coffee substitute. A manna is obtained from the tree[183]. No further details.

tcanta Dye Ink Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. The acorn cups contain about 45% tannin[171, 223]. A black dye can be obtained from them[89] and it can be used as an ink[100]. Gall-like excretions on the plant are caused by damage from the insect Cynips calicis. These growths contain about 30% tannin[223].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta S.E. Europe to W. Asia. ksacta Open forests in the hills or as solitary trees[45, 89], usually in dry solis[100].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left

tcanta Hedge Hedge ShelterbeltPlants make an impenetrable barrier, especially in exposed maritime areas. They are a useful windbreak by the coast.

nrakta S.W. Europe - Portugal to southern France. ks-acta Not known

propta Seed - pre-soak 24 hours in hot water and sow in individual pots in a greenhouse in late winter to early spring. Germination should take place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants are very intolerant of root disturbance and so should be planted into their permanent positions as soon as possible, though not until after the last expected frosts[78]. Cuttings of half-ripe wood, 7cm with a heel, July/August in a frame. Pot up in spring as soon as rooting commences and plant out into their permanent positions as soon as possible[78].

nwatta Requires a poor soil and a sunny position, doing well on dry sunny banks or poor gravelly soils[11]. Succeeds on land that is too dry and barren for most plants[200]. Intolerant of shade, nor does it do well on rich soils[11, 182]. Prefers a neutral to slightly acid soil[200], disliking alkaline soils[17]. Plants are very intolerant of root disturbance[11]. Very tolerant of maritime exposure and, once established, drought[75, 186]. Hardy to about -15°c[200]. Hybridizes freely with other members of this genus[200]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 7.1.23 Clitoria mariana

Atlantic Pigeonwings, Butterfly Pea tfo2n 6 tlin 9 cyuc 0 kcak 3 tcan 0 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli prik hpa7tmwatli hjonli

drutta Clitoria mariana is a PERENNIAL CLIMBER growing to  $0.8\ m$  (2ft 7in) by  $0.8\ m$  (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or project soil

pcista Parts of the plant are poisonous. No further information given.

kcakta None Known

tcanta Nitrogen fixer.

dwatta AphrodisiacThe roots and seeds have been used medicinally, including as an aphrodisiac according to the ancient but unscientific doctrine of signatures.' but we have not been able to confirm this - Missouriplants.com

nrakta The plant is native to the eastern, southern, and central United States west to New Mexico and Arizona. It is also found in Asia, in: Bhutan, India, Laos, Myanmar, Thailand, Vietnam, and southern China (Guangxi, Yunnan) ksacta Dry open forests, shale barrens, and rocky or sandy woodlands.

propta Seed

nwatta A temperate perennial forb. Stems are erect to reclining or trailing, to 1.2m, glabrous to sparsely pubescent with short, fine, curved hairs. It is a twining vine and not a climbing vine so is often found growing along the ground. In southern China it grows in forests between 100-2,000m above sea level. It grows in hardiness zones 6-9. Light Requirement: Sun, Part Shade. Preferred soil: Dry and Sandy. Bloom Color: Pink, Blue. Bloom Time: Jun to Aug. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Herbaceous. Growth habit is a single or multiple shooting vine from a crown [1-2].

## 7.1.24 Strophostyles umbellata

Pink fuzzybean, Perennial wild bean tfo2n 6 tlin 9 cyuc 0 kcak 2 tcan 0 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Strophostyles umbellata is a PERENNIAL CLIMBER growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista None Known

kcakta None Known

tcanta Nitrogen fixer. Invertebrates shelter: beneficial for insects and other arthropods [1-2].

nrakta Native to fields and woods in the southeastern and central United States. ksacta Sandy soils of fields, forest edges, meadows and woodlands and clearings, mainly near the coast

propta From seed- direct sow outdoors in fall. Self-sows freely

nwatta A perennial herbaceous climbing vine. Prefers light (sandy) to medium soils in semi-shade to full sun conditions. A dry to moist soil. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Herbaceous. Growth habit is a single or multiple shooting vine from a crown [1-2].

## 7.1.25 Ceanothus prostratus

Squaw Carpet, Prostrate ceanothus tfo2n 6 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ceanothus prostratus is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Dye SoapA green dye is obtained from the flow-ers[168]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K]. A useful ground cover plant, especially on warm sunny slopes[200].

nrakta Western N. America - British Columbia to Colorado and California. ksacta Dry forest floors[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place within 1 -2 months at 20°c[138]. one report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. It then requires a period of chilling below 5°c for up to 84 days before it will germinate[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their

permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. A difficult plant to cultivate, it might do well in a lime-free soil in full sun and occasionally does well on heavier soils[208]. This species is particularly susceptible to damage by frost when it is young[200], though it should be hardy as it grows older[11]. The sub-species C. prostratus occidentalis. McMinn. is a form growing by the coast in N. California - it may be a more suitable form for maritime areas[K]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Plants flower on the previous year's growth, if any pruning is necessary it is best carried out immediately after the plant has finished flowering[200]. Constant pruning to keep a plant small can shorten its life[200, 219]. Fast growing, it flowers well when young, often in its second year from seed[11]. The branches are prostrate and often form roots where they touch the soil[11]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2].

## 7.1.26 Genista pilosa procumbens

Creeping broom, Creeping hairy broom tfo2n 6 tlin 8 cyuc 0 kcak 3 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Genista pilosa procumbens is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista None Known kcakta None Known

tcanta A good high density groundcover. Nitrogen Fixer. Location: Border, Ground Cover, Mass Planting, Rock Garden, Wildlife Garden, Woodland Garden. Invertebrates shelter: beneficial for insects and other arthropods. Nectary: provides nectar or pollen for beneficial insects [1-2].

nrakta Europe. Native range from southern Sweden to the Mediterranean; in dry summer areas. ksacta Poor, dry, sandy, and stony soils

propta Seed: Easy. Cover seed and germinate at 55-65F/13-18C. Chipping and soaking may aid germination. Do not transplant. Cuttings taken in summer, or by simple layering. Tip cuttings about 3-6 cm may be taken in mid-summer and rooted in a mist chamber or shaded frame.

nwatta Evergreen prostrate shrub. Flowers, goldenyellow, cover the plants in late spring to early summer. Poor, dry, sandy, and stony soils. Full sun or part shade and well drained soil. Soil pH: Acid/Neutral/Alkaline. Foot Traffic: Light. Drought tolerant. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-21.

## **7.2** mran

#### 7.2.1 Ouercus ilex ballota

Holm Oa

6 tlin 9 cyuc 5 kcak 3 tcan 2 dwat 25 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Quercus ilex ballota is an evergreen Tree growing to 25 m (82ft) by 20 m (65ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: Coffee OilSeed - raw or cooked[1, 2, 46, 63, 200]. The seed of this variety is normally sweet. The seed is up to 3cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed from some trees contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute. An edible oil is obtained from the seed[183].

tcanta Fuel Hedge Hedge Oil Repellent Shelterbelt Tannin Woodd mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Very tolerant of maritime exposure and of trimming, it can be grown as a shelterbelt tree or hedge in maritime areas[11, 29, 49, 75]. Wood - strong, hard, durable. Used for furniture[46, 61, 89]. It makes a good charcoal[89] and a good fuel, burning well even if green[146]. The bark is a source of tannin[146].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Europe - Mediterranean. ksacta Arid places, maquis, woods and hills on limestone[89].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Thrives on shallow chalky soils[188]. Succeeds in all soils except those that are cold and poorly drained[98]. Grows well in sandy soils[188]. Young plants tolerate reasonable levels of side shade[200]. Very resistant to maritime exposure[11, 49, 75]. A very ornamental[1] though quite slow-growing tree[75]. Transplants badly unless moved regularly and this should be done as growth commences in late May or in September[11]. This plant is treated as a distinct species, Q. rotundifolia. Lam. by some botanists[50]. Cultivated for its edible seed in Spain[11, 63]. The tree grows well in Britain but is said to fruit poorly here[11], however a tree at Kew was bearing a very good crop at the end of the hot summer of 1989 and again in

pungency and give them a nutty flavour [238]. Sprouted seeds can be added to salads. Plants produce swellings on the stem, these can be cooked or pickled [206].

dwatta Anodyne Antiarthritic Antiinflammatory Antirheumatic Antitumor Diuretic Emetic Emmenagogue Foot care Galactogogue Laxative Rubefacient Stimulant TonicReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[ 269 ]. The seed is used in the treatment of tumours in China[ 269 ]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[ 269 ]. The root is used as a galactagogue in Africa [269]. Ingestion may impart a body odour repellent to mosquitoes [269]. Mustard oil is used in the treatment of skin eruptions and ulcers[ 269 ]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[ 269 ]. In Java the plant is used as an antisyphilitic emmenagoguel 269 l. Leaves applied to the forehead are said to relieve headache[ 269 ]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[ 269 ].

nrakta A cultivar of garden origin. ksacta Not known in the wild.

propta Seed - sow in situ from August to October. Spring and early summer-sown crops tend to run quickly to seed, though they can be eaten whilst still small[ 206 ]. It is best not to sow the seed in very hot weather[ 206 ]. There are about 5.660 - 6.000 per 0.01 kg (1/3 oz) [269 ].

nwatta Originating from the central Asian Himalayas to China, the plant has long been cultivated and many forms have been developed that can be grown from the temperate to the tropical zones. Succeeds in full sun in most well-drained moisture-retentive fertile soils[ 16 , 200 , 206 ]. Prefers a heavy soil and some shade[ 16 ]. Dislikes very hot weather[ 33 ]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[ 206 ]. A form of B. Juncea that has been selected in the Orient for its edible swollen stem, there are many named varieties[ 206 ]. Plants are reasonably cold-tolerant[ 206 ]. They prefer a fairly high stable temperature and are well adapted to short day length[ 200 ]. Plants have a rooting depth of between 90 - 120 cm[ 269 ]. A good bee plant[ 74 ].

## 7.2.69 Brassica juncea tumida

Swollen-Stem Mustard

6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica juncea tumida is a ANNUAL growing to 0.8 m (2ħ '7in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil StemEdible Uses: Condiment OilLeaves and leaf stems - raw or cooked[22, 33, 46, 52, 61]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[206]. The leaves can also be finely shredded and added to mixed salads[206]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling[183]. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133]. An edible semi-drying oil is obtained from the seed[1, 2, 17, 57, 183]. The seed contains 25 - 30% oil[74]. The seed is used as a mustard flavouring[171]. It is the source of 'brown mustard'[183], a prepared mustard that is milder than that produced from other species[238]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles[238]. They are often heated in oil to destroy their pungency and

give them a nutty flavour[238]. Sprouted seeds can be added to salads. Plants produce swellings on the stem, these can be cooked or pickled[206].

tcanta Green manure Oil RepellentThere is some evidence that if this plant is grown as a green manure it is effective in reducing soil-borne root rots in pea crops[206]. This is attributed to chemicals that are given off as the plants decay[206].

dwatta Anodyne Aperient Diuretic Emetic Galactogogue Rubefacient StimulantReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[269]. The seed is used in the treatment of tumours in China[269]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[269]. The root is used as a galactagogue in Africa[269]. Ingestion may impart a body odour repellent to mosquitoes[269]. Mustard oil is used in the treatment of skin eruptions and ulcers[269]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[269]. In Java the plant is used as an antisyphilitic emmenagogue[269]. Leaves applied to the forehead are said to relieve headache[269]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[269].

nrakta A cultivar of garden origin. ksacta Not known in the wild.

propta Seed - sow in situ from August to October. Spring and early summer-sown crops tend to run quickly to seed, though they can be eaten whilst still small[206]. It is best not to sow the seed in very hot weather[206]. There are about 5.660 - 6.000 per 0.01 kg (1/3 oz)[269].

nwatta Šucceeds în full sun in most well-drained moisture-retentive fertile soils[16, 200, 206]. Prefers a heavy soil and some shade[16]. Dislikes very hot weather[33]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[206]. A form of B. Juncea that has been selected in the Orient for its edible swollen stem, there are many named varieties[206]. Plants are reasonably cold-tolerant[206]. They prefer a fairly high stable temperature and are well adapted to short day length[200]. Many are best grown in warmer climates than Britain but there are several cultivars that grow well in this country[206]. Plants have a rooting depth of between 90 - 120 cm[269]. A good bee plant[74].

#### 7.2.70 Yucca baccata

Spanish Bayonet, Banana yucca, Blue Yucca, Spanish Yucca 6 tlin 11 cyuc 4 kcak 5 tcan 1 dwat 0.9 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasilutnyik hpa7tli flat-

priklwis hpa7tmwatli xre7t hjonli

drutta Yucca baccata is an evergreen Shrub growing to 0.9 m (3ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit Leaves Seed StemEdible Uses: Fully ripe fruit - raw, cooked or dried for winter use[1, 2, 3, 62, 92, 94, 257]. A staple food for several native North American Indian tribes, the fruits are large, fleshy, sweet and palatable[85, 92, 95, 183]. The ovoid fruit is about 17cm long and 7cm wide[200]. Considered to be a luxury by the native North American Indians[207], the fruits were often baked in ovens[216]. The cooked fruit can be formed into cakes and then dried for later use[257]. Large quantities of the fruit has caused diarrhoea in people who are not used to

and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Young shoots -cooked. They are so popular in Japan that a license is required in order to collect them. Seed - used as a cereal[177]. The seed is only produced at intervals of many years.

nrakta E. Asia - Japan. ksacta Woodlands and damp hollows, C. and S. Japan[58, 200].

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°c. Stored seed is best sown as soon as it is received. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 -6 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse until large enough to plant out, which could be a few years. Plants only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Take large divisions, trying to cause as little root disturbance to the main clump as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Divisions of less than 5 - 6 culms rarely succeed[200].

nwatta Prefers a damp humus rich soil in partial shade[200]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rootstock can be rampant and invasive[200]. Plants are sometimes confused with Sasaella ramosa[200].

## 7.2.67 Brassica juncea crispifolia

Curled Mustard

 $6\ tlin\ 9\ cyuc\ 4\ kcak\ 0\ tcan\ 2\ dwat\ 0.3\ m$ hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica juncea crispifolia is a ANNUAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves OilEdible Uses: Condiment OilLeaves - raw or cooked[22, 33, 46, 52, 61]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[206]. The leaves can also be finely shredded and added to mixed salads[206]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling[183]. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133]. An edible semidrying oil is obtained from the seed[1, 2, 17, 57, 183]. The seed contains 25 - 30% oil[74]. The seed is used as a mustard flavouring[171]. It is the source of 'brown mustard'[183], a prepared mustard that is milder than that produced from other species [238]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles[238]. They are often heated in oil to destroy their pungency and give them a nutty flavour[238]. Sprouted seeds can be added to salads.

tcanta Green manure Oil RepellentThere is some evidence that if this plant is grown as a green manure it is effec-

tive in reducing soil-borne root rots in pea crops[206]. This is attributed to chemicals that are given off as the plants decay[206].

dwatta Anodyne Aperient Diuretic Emetic Galactogogue Rubefacient StimulantReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[269]. The seed is used in the treatment of tumours in China[269]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[269]. The root is used as a galactagogue in Africa[269]. Ingestion may impart a body odour repellent to mosquitoes[269]. Mustard oil is used in the treatment of skin eruptions and ulcers[269]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[269]. In Java the plant is used as an antisyphilitic emmenagogue[269]. Leaves applied to the forehead are said to relieve headache[269]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[269].

nrakta A cultivar of garden origin. ksacta Not known in

propta Seed - sow in situ from August to October. Spring and early summer-sown crops tend to run quickly to seed, though they can be eaten whilst still small[206]. It is best not to sow the seed in very hot weather[206]. There are about 5,660 - 6,000 per 0.01 kg (1/3 oz)[269].

nwatta Succeeds in full sun in most well-drained moisture-retentive fertile soils[16, 200, 206]. Prefers a heavy soil and some shade[16]. Dislikes very hot weather[33]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[206]. A form of B. juncea with curled leaves that has been selected in the Orient for its edibility. There are some named varieties[206]. Plants in this group are fairly cold-tolerant and often stand the winter, they are then slow to bolt and can supply a good crop of leaves in the spring[206]. Plants have a rooting depth of between 90-120 cm[269]. A good bee plant[74].

## 7.2.68 Brassica juncea tsatsai tu-

Swollen-Stem Mustard

6 tlin 10 cyuc 4 kcak 2 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

wis hpa7tmwatli fyif hjonli

drutta Brassica juncea tsatsai tumida is a ANNUAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil Oil Seed Shoots StemEdible Uses: Condiment Oil OilEdible portion: Flowers, Leaves, Oil, Stem, Vegetable. Leaves and leaf stems - raw or cooked[ 22 , 33 , 46 , 52 , 61 ]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[ 206 ]. The leaves can also be finely shredded and added to mixed salads[ 206 The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling 183 l. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[ 133 ]. The stem is trimmed then washed, halved, withered slightly and preserved with salt, cayenne pepper and zanthoxylum pericarps under pressure then marketed. An edible semi-drying oil is obtained from the seed[ 1 , 2 , 17, 57, 183]. The seed contains 25 - 30% oil[ 74]. The seed is used as a mustard flavouring[ 171 ]. It is the source of 'brown mustard' [183], a prepared mustard that is milder than that produced from other species[ 238 ]. Pungency of mustard develops when cold water is added to the groundup seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[ 238 Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and

pickles [238]. They are often heated in oil to destroy their

1991[K]. The seed ripens in its first year[200]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200].

## 7.2.2 Torreya nucifera

Kaya, Japanese torreya 6 tlin 8 cyuc 5 kcak 0 tcan 2 dwat 20 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Torreya nucifera is an evergreen Tree growing to 20 m (65ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen from September to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed raw, cooked or used in confectionery[1, 63, 105, 183]. An agreeable sweet slightly resinous flavour[11]. An aromatic flavour[46], it is much relished and is eaten in quantity[178] though it is said to be laxative if eaten in excess[2]. An edible oil is obtained from the seed[1, 2, 1, 63, 178, 183]. Used in cooking[183].

dwatta Anodyne Anthelmintic Carminative Digestive Laxative PectoralThe seeds are anthelmintic[63, 147, 178, 218]. They are used in the treatment of several parasitic conditions including hookworm, tapeworms, pinworms and roundworms[279]. The plant is anodyne, carminative, digestive, laxative and pectoral[63, 147, 178, 218].

nrakta E. Asia - C. and S. Japan. ksacta Moist valley bottoms[81].

propta Seed - best sown as soon as it is ripe in a cold frame. Some of the seed should germinate in the following spring though much of it might take another 12 months. Stored seed requires a period of cold stratification and can take 18 months or more to germinate. Prick out the seedlings into individual pots as soon as growth is observed and grow them on in light shade in the greenhouse for at least the next couple of winters, making sure to pot them on into larger pots as and when required. Plant them out into their permanent positions in early summer when the plants are at least 20cm tall. Cuttings of half-ripe shoots in late summer[1]. Cuttings do not grow well[11]. Layering.

nwatta Management: Standard Regional Crop Staple Crop: Protein-oilSucceeds in ordinary garden soil, tolerating some lime[1]. Prefers an acid soil[200]. Dislikes wind exposure[200]. Requires a sheltered position and either high humidity or a moist riverside soil[200]. Tolerates woodland shade very well[200]. Requires hot, very humid summers for best growth[200]. Trees are probably not hardy in all parts of Britain, but should succeed quite far north. A tree at Wakehurst Place was 11 metres tall in 1970[185]. A shrub growing in the shade of coniferous trees at Kew was about 2.5 metres tall and 4 metres wide in September 1993[K]. it was carrying a very heavy crop of fruit[K]. No fruit was formed in 1994[K]. A specimen at Cambridge Botanical Gardens was 6 metres tall and 6 metres wide, it was carrying an enormous crop of seed in the late summer of 1996[K]. This plant has an excellent potential as a nut crop in Britain[K]. Sometimes cultivated for its edible seed in Japan, the variety 'Shibunashigaya' is considered to be the best for seed production[46]. The seed takes two summers to mature[229]. Plants are dioecious so both male and female plants are reguired if seed is to be produced. Occasional trees are monoecious with dioecious branches. Solitary trees have been seen on a number of occasions with heavy crops of fertile seed, so it would appear that the tree is not dioecious[K].

## 7.2.3 Sorbus domestica

Service Tree 6 tlin 10 cyuc 5 kcak 2 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sorbus domestica is a deciduous Tree growing to  $15 \mathrm{\ m}$  (49ft  $3 \mathrm{\ m}$ ) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is usually bletted if it is going to be eaten raw[1, 2, 3, 11, 115, 183]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit[K]. The fruit will often begin its bletting process whilst still on the tree and we have eaten delicious fruits straight from the tree in mid-Septemberf[K]. The fruit can also be dried and used like prunes. The fruit is up to 3cm across[200].

tcanta Tannin WoodThe bark is a source of tannin[61]. Wood - fine grained, very heavy, hard to split. Used for furniture, screws, wine presses etc[11, 46, 61, 74, 115].

nrakta Europe. ksacta Woods and bushy places[45].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. The service tree is occasionally cultivated for its edible fruit[3, 45, 132]. There are 2 distinct forms, S. domestica pomifera. (Hayne.)Rehd. with apple shaped fruits (which ripen from September) and S. domestica pyriformis. (Hayne.)Rehd. with pear shaped fruits which ripen from October[11, 132]. Plants are susceptible to fireblight[188] and to canker (which is especially prevalent in areas with high rainfall)[K]. They grow best in the drier areas of Britain, which in general means the eastern half of the country[121]. The plant is heat tolerant in zones 8 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over  $86 \text{ degrees } \vec{F}$  (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 7.2.4 Vitis vinifera

Grape, Wine grape, Purpleleaf Grape, Common Grape 6 tlin 10 cyuc 5 kcak 2 tcan 2 dwat 15 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis vinifera is a deciduous Climber growing to  $15~\mathrm{m}$  (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from May to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Fruit Leaves Oil ShootsEdible Uses: OilFruit - raw or dried for winter use[1, 2, 11, 46]. The dried fruits are the raisins, sultanas and currants of commerce, different varieties producing the different types of dried fruit. A fully ripened fresh fruit is sweet, juicy and delicious[K]. The fruit juice can be concentrated and used as a sweetener[183]. This fruit is widely used in making wine[183]. Leaves - cooked[55]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour[183]. Young tendrils - raw or cooked[85]. The flower clusters are used as a vegetable[183]. An edible oil similar to sunflower oil is obtained from the seed[7, 183]. It needs to be refined before it can be eaten[46]. A polyunsaturated oil, it is suitable for mayonnaise and cooking, especially frying[238]. San - raw. Used as a drink, it has a sweet taste. The san can be harvested in spring and early summer, though it should not be taken in quantity or it will weaken the plant. The roasted seed is a coffee substitute[7]. Cream of tartar, also known as potassium bitartrate, a crystalline salt, is extracted from the residue of pressed grapes, and from the sediment of wine barrels. It is used in making baking powder[238].

tcanta Dye Miscellany OilA yellow dye is obtained from the fresh or dried leaves[168]. An oil from the seed is used for lighting and as an ingredient in soaps, paints etc[46, 61]. Cream of tartar, extracted from the residue of pressed grapes, is used in making fluxes for soldering[238]. Especially when growing in hotter countries than Britain, the stems of very old vines attain a good size and have been used to supply a very durable timber[4].

dwatta Analgesic Antiinflammatory Astringent Bach Cholera Demulcent Diuretic Hepatic Laxative Lithontripic Miscellany Skin StomachicGrapes are a nourishing and slightly laxative fruit that can support the body through illness, especially of the gastro-intestinal tract and liver[254]. Because the nutrient content of grapes is close to that of blood plasma, grape fasts are recommended for detoxification[254]. Analgesic[178]. The fresh fruit is antilithic, constructive, cooling, diuretic and strengthening[4, 218]. A period of time on a diet based entirely on the fruit is especially recommended in the treatment of torpid liver or sluggish biliary function[7]. The fruit is also helpful in the treatment of varicose veins, haemorrhoids and capillary fragility[254]. The dried fruit is demulcent, cooling, mildly expectorant, laxative and stomachic[218]. It has a slight effect in easing coughs[254]. The leaves, especially red leaves, are antiinflammatory and astringent[4, 7, 218, 254]. A decoction is used in the treatment of threatened abortion, internal and external bleeding, cholera, dropsy, diarrhoea and nausea[4, 218, 254]. It is also used as a wash for mouth ulcers and as douche for treating vaginal discharge[254]. Red grape leaves are also helpful in the treatment of varicose veins, haemorrhoids and capillary fragility[254]. The leaves are harvested in early summer and used fresh or dried[238]. The seed is anti-inflammatory and astringent[4, 7, 218]. The sap of young branches is diuretic[7]. It is used as a remedy for skin diseases[218, 240] and is also an excellent lotion for the eyes[4, 7, 254]. The tendrils are astringent and a decoction is used in the treatment of diarrhoea[7]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Dominating', 'Inflexible' and 'Ambitious' [209].

nrakta Central and southern Europe; Northern Africa; Western Asia and the Caucasus. ksacta Riversides and damp woods[200]. Grows on the banks of the Thames at Kew in Britain[17].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germina-

tion rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Landscape Uses: Arbor. Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil, but dislikes excessively chalky soils[200]. Prefers a pH in the range 6.5 to 7[200] but tolerates a range from 4.3 to 8.6. Succeeds in sun or partial shade though a warm sunny sheltered position is required for the fruit to ripen[200]. Very commonly grown in the temperate zones of the world for its edible fruit, there are many named varieties, some of which have been developed for their use as a dried fruit, others for dessert use and others for wine[132, 183]. Good and regular crops are a bit problematical in Britain, grapes are on the northern most limits of their range in this country and the British summer often does not provide enough heat to properly ripen the fruit. Late frosts can also damage young growth in spring, though dormant shoots are very hardy, tolerating temperatures down to about -20°c[11]. Nonetheless, there are a number of commercial vineyards in Britain (usually producing wine grapes) and, given a suitably sunny and sheltered position, good dessert grapes can also be grown. In general it is best to grow the dessert varieties against the shelter of a south or west facing wall[219]. There are a number of varieties that have been bred to cope with cooler summers. Grapes are very susceptible to attacks by phylloxera, this disease is especially prevalent in some areas of Europe and it almost destroyed the grape industry. However, American species of grapes that are resistant to phylloxera are now used as rootstocks and this allows grapes to be grown in areas where the disease is common. Britain is free of the disease at the present (1989) and grapes are usually grown on their own roots. Plants in this genus are notably susceptible to honey fungus[200]. The flowers are intensely fragrant[245]. Grapes grow well in the company of hyssop, chives, basil and charlock[201]. They grow badly with radishes, both the grapes and the radishes developing an off taste[201]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182]. The cultivated grape is thought to have been derived from V. vinifera sylvestris. (Gmel.)Hegi. This form has dioecious flowers and produces small black grapes. Special Features: Attractive foliage, Inconspicuous flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine

#### 7.2.5 Crataegus tanacetifolia

Tansy-Leaved Thorn

6 tlin 8 cyuc 5 kcak 3 tcan 2 dwat 10 m hkuc hmimhtut cyutli hgatkyuctcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus tanacetifolia is a deciduous Tree growing to 10 m (32ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

smooth-edged edible leaves. B. juncea japonica. Rather similar to B. juncea crispifolia and combined with that group by some botanists. B. juncea multiceps. The multishoot mustard group. B. juncea napiformis. A form with a swollen edible root. B. juncea rugosa. Large somewhat cabbage-like edible leaves. B. juncea strumata. A form with large edible leaf stalks. B. juncea tumida. A form with swollen edible stems. Plants take from 2 - 5 months from sowing to maturity, depending on the season and the cultivar[206]. They prefer a fairly high stable temperature and are well adapted to short day length[200]. Many are best grown in warmer climates than Britain but there are several cultivars that grow well in this country[206]. Plants have a rooting depth of between 90 - 120 cm[269]. A good bee plant[74].

#### 7.2.64 Allium victorialis

Alpine Leek, Victory onion 6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis

drutta Allium victorialis is a BULB growing to  $0.6~\mathrm{m}$  (2ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf from November to July, in flower in May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[183]. An onion substitute[22]. The plants are as pungent as garlic[203]. The bulbs are rather small, about 10 - 20mm in diameter, and are produced in clusters on a short rhizome[200]. Leaves - raw or cooked. The stems and leaves are eaten[177, 179], they are much favoured in [apan[116]. Flowers - raw or cooked.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Antiscorbutic Carminative Diuretic Vermifuge Women's complaintsThe root is antiscorbutic, carminative, diuretic and vermifuge[1, 46, 178, 218]. Used in the treatment of profuse menstruation[1, 46, 178].

nrakta Europe - Mediterranean to Russia, China, Japan and Korea. ksacta Rocky and stony places in mountains, usually on calcareous soils[45]. Forests, shady and moist slopes, pastures and streamsides at elevations of 600 - 2500 metres in China[266].

propta Seed - best sown as soon as it is ripe in a greenhouse or cold frame. It germinates quickly and can be grown on in the greenhouse for the first year, planting out the dormant bulbs in the late summer of the following year if they have developed sufficiently, otherwise grow on in pots for a further year. Stored seed can be sown in spring in a greenhouse. Division in summer after the plants have died down. Fairly easy, though we have found that it is best to pot up the divisions until they are growing away strongly before planting them out into their permanent positions[K].

nwatta Requires a sunny position in a light well-drained soil[1, 200]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 7.2.65 Eruca vesicaria sativa

Rocket

6 tlin 9 cyuc 4 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Eruca vesicaria sativa is a ANNUAL growing to  $0.6 \,\mathrm{m}$  (2ft) by  $0.3 \,\mathrm{m}$  (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Flowers Leaves Oil OilEdible Uses: Condiment Oil OilYoung leaves - raw or cooked[2, 27, 33, 34, 74]. A distinct strongly spicy flavour[183], the taste is best from fast, well-grown plants[200]. A few leaves added to a salad are acceptable though the flavour is too strong for many tastes[K]. Some people really like these leaves though most are not very keen[K]. Older leaves that have become too hot to eat on their own can be pureed and added to soups etc[183]. In the milder areas of Britain it is possible to produce edible leaves all year round from successional sowings, especially if the winter crop is given some protection[K]. Flowers - raw[52]. A similar taste to the leaves, they make a nice garnish on the salad bowl[183]. The seed yields a semidrying oil[1, 2, 74] which is edible if stored 6 months[61, 114] and is a substitute for rapeseed oil[34]. It contains 32% fat, 27% protein[114]. It is known as 'jamba oil'[183]. A mustard is obtained from the seed[46, 74, 183], the strong flavour comes from an essential oil that is contained within the oil of the seed[114]. The pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238].

tcanta Oil OilThe seed yields a semi-drying oil which is a substitute for rapeseed oil[46]. It can also be used for lighting, burning with very little soot[114].

dwatta Antibacterial Antiscorbutic Aphrodisiac Diuretic Rubefacient Stimulant StomachicRocket was at one time used medicinally, though it is now used only as a salad herb[233]. The leaves are antiscorbutic, diuretic, stimulant and stomachic[4, 46]. The seed is rubefacient and stimulant[4, 46]. The powdered seed possesses antibacterial activity, but no alkaloids have been isolated[240]. The oil from the seed is said to have aphrodisiac properties[264].

nrakta Europe - Mediterranean. A frequent casual in Britain, occasionally becoming established for a while. ks-acta Waste ground, fields, olive groves, stony hills, tracksides etcl891.

propta Seed - sow outdoors in spring in situ. Germination is usually very quick and free. In order to obtain a continuous supply of edible leaves, successional sowings can be made every few weeks until mid August[33]. A late summer/early autumn sowing can provide leaves in winter, though the plants might require some protection in very cold winters[200].

nwatta A very easily grown and fast-maturing plant, it succeeds in most soils and conditions, though it prefers some shade in summer[52]. Once established, plants are quite drought resistant[160]. Rocket is occasionally cultivated for its edible leaves and flowers, it can be ready for harvest within 40 days of sowing the seed[1, 46, 89, 264], there are some named varieties. 'Rocket Improved' is less prone to bolting, though it still grows best in cooler weather[183]. Plants usually self-sow freely if the ground is disturbed in some way, such as by hoeing[K]. This species is normally untroubled by pests or diseases[160].

## 7.2.66 Sasa nipponica

Miyako-Zasa

6 tlin 9 cyuc 4 kcak 0 tcan 0 dwat 0.8 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sasa nipponica is an evergreen Bamboo growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy)

a pH of 5.5 to 7[200]. Prefers a cool moist reasonably fertile soil[52]. The plant is shallow rooted and intolerant of drought, it needs to be grown in a moist fertile soil for the best quality leaves[206]. Fairly hardy, tolerating quite hard frosts, though plants are likely to die if this is coupled with wet weather[206]. Plants are also tolerant of summer heat[206]. Mizuna is widely cultivated in China for its edible leaves, there are many named varieties[206]. This plant is one of the most resistant to bolting of the oriental brassicas and can be sown in spring. It can also be planted in the summer for an autumn and winter crop[264]. Mizuna can also be transplanted successfully[206]. A fast growing plant, it can be cropped on a cut and come again basis just 2 - 3 weeks after sowing and has been known to continue cropping for 10 months before going to seed[206]. A very ornamental plant[206].

#### 7.2.62 Triteleia laxa

Grassnut, Ithuriel's spear 6 tlin 9 cyuc 4 kcak 0 tcan 0 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Triteleia laxa is a BULB growing to  $0.5 \mathrm{\ m}$  (1ft 8in) by  $0.1 \mathrm{\ m}$  (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[105, 177, 257]. Tasty[161]. A sweet flavour[207]. Rich in starch, the bulb can be used like potatoes[257].

nrakta South-western N. America- California to Oregon. ksacta Heavy soils in many habitats below 1400 metres[71]. Open forests, mixed conifer or foothill woodlands, grasslands on clay soils from sea level to 1500 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame. Alternatively, the seed can be sown in spring in a cold frame. Germination usually takes place within 1 - 3 months at 15°c. Sow the seed thinly so that there is no need to prick them out and grow the seedlings on in the pot for their first year. Give an occasional liquid feed to ensure that they do not become mineral deficient. Seedlings are prone to damping off so be careful not to overwater them and keep them well ventilated. When they become dormant, pot up the small bulbs placing about 3 in each pot. Grow them on in the greenhouse for another year or two until the bulbs are about 20mm in diameter and then plant them out into their permanent positions when they are dormant in the autumn. Division of flowering size bulbs in autumn. Dig up the clumps of bulbs, replanting the larger ones direct into their permanent positions. It is best to pot up the smaller ones and grow them on in a greenhouse for a year before planting them out when they are dormant in early autumn.

nwatta Succeeds outdoors in a warm position[90], requiring a rich well-drained sandy loam[1]. Likes plenty of moisture whilst in growth followed by a warm dry period in late summer and autumn[200]. A polymorphic species[71].

## 7.2.63 Brassica juncea

Brown Mustard

6 tlin 9 cyuc 4 kcak 2 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Brassica juncea is a ANNUAL growing to 0.8 m (2ft 7in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Mustard allergy possibly especially in children and adolescents. Retention of seeds possibly in intestines if taken internally [301].

kcakta Edible Parts: Flowers Leaves Oil Root SeedEdible Uses: Condiment OilLeaves - raw or cooked[22, 33, 46, 52, 61]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[206]. The leaves can also be eaten raw, when finely shredded they make a very acceptable addition to mixed salads[206]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling[183]. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133]. An edible semi-drying oil is obtained from the seed[1, 2, 17, 57, 183]. The seed contains 25 30% oil[74]. The seed is used as a mustard flavouring[171]. It is the source of 'brown mustard' [183], a prepared mustard that is milder than that produced from other species[238]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles [238]. They are often heated in oil to destroy their pungency and give them a nutty flavour [238]. The root of some forms of this species is edible[183]. Sprouted seeds can be added to salads.

tcanta Green manure Oil RepellentThere is some evidence that if this plant is grown as a green manure it is effective in reducing soil-borne root rots in pea crops[206]. This is attributed to chemicals that are given off as the plants decay[206]. Brassica juncea is used in phytoremediation to remove heavy metals, such as lead, from the soil in hazardous waste sites because it has a higher tolerance for these substances and stores the heavy metals in its cells. In particular, Schneider et al. found that Brassica juncea was particularly effective at removing cadmium from soil.

dwatta Anodyne Antibiotic Aperient Diuretic Emetic Galactogogue Rubefacient StimulantAlthough not usually used medicinally, the seed is a warming stimulant herb with antibiotic effects[238]. Reported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, Brown Mustard is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[269] The seed is used in the treatment of tumours in China[269]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[269]. The root is used as a galactagogue in Africa[269]. Ingestion may impart a body odour repellent to mosquitoes[269]. Mustard oil is used in the treatment of skin eruptions and ulcers[269]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[269]. In Java the plant is used as an antisyphilitic emmenagogue[269]. Leaves applied to the forehead are said to relieve headache[269]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[269].

nrakta N. Europe to C. Asia. Rarely naturalized in Britain[17]. ksacta Cornfields in Britain[17].

propta Seed - sow in situ from early spring to early autumn in order to obtain a succession of edible leaves. Most varieties of Oriental vegetables belonging to this species are best sown from late June to early September otherwise they may bolt[206]. There are about 5,660 - 6,000 per 0.01 kg (1/3 oz)[269].

nwatta Succeeds in full sun in most well-drained moisture-retentive fertile soils[16, 200, 206]. Prefers a heavy soil and some shade[16]. Dislikes very hot weather[33]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[206]. Tolerates a pH in the range 4.3 to 8.3. Brown mustards is widely cultivated for its edible seed which is used to make the condiment 'brown mustard' and is also sprouted as the mustard of mustard and cress[50, 200]. It has only 70% of the pungency of black mustard (B. nigra) but can be harvested mechanically so is more viable commercially[238]. This species has also been cultivated in the Orient for many hundreds of years and a wide diversity of forms has been developed with edible leaves, stems, roots and seeds. These forms have been classified by the botanists as follows and separate entries have been made for each of them. B. juncea crispifolia. The curled or cutleaf mustards, this group has attractively curled edible leaves. B. juncea foliosa. The leaf mustards have guite large

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 105]. A good size with a soft juicy texture and an acid/sweet apple-like flavour that is very nice raw when fully ripe[11, 183, K]. The fruit can also be used in making pies, preserves, etc, and can be dried for later use. The fruit sup to 25mm in diameter[200]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta WoodWood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[74, 82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta W. Asia. ksacta Dry slopes[74].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 -8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. Unlike most members of this genus, the flowers are sweetly scented and free from the smell of decaying fish[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. This species has an excellent potential as a fruit crop in Britain. The fruit is of a reasonable size, it is usually very freely borne and the quality is very acceptable for dessert[K]. The tree is very easily grown and is little troubled by pests or diseases. It also requires very little attention, once the trees are established virtually the only work needed is to harvest the fruit each year[K]. A tree at Cambridge Botanical Gardens was about 6 metres tall and 4 metres wide in September 1993. It usually carries a very good crop of fruit[K]. A very ornamental plant[1], it is closely related to C. laciniata[11].

## 7.2.6 Actinidia deliciosa

Kiwi Fruit

6 tlin 9 cyuc 5 kcak 1 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat hpa7tmwatli nyanhjen hjonli drutta Actinidia deliciosa is a deciduous Climber growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Leaves SeedEdible Uses: Fruit - raw or cooked. A delicious flavour[1, 2, 3, 11, 105], the fruit can be up to 8cm long, it is very juicy when fully ripe and has a refreshing, acid flavour[K]. It contains a number of small seeds, but these are easily eaten with the fruit[K]. Rich in vitamin C[183]. Fresh fruits contain 100 - 420mg vitamin C per 100g and 8 - 14% carbohydrate[218]. Acidity is 1 - 2%, mainly citric acid[218]. The fruit ripens in November and can store for 3 - 4 months[132]. Yields of 8 - 30 tonnes per hectare are possible[218]. Leaves are a famine food[179].

tcanta Paper PencilPaper is made from the bark[178]. If the bark is removed in one piece from near the root and placed in hot ashes, it becomes very hard and can be used as a tube for a pencil[178].

dwatta Diuretic Febrifuge Sedative Urinary Vitamin CThe fruits, stems and roots are diuretic, febrifuge and sedative[147]. They are used in the treatment of stones in the urinary tract, rheumatoid arthralgia, cancers of the liver and oesophaqus[147].

nrakta E. Asia - China ksacta Derived in cultivation from A. chinensis, it is not known in a truly wild situation.

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy acid soil, it dislikes alkaline soils and becomes chlorotic at pH 6 or higher[11]. Tolerates a pH in the range 5.5 to 7.3. Succeeds in semi-shade but full sun is best for fruit production[3, 126, 200]. Prefers a sheltered position[200]. Does well when grown into trees[K]. Plants requires a 6 - 8 month frost-free growing season[160, 2001. They are hardy to about -12°c when fully dormant but young growth is very subject to damage by late frosts, being killed back at -2°c[160, 200]. Plants also require a winter chilling of 600 - 1100 hours below 7°c and a long warm summer to ripen the fruit[200]. Plants fruit on second year wood or on fruit spurs produced on older wood[126], any pruning is best carried out in the winter[219]. The flowers are sweetly scented[245]. A very ornamental plant[1], it is widely cultivated in warm temperate zones for its edible fruit, there are many named varieties[183, 200]. The fruit can store for up to 9 months at 0°c with a relative humidity of 90%, but under domestic conditions 4 - 6 weeks is optimal[200]. This is a rampant climbing plant, supporting itself by twining around branches etc[200]. Plants have been seen with very good crops of fruit at the Hillier Arboretum in Hampshire in several autumns. These plants had outgrown their planned supports and had climbed 15 metres into neighbouring trees. The main problem with them would be how to harvest the fruit[K]. The female 'Heywood' is the most commonly cultivated form in Britain (1993), its fruits store well but it tends to flower late and there can be problems with pollination[126]. The cultivar 'Blake' is said to be fast cropping and self-fertile[200]. The male 'Tomurii' is free-flowering and disease-resistant[202]. Plants in this genus are notably resistant to honey fungus[200]. Plants are usually dioecious, but hermaphrodite forms are known. However, the fruit quality and vield of these hermaphrodite forms is usually infe-

rior[11]. Male and female plants must usually be grown if seed is required, one male to five or six females is normally adequate. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Woody. Growth habit is a single or multiple shooting vine from a crown [1-2].

## 7.2.7 Semiarundinaria fastuosa

Narihiradake, Narihira bamboo 6 tlin 9 cyuc 5 koak 2 tcan 0 dwat 7.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Semiarundinaria fastuosa is an evergreen Bamboo growing to 7.5 m (24ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UX zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked[25, 61, 177]. The shoots are almost free of any acridity[183]. Although small, they are of good quality when cooked[183]. A plant at Trebah gardens in Cornwall was producing a good amount of new shoots about 35mm in diameter in early April 1995[K]. They are best harvested as they come through the soil in spring[183]. Do not take too many from any plant since this will weaken the clump.

tcanta Hedge Hedge Plant supportThe plant is fairly resistant to maritime exposure and makes a good shelter hedge[K]. A hedge seen in 1987 in an exposed position at Rosewarne in N. Cornwall was looking good even after the severe winter of that year[K]. It needs to be planted fairly closely if a thick hedge is wanted quickly since it is a slow spreader. 60 - 75cm is a good distance. The canes can be used as plant supports[25].

nrakta E. Asia - S. Japan. Locally naturalized in Britain and Ireland. ksacta Light woodlands and moist places[162].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in a lightly shaded place in the greenhouse until large enough to plant out, which could be 2 - 3 years. The plants only flower at intervals of many years and so seed is rarely available. Division as the plants come into growth in spring. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings. Rhizome cuttings.

nwatta Prefers a damp humus-rich soil in sun or semishade[200]. Dislikes drought[1]. A slow growing plant, it prefers a position sheltered from cold north and east winds[25] but is fairly tolerant of maritime exposure[K]. A very ornamental and hardy bamboo[195], tolerating temperatures down to about -22°c[25, 200]. Most leaves are produced at the tops of the stems[200]. This species is notably resistant to honey fungus[200]. The plant has a running roots tock but is slow moving and generally well behaved in the British climate. New shoots are produced from late April[25]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into

producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 7.2.8 Cephalotaxus fortunei

Chinese Plum Yew

6 tlin 9 cyuc 5 kcak 3 tcan 1 dwat 6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cephalotaxus fortunei is an evergreen Shrub growing to 6 m (19ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit[2]. Fairly large, it is about  $30mm \times 15mm[200]$ . We have no further details, though it is closely related to C. harringtonia, the fruit of which is edible raw if fully ripe[K]. The fruit does not always ripen in Britain, before full ripeness it has a disgusting resinous flavour that coats the mouth and refuses to go away for hours[K]. It is quite possible that the seed of this species is also edible[K].

tcanta Hedge HedgeSome forms of this species are procumbent in habit and can be used as ground cover in shady places[200]. Very tolerant of pruning, this plant makes a very good hedge in shady positions[200].

dwatta CancerSubstances from the plant have shown anticancer activity[218].

nrakta E. Asia - E. and C. China. ksacta Woodlands, especially in limestone regions[109]. Mixed, coniferous, and broad-leaved forests, thickets and roadsides at elevations of 200 - 3700 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[113], it should then germinate in the following spring[K]. A hard seedcoat can delay germination, especially in if the seed is not sown as soon as it is ripe[81, K]. Stored seed should be cold-stratified and sown in a cold frame in the spring[200]. Germination can take 18 months or more. Prick out the seedlings as soon as they are large enough to handle and grow them on for at least their first winter under cover. Plant out in late spring after the last expected frosts. Greenwood cuttings of terminal shoots, August/September in a humid cold frame[1, 200]. Difficult[113].

nwatta Prefers a moist well-drained sandy soil but succeeds in most soils though it dislikes dry gravelly or chalky soils[1, 200]. Prefers a position in semi-shade but tolerates full shade[11, 81] and it also succeeds but does not usually thrive in full sun[200]. It grows very well in the mild wet coastal region of W. Scotland where it succeeds even in full sun[200]. Requires a humid sheltered site[200], strongly disliking very exposed positions[1]. Although the dormant plant is very cold-hardy, the young growth in spring, even on nature plants, is frost-tender and so it is best to grow the

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium scorodoprasum is a BULB growing to  $0.6\,\mathrm{m}$  (2ft) by  $0.1\,\mathrm{m}$  (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[5, 46]. A garlic substitute[22, 27, 37, 61], it is used as a flavouring in salads, soups etc[238]. The bulbs are smaller than garlic and have a milder flavour, they are produced at the points of the stem as well as at the base[2]. The bulbs are 10 - 20mm in diameter[200]. Leaves - raw or cooked[238]. Used as a flavouring in salads etc[238]. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Cholera Depurative Digestive DysenteryThe plant is digestive and depurative[178]. The bulb is used in the treatment of abscesses, amoebic dysentery, bronchitis, cholera, dysentery, influenza, skin diseases and TB[218].

nrakta Most of Europe, including Britain, east and south to W. Asia and Syria. ksacta Grassland and scrub on dry soils[17].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta Prefers a sunny position in a light well-drained soil[1]. Thrives in poor dry soils[238]. The bulbs should be planted fairly deeply[1]. Many forms of this species produce numerous bulbils in the flowering head[203]. The plants can become very invasive by means of these bulbils[203]. The sub-species A. scorodoprasum jajlae and A. scorodoprasum rotundum do not produce bulbils[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Occasionally cultivated, especially in Russia, for its edible bulb[183]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 7.2.60 Brassica juncea strumata

Large Petiole Mustard 6 tlin 9 cyuc 4 koak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tlmstuf fyffxre7t hjonli

drutta Brassica juncea strumata is a ANNUAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil StemEdible Uses: Oil-Leaves and leaf stems - raw or cooked. Flowers and young flowering stems - raw or cooked. Flowers and succulent[133]. An edible semi-drying oil is obtained from the seed[1, 2, 17, 57, 183]. The seed contains 25 - 30% oil[74]. The seed is used as a mustard flavouring[171]. It is the source of 'brown mustard'[183], a prepared mustard that

is milder than that produced from other species[238]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles[238]. They are often heated in oil to destroy their pungency and give them a nutty flavour[238]. Sprouted seeds can be added to salads.

dwatta Anodyne Aperient Diuretic Emetic Galactogogue Rubefacient StimulantReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[269]. The seed is used in the treatment of tumours in China[269]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[269]. The root is used as a galactagogue in Africa[269]. Ingestion may impart a body odour repellent to mosquitoes[269]. Mustard oil is used in the treatment of skin eruptions and ulcers[269]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[269]. In Java the plant is used as an antisyphilitic emmenagogue[269]. Leaves applied to the forehead are said to relieve headache[269]. The Chinese eat the leaves in soups for bladder inflammation or baemorrhage[269]

nrakta A cultivar of garden origin. ksacta Not known in the wild.

propta Seed - sow in situ from August to October. Spring and early summer-sown crops tend to run quickly to seed, though they can be eaten whilst still small[206]. It is best not to sow the seed in very hot weather[206]. There are about 5.660 - 6.000 per 0.01 kg (1/3 oz)[269].

nwatta Succeeds in full sun in most well-drained moisture-retentive fertile soils[16, 200, 206]. Prefers a heavy soil and some shade[16]. Dislikes very hot weather[33]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[206]. A form of B. juncea that has been selected in the Orient for its edible swollen stem, there are many named varieties[206]. Plants are reasonably cold-tolerant[206]. They prefer a fairly high stable temperature and are well adapted to short day length[200]. Many are best grown in warmer climates than Britain but there are several cultivars that grow well in this country[206]. Plants have a rooting depth of between 90 - 120 cm[269]. A good bee plant[74].

## 7.2.61 Brassica rapa nipposinica

Mizuna

6 tlin 9 cyuc 4 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Brassica rapa nipposinica is a BIENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[206]. They can be eaten at any stage from seedling to mature plant though older leaves become fibrous[206]. A very good salad, the leaves can also be cooked as greens or in soups etc[206]. The leaf stalks can also be eaten but require more cooking than the leaves[206]. It can be used as a cut and come again crop. regrowing rapidly after being harvested[206]. Immature flowering stems - cooked like broccoli[206]. A sweet flavour[206].

nrakta A cultivar of garden origin. ksacta Not known in the wild.

propta Seed - sow in situ or in a seed bed from April to September. Thinnings can be transplanted[206]. Some varieties can also be sown in a cold greenhouse in late autumn or early spring to provide leaves overwinter and in late spring.

nwatta Succeeds in full sun in most well-drained fertile soils[200]. Summer crops tolerate light shade[206]. Prefers

soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil Seed Shoots StemEdible Uses: Condiment OilLeaves and stems - raw or cooked[ 22 , 33 , 46 , 52 , 61 ]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[ 206 ]. The leaves are more peppery than the stems[ 206 ]. The leaves can also be finely shredded and added to mixed salads[ 206 ]. The leaves can be harvested at any stage from seedling to maturity, becoming hotter with age[ 206 ]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling [183]. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133]. An edible semidrying oil is obtained from the seed [1, 2, 17, 57, 183]. The seed contains 25 - 30% oil[ 74 ]. The seed is used as a mustard flavouring 171 l. It is the source of 'brown mustard' 183 l. a prepared mustard that is milder than that produced from other species[ 238 ]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[ 238 ]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles [238]. They are often heated in oil to destroy their pungency and give them a nutty flavour[ 238 ]. Sprouted seeds can be added to salads.

tcanta Green manure Oil Repellent Soil reclamationOther uses rating: Low (2/5). Agroforestry Uses: There is some evidence that if this plant is grown as a green manure it is effective in reducing soil-borne root rots in pea crops[ 206]. This is attributed to chemicals that are given off as the plants decay[ 206 1.

dwatta Anodyne Antiarthritic Antiinflammatory Antirheumatic Antitumor Diuretic Emetic Emmenagogue Foot care Galactogogue Laxative Rubefacient Stimulant TonicReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[ 269 ]. The seed is used in the treatment of tumours in China[ 269 ]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders [269]. The root is used as a galactagogue in Africa[ 269 ]. Ingestion may impart a body odour repellent to mosquitoes[ 269 ]. Mustard oil is used in the treatment of skin eruptions and ulcers[ 269 1 Believed to be aperient and tonic the volatile oil is used as a counterirritant and stimulant[ 269 ]. In Java the plant is used as an antisyphilitic emmenagoguel 269 l. Leaves applied to the forehead are said to relieve headache[ 269 ]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[ 269 ].

nrakta A cultivar of garden origin. ksacta Not known in the wild.

propta Seed - sow in situ from August to October[ 206 ]. Seed can also be sown in the spring but plants are very likely to run to seed[ 206 ]. There are about 5,660 - 6,000 per 0.01 kg (1/3 oz)[ 269 ].

nwatta Originating from the central Asian Himalayas to China, the plant has long been cultivated and many forms have been developed that can be grown from the temperate to the tropical zones. Succeeds in full sun in most well-drained moisture-retentive fertile soils[ 16 , 200 , 206 ]. Prefers a heavy soil and some shade[ 16 ]. Dislikes very hot weather[ 33 ]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[ 206 ]. A form of B. Juncea that has been selected in the Orient for its large edible leaves, there are many named varieties[ 206 ]. Plants take 3 - 4 months to reach maturity[ 206 ]. They prefer a fairly high stable temperature and are well adapted to short day length[ 200 ]. Plants have a rooting depth of between 90 - 120 cm[ 269 ]. A good bee plant[ 74 ].

## 7.2.58 Brassica juncea rugosa

Head Mustard

6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica juncea rugosa is a ANNUAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardi-

ness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil Seed ShootsEdible Uses: Condiment OilLeaves and stems - raw or cooked[22, 33, 46, 52, 61]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[206]. The leaves are more peppery than the stems[206]. The leaves can also be finely shredded and added to mixed salads[206]. The leaves can be harvested at any stage from seedling to maturity, becoming hotter with age[206]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling[183]. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133]. An edible semi-drying oil is obtained from the seed[1, 2, 17, 57, 183]. The seed contains 25 30% oil[74]. The seed is used as a mustard flavouring[171]. It is the source of 'brown mustard' [183], a prepared mustard that is milder than that produced from other species[238]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles[238]. They are often heated in oil to destroy their pungency and give them a nutty flavour[238]. Sprouted seeds can be added to salads.

tcanta Green manure Oil RepellentThere is some evidence that if this plant is grown as a green manure it is effective in reducing soil-borne root rots in pea crops[206]. This is attributed to chemicals that are given off as the plants decay[206].

dwatta Anodyne Aperient Diuretic Emetic Galactogogue Rubefacient StimulantReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[269]. The seed is used in the treatment of tumours in China[269]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[269]. The root is used as a galactagogue in Africa[269]. Ingestion may impart a body odour repellent to mosquitoes[269]. Mustard oil is used in the treatment of skin eruptions and ulcers[269]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[269]. In Java the plant is used as an antisyphilitic emmenagogue[269]. Leaves applied to the forehead are said to relieve headache[269]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[269].

nrakta A cultivar of garden origin. ksacta Not known in the wild.

propta Seed - sow in situ from August to October[206]. Seed can also be sown in the spring but plants are very likely to run to seed[206]. There are about 5,660 - 6,000 per 0.01 kg (1/3 oz)[269].

nwatta Succeeds in full sun in most well-drained moisture-retentive fertile soils[16, 200, 206]. Prefers a heavy soil and some shade[16]. Dislikes very hot weather[33]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[206]. A form of B. juncea that has been selected in the Orient for its large edible leaves, there are many named varieties[206]. Plants are very hardy and stand the winter well in temperate areas, they can be harvested lightly in the winter but the main cropping time is in spring[206]. Plants take 3 - 4 months to reach maturity[206]. They prefer a fairly high stable temperature and are well adapted to short day length[200]. Plants have a rooting depth of between 90 - 120 cm[269]. A good bee plant[74].

## 7.2.59 Allium scorodoprasum

Rocambole, Sand leek 6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.6 m hkuc plants in a position sheltered from the early morning sun[K]. The Chinese plum yew is a very slow growing shrub or small tree[185] that has excellent potential as a nut crop in Britain. It usually fruits regularly and well in most parts of the country[K] and does well in Cornwall[59]. Trees growing in the shade of other conifers fruit regularly and heavily at Kew Botanical gardens and, unlike most nut trees there, the seeds do not get eaten by the squirrels[K]. Although we have seen no records of edibility for the seed of this species, the closely related C. harringtonia does have edible seed[K]. There are some named forms selected for their ornamental value[200]. 'Grandis' is a long leafed female form[200]. 'Longifolia' is male but otherwise similar to 'Grandis' [200]. 'Prostrata' (syn 'Prostrate Spreader') is a procumbent ground-covering plant that arose as cuttings from a side-shoot of a normal plant[200], a plant of this cultivar was seen with a very heavy crop of immature fruit in mid September 1994 at Hillier Arboretum[K]. Plants are dioecious, but female plants sometimes produce fruits and infertile seeds in the absence of any male plants[11]. However, at least one male plant for every five females should be grown if you are growing the plants for fruit and seed. Plants have also been known to change sex[81]. Male cones are produced in the axils of the previous year's leaves, whilst female cones are borne at the base of branchlets[200].

## 7.2.9 Phyllostachys aurea

Golden Bamboo, Fishpole Bamboo 6 tlin 11 cyuc 5 kcak 0 tcan 0 dwat 6 m hkuc hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys aurea is an evergreen Bamboo growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Seed StemEdible Uses: Young shoots - cooked[61, 105, 177]. They can also be eaten raw and have very little bitterness[183]. They are said to be the sweetest of the genus[25]. The canes are about 15mm in diameter[K]. In China, the new canes are 2 - 5cm in diameter[266]. The shoots are harvested in the spring when about 8cm above the ground, cutting them about 5cm below soil level. Seed - raw or cooked. The seed is only produced at intervals of several years, it can be eaten in all the ways that rice s used and can also be ground into a flour and used as a ceral[183]

tcanta Paper Plant support WoodThe canes make excellent plant supports and are also used for making items such as umbrella handles, walking sticks, fan handles and pipe stems[25, 162, 195]. The canes are very hard but superflexible[195]. A fibre from the stems is used for making paper[189]. The stems are harvested at any time of the year and crushed with a hammer. They are then cooked for 2 hours or more with lye and beaten in a ball mill for 4 hours. The fibre makes a yellow(qold to cream paper[189].

nrakta E. Asia - S.E. China. ksacta Woodland[162]. propta Seed - surface sow as soon as it is ripe in a green-

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Landscape Uses:Container, Screen, Specimen. Requires a rich damp soil in a sheltered position[200]. Dislikes prolonged exposure to hard frosts[200]. Established plants are drought resistant[74]. A very hardy bamboo, it succeeds in most parts of Britain[25] but suffers leaf and culm damage at temperatures below about -15°c. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. Although called the Golden Bamboo', the leaves of this plant only turn golden if plants are grown in full sun[195], especially if the plants are half-starved. This species is considered by some botanists to be a part of P. bambusoides[25]. Cultivated for its edible shoots in China[25, 162], it has the sweetest taste of the genus[25]. It has been widely planted as an ornamental in the Mediterranean and seems to be naturalizing there[50]. This species is notably resistant to honey fungus[200]. The rootstock is running[25], but not aggressively so, the plant forming fairly tight clumps[195]. New shoots are produced from late May[25]. This is a good companion species to grow in a woodland because the plants have shallow root systems that do not compete with deep tree roots[195]. Special Features:Not North American native, Naturalizing, Inconspicuous flowers or blooms.

## 7.2.10 Phyllostachys nidularia

Big-Node Bamboo, Broom bamboo 6 tlin 9 cyuc 5 kcak 4 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys nidularia is an evergreen Bamboo growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked. Highly prized in China, both for their earliness and their delicate flavour[195], they taste somewhat like hominy corn[183]. Neither acrid nor bitter, even in the raw state. The shoots, which are about 4cm in diameter[266] are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta Hedge Hedge Plant support Soil stabilization WoodThe plant has been suggested as being useful for soil and water stabilization on hills and levees[195]. The canes are strong and useful in their whole state, but do not split well[195]. They can be used for plant supports etc.

nrakta E. Asia - N. and C. China. ksacta Usually in forest or bush at elevations up to 1300 metres[266].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position. Dislikes prolonged exposure to hard frosts. New growth begins in early spring. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few

plants are more likely to die[122].

## 7.2.11 Cephalotaxus harringtonia

Iapanese Plum Yew

6 tlin 9 cyuc 5 kcak 3 tcan 0 dwat 5 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cephalotaxus harringtonia is an evergreen Shrub growing to 5 m (16ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Oil OilFruit. - raw or cooked. About 2 - 3cm long[200]. The fruit of this plant is said to be astringent and inedible even when fully ripe[200]. However, several of its sub-species produce a very nice sweet fruit - see cultivation details for more information. Seed - raw or cooked[81, 105]. Oily[1] with a slightly resinous flavour[K]. The seed is up to 15mm long.

tcanta Hedge Hedge Oil OilAn oil obtained from the seed is used as an illuminant[105]. Very tolerant of pruning, this plant makes a very good hedge in shady positions[200].

nrakta E. Asia - Japan. ksacta An understorey shrub in woodlands[109, 200]. In temperate deciduous forests at elevations of 600 - 1000 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame[113], it should then germinate in the following spring[K]. A hard seedcoat can delay germination, especially in if the seed is not sown as soon as it is ripe[81, K]. Stored seed should be cold-stratified and sown in a cold frame in the spring[200]. Germination can take 18 months or more. Prick out the seedlings as soon as they are large enough to handle and grow them on for at least their first winter under cover. Plant out in late spring after the last expected frosts. Greenwood cuttings of terminal shoots, August/September in a humid cold frame[1, 200], Difficult[113],

nwatta Prefers a moist well-drained sandy soil but succeeds in most soils though it dislikes dry gravelly or chalky soils[1, 200]. Prefers a position in semi-shade but tolerates full shade[11, 81] and it also succeeds but does not usually thrive in full sun[200]. It grows very well in the mild wet coastal region of W. Scotland where it succeeds even in full sun[200]. Requires a humid sheltered site[200], strongly disliking very exposed positions[1]. Although the dormant plant is very cold-hardy, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. The Japanese plum yew is a very slow growing tree[185] with an excellent potential as a food crop in Britain. It generally has a large crop of fruit and seeds, these are often eaten in Japan. In addition, the seeds seem to be immune to the predations of squirrels, the seed on trees growing at Kew Botanical gardens being untouched even though virtually every other nut tree there has its crop destroyed[K]. There has been some confusion in the naming of this species. Some botanists have separated off C. drupacea as a separate species, though most nowadays include it as a subspecies of this plant as C. harringtonia drupacea. (Sieb. and Zucc.)Koidzumi., differing from the species in its shortly pedunculate male catkins[81]. In cultivation it is often known as the variety 'Fastigiata' [81]. Another subspecies, C. harringtonia nana. (Nakai.)Rehd. is a small spreading shrub to 2 metres, spreading by means of suckers[81, 200]. This form is said to have the best fruit of this genus[200], it is a very hardy plant, succeeding as far north as S. Sweden and Nova Scotia[200]. Plants are dioecious, but female plants sometimes produce fruits and infertile seeds in the absence of any male plants[11]. However, at least one male plant for every five females should be grown if you are growing the plants for fruit and seed. Plants have also been known to change sex[81]. Male cones are produced in the axils of the previous year's leaves, whilst female cones

years. If fed with artificial NPK fertilizers at this time the are borne at the base of branchlets[200]. The plant is heat tolerant in zones 9 through 3. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. An evergreen.

#### 7.2.12 Cephalotaxus harringtonia drupacea

Japanese Plum Yew

6 tlin 9 cyuc 5 kcak 3 tcan 0 dwat 5 m hkuc

pcimhmim cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cephalotaxus harringtonia drupacea is an evergreen Shrub growing to 5 m (16ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Oil OilFruit. - raw or cooked[177]. The fruit closely resembles a plum in its structure, the flesh is thick, juicy and very sweet with a hint of pine in its flavour[2, 183]. The fruit is about 2 - 3cm long[200]. The fruit does not always ripen in Britain. before full ripeness it has a disgusting resinous flavour that coats the mouth and refuses to go away for hours[K]. Seed raw or cooked[81, 105]. Oilv[1]. The seed has a firm texture and a slightly resinous flavour[K].

tcanta Hedge Hedge Oil OilAn oil obtained from the seed is used as an illuminant[105]. Very tolerant of pruning, this plant makes a very good hedge in shady positions[200].

nrakta E. Asia - Japan. ksacta An understorey shrub in woodlands[109, 200].

propta Seed - best sown as soon as it is ripe in a cold frame[113], it should then germinate in the following spring[K]. A hard seedcoat can delay germination, especially in if the seed is not sown as soon as it is ripe[81, K]. Stored seed should be cold-stratified and sown in a cold frame in the spring[200]. Germination can take 18 months or more. Prick out the seedlings as soon as they are large enough to handle and grow them on for at least their first winter under cover. Plant out in late spring after the last expected frosts. Greenwood cuttings of terminal shoots, August/September in a humid cold frame[1, 200]. Difficult[113].

nwatta Landscape Uses:Border, Foundation, Hedge, Massing, Screen, Woodland garden. Prefers a moist welldrained sandy soil but succeeds in most soils though it dislikes dry gravelly or chalky soils[1, 200]. Prefers a position in semi-shade but tolerates full shade[11, 81] and it also succeeds but does not usually thrive in full sun[200]. It grows very well in the mild wet coastal region of W. Scotland where it succeeds even in full sun[200]. Requires a humid sheltered site[200], strongly disliking very exposed positions[1]. Although the dormant plant is very cold-hardy, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. The Japanese plum yew is a very slow growing tree[185] with an excellent potential as a food crop in Britain. This subspecies is growing very well in the shade of other conifers at Kew botanical gardens, where it fruits regularly and heavily. Both the fruit and the seed are edible, these are often eaten in Japan. In addition, the seeds to sow the seed in very hot weather[206]. There are about 5,660 - 6,000 per 0.01 kg (1/3 oz)[269].

nwatta Succeeds in full sun in most well-drained moisture-retentive fertile soils[16, 200, 206]. Prefers a heavy soil and some shade[16] Dislikes very hot weather[33] Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[206]. A form of B. juncea with entire leaves that has been selected in the Orient for its edibility. There are many named varieties[206]. A very fast growing variety, usually maturing within 40 days of sowing[206]. The plants in this group are fairly coldtolerant[206]. Plants have a rooting depth of between 90 -120 cm[269]. A good bee plant[74].

## 7.2.56 Pinus monophylla

Single Leaf Piñon, Single Leaf PinyonPine, Stone Pine, Pine Pinyon

6 tlin 8 cyuc 4 kcak 5 tcan 2 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus monophylla is an evergreen Tree growing to 10 m (32ft 10in) at a slow rate. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222]

kcakta Edible Parts: SeedEdible Uses: CondimentSeed - raw or cooked[1, 82, 161, 257]. Oily, with an agreeable almond-like flavour[2, 229], they are often used in sweetmeats, pastries, etc. They are the lowest in protein and fats and the highest in starch of the piñons[183, 200]. The seeds are an important food source for the local Indians of Nevada and California[82]. A good size, the seed is up to 20mm long[200] and has a thin shell[229]. The pitch obtained from the trunk is allowed to harden and is then used as a chewing gum[257]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Adhesive Dve Fuel Herbicide Pitch Plaster Roofing WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. The gum (this almost certainly means the resin[K]) is used in waterproofing canoes, baskets, water containers etc, for repairing pottery vessels and in making turquoise mosaic[216]. It is also used as an adhesive for mending pottery[257]. The bark has been used as a roofing material in houses[257]. Wood light, soft, weak and brittle[82]. Used primarily for fuel and fence posts[229]. It is also made into charcoal and used for smelting[82]. The wood has a high combustibility and burns well[257]. It gives off a pleasant aroma as it burns[257].

dwatta Antiseptic Contraceptive Diuretic Laxative Plaster Poultice Salve Skin VermifugeSingle leaf piñon was employed medicinally by several native North American Indian tribes who valued it especially for its antiseptic and vulnerary properties and also for its beneficial effect on the respiratory system[257]. It is little, if at all, used in modern herbalism. The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It

though they can be eaten whilst still small[206]. It is best not is a valuable remedy in the treatment of kidney and bladder complaints, and is used both internally and externally to treat rheumatic affections[4, 257]. It is also used in treating diseases of the mucous membranes, respiratory complaints, VD, TB, coughs, colds and influenza[4, 257]. A decoction is used to rid the body of tapeworms and other internal parasites[257]. Externally it is used in the form of liniment plasters and inhalers[4]. A poultice of the melted gum has been applied to cuts and sores[257]. The heated pitch has been applied to the face as a depilatory[257]. The pitch has also been used as a face cream to prevent sunburn[257]. The heated pitch has been used as a poultice to treat sciatic pains and muscular soreness[257]. The cooked pitch has been used by women to stop menstruation and thereby become infertile[257]. It has also been given to adolescent girls to help them keep youthful and live a long life[257]. The gum is used as a plaster on sores and cuts[216].

nrakta Western N. America - Utah to Nevada, Arizona and California. ksacta Arid slopes at low elevations[120], growing in pinyon-juniper woodlands[229]. Often forms extensive open forests at elevations of 1500 - 2100 metres[82].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Management: Standard Staple Crop: Proteinoil Wild Staple CropLandscape Uses:Specimen, Woodland garden. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Succeeds in a hot dry position[200]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. A slow growing tree in the wild, taking 25 years from sowing until it produces a crop[117]. It then usually produces cones annually, with heavy crops very 2 - 3 years[229]. The tree is long-lived, taking 250 - 350 years to reach maturity[181]. It grows well in southern England[120] and in most of the drier parts of Britain[11]. The cones take 2 summers to mature[229], they open and shed their seed whilst still attached to the tree[226]. Closely related to P. cembroides and considered to be no more than a sub-species of it by some botanists[11]. The main difference is that this species has its leaves singly whilst P. cembroides has them in groups of two or three[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow beneath the tree[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: North American native. Inconspicuous flowers or blooms.

## 7.2.57 Brassica juncea integrifolia rugosa

Head Mustard

6 tlin 10 cvuc 4 kcak 2 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Brassica juncea integrifolia rugosa is a ANNUAL growing to 0.6 m (2ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline)

mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[ 238 ]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles[ 238 ]. They are often heated in oil to destroy their pungency and give them a nutty flavour[ 238 ]. The root of some forms of this species is edible[ 183 ]. Sprouted seeds can be added to salads.

dwatta Anodyne Antiarthritic Antiinflammatory Antirheumatic Antitumor Diuretic Emetic Emmenagogue Foot care Galactogogue Laxative Rubefacient Stimulant TonicReported to be anodyne, aperitif, diuretic, emetic, rubefacient. and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism 269 l. The seed is used in the treatment of tumours in China[ 269 ]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[ 269 ]. The root is used as a galactagogue in Africal 269 l. Ingestion may impart a body odour repellent to mosquitoes[ 269 ]. Mustard oil is used in the treatment of skin eruptions and ulcers 269 ]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[ 269 ]. In Java the plant is used as an antisyphilitic emmenagogue 269 ]. Leaves applied to the forehead are said to relieve headache[ 269 ]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[ 269 ].

nrakta Reported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk ksacta Not known in the wild.

propta Seed - sow in situ from June to October. Springsown crops tend to run quickly to seed, though they can be eaten whilst still small [206]. It is best not to sow the seed in very hot weather [206]. There are about 5,660 - 6,000 per 0.01 kg (1/3 oz) [269].

nwatta Originating from the central Asian Himalayas to China, the plant has long been cultivated and many forms have been developed that can be grown from the temperate to the tropical zones. Succeeds in full sun in most well-drained moisture-retentive fertile soils [16, 200, 206]. Prefers a heavy soil and some shade [16]. Dislikes very hot weather [33]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant [206]. A form of B. Juncea that has been selected for its edible leaves, there are many named varieties [206]. They prefer a fairly high stable temperature and are well adapted to short day length [200]. Plants have a rooting depth of between 90-120 cm [269]. A good bee plant [74].

## 7.2.54 Physalis philadelphica

Wild Tomatillo, Mexican groundcherry 6 tlin 9 cyuc 4 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Physalis philadelphica is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant, except the fruit, are poisonous[19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 50, 105]. A delicious flavouring when used like a tomato and added to soups, stews etc[K]. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten. The fruit can be stored for up to a year if picked before they are fully ripe and left inside their calyx.

dwatta OphthalmicThe juice from the berries has been used as an evewash[257].

nrakta N. America and S. America. ksacta Not known in a truly wild situation, it is found as a weed of cultivation.

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away well. Diurnal temperature fluctuations assist germination[170].

nwatta Succeeds in any well-drained soil in full sun or light shade[200]. Cultivated for its edible fruit in the Ukraine[50]. There are some named varieties[183, 200]. Purple de Milpa' has small purple-tinged fruits with a sharp flavour, they keep well[200]. Closely related to P. ixocarpa, this is probably the wild species that P. ixocarpa was derived from in cultivation[170].

## 7.2.55 Brassica juncea foliosa

Leaf Mustard

6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Brassica juncea foliosa is a ANNUAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves OilEdible Uses: Condiment OilLeaves - raw or cooked[22, 33, 46, 52, 61]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[206]. The leaves can also be finely shredded and added to mixed salads[206]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling[183]. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133]. An edible semidrying oil is obtained from the seed[1, 2, 17, 57, 183]. The seed contains 25 - 30% oil[74]. The seed is used as a mustard flavouring[171]. It is the source of 'brown mustard'[183], a prepared mustard that is milder than that produced from other species [238]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles[238]. They are often heated in oil to destroy their pungency and give them a nutty flavour[238]. Sprouted seeds can be added to salads.

tcanta Green manure Oil RepellentThere is some evidence that if this plant is grown as a green manure it is effective in reducing soil-borne root rots in pea crops[206]. This is attributed to chemicals that are given off as the plants decay[206].

dwatta Anodyne Aperient Diuretic Emetic Galactogogue Rubefacient StimulantReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[269]. The seed is used in the treatment of tumours in China[269]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[269]. The root is used as a galactagogue in Africa[269]. Ingestion may impart a body odour repellent to mosquitoes[269]. Mustard oil is used in the treatment of skin eruptions and ulcers[269]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[269]. In Java the plant is used as an antisyphilitic emmenagogue[269]. Leaves applied to the forehead are said to relieve headache[269]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[269].

nrakta A cultivar of garden origin. ksacta Not known in

propta Seed - sow in situ from August to October. Spring and early summer-sown crops tend to run quickly to seed,

seem to be immune to the predations of squirrels. The seed on trees growing at Kew Botanical gardens are untouched even though virtually every other nut tree there has its crop destroyed[K]. Plants are dioecious, but female plants sometimes produce fruits and infertile seeds in the absence of any male plants[11]. However, at least one male plant for every five females should be grown if you are growing the plants for fruit and seed. Plants have also been known to change sex[81]. Male cones are produced in the axils of the previous year's leaves, whilst female cones are borne at the base of branchlets[200]. There has been some confusion in the naming of this plant. Some botanists have separated it off as a separate species, C. drupacea, though most nowadays include it as a subspecies of C. harringtonia, differing from the species in its shortly pedunculate male catkins[81]. In cultivation it is often known as the variety 'Fastigiata'[81]. Special Features: Not North American native, Inconspicuous flowers or blooms.

## 7.2.13 Crataegus festiva

6 tlin 9 cyuc 5 kcak 2 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Crataegus festiva is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkapine) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. About 15mm in diameter with a delicious sweed flavour and juicy though slightly mealy texture[K]. This is a very acceptable dessert fruit that makes very enjoyable eating[K]. The fruit can also be used in making pies, preserves, etc, and can be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[2221.

nrakta Eastern N. America. ksacta Not known

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta We have very little information on this species and do not know how hardy it will be in Britain. However, a tree growing in an open sunny position at Kew Botanical Gardens is healthy and bears a very good crop of fruit every year[K]. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year [K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

#### 7.2.14 Helianthus annuus

Sunflower, Common sunflower 6 tlin 9 cyuc 5 kcak 5 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hionli

drutta Helianthus annuus is a ANNUAL growing to 3 m (9ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate droudht.

pcista The growing plant can accumulate nitrates, especially when fed on artificial fertilizers[76]. The pollen or plant extracts may cause allergic reactions[222].

kcakta Edible Parts: Flowers Oil Seed StemEdible Uses: Coffee OilSeed - raw or cooked[4, 14, 94, 101, 183], A delicious nut-like flavour, but very fiddly to extract due to the small size of the seed. Commercially there are machines designed to do this. Rich in fats, the seed can be ground into a powder[95], made into sunflower butter or used to make seed yoghurt. When mixed with cereal flours, it makes a nutritious bread[244]. Cultivars with up to 50% oil have been developed in Russia[218]. The oil contains between 44 - 72% linoleic acid[218]. The germinated seed is said to be best for seed voghurt, it is blended with water and left to ferment[183]. The sprouted seed can be eaten raw[183]. A nutritional analysis of the seed is available[218]. Young flower buds - steamed and served like globe artichokes[2, 85, 101, 117, 183]. A mild and pleasant enough flavour, but rather fiddly[K]. Average yields range from 900 - 1,575 kg/ha of seed, however yields of over 3,375 kg/ha have been reported[269]. A high quality edible semi-drying oil is obtained from the seed[4]. It is low in cholesterol[244], and is said to be equal in quality to olive oil[4]. Used in salads, margarines, or in cooking[2, 34, 46, 57, 94, 95, 183, 269]. The roasted seed is a coffee and drinking chocolate substitute[4, 7, 100, 102]. Another report says the roasted hulls are used[183]. The leaf petioles are boiled and mixed in with other foodstuffs[7].

tcanta Blotting paper Dye Fibre Fuel Green manure Herbicide Kindling Microscope Oil PaperLandscape Uses: Border, Container, Foundation, Massing, Seashore, Specimen. An edible semi-drying oil is obtained from the seed. Some varieties contain up to 45% oil[61]. The oil is also used, often mixed with a drying oil such as linseed (Linum usitatissimum) to make soap, candles, varnishes, paint etc, as well as for lighting. The oil is said to be unrivalled as a lubricant[4, 21, 34, 46, 100, 269]. A blotting paper is made from the seed receptacles[2, 4, 101, 117]. A high quality writing paper is made from the inner stalk[4, 14, 100, 101]. The pith of the stems is one of the lightest substances known, having a specific gravity of 0.028[4]. It has a wide range of appli-

cations, being used for purposes such as making life-saving appliances and slides for microscopes[4, 46, 61]. The dried stems make an excellent fuel, the ash is rich in potassium[4]. Both the dried stems and the empty seed receptacles are an excellent kindling[4]. A fibre from the stem is used to make paper[4] and a fine quality cloth[1, 94, 101]. A yellow dye is obtained from the flowers[4, 14, 94, 95]. A purple-black dye is obtained from the seed of certain varieties that were grown by the Hopi Indians of S.W. North America[117, 169]. Sunflowers can be grown as a spring-sown green manure, they produce a good bulk of material[87]. Root secretions from the plant can inhibit the growth of nearby plants[201]. A good bee plant, providing large quantities of nectar[18, 34, 244]. The flowers attract beneficial insects such as lacewings and parasitic wasps[238]. These prev on various insect pests. especially aphis[238]. Special Features: Attracts birds, Attractive foliage, North American native, Edible, Naturalizing, Wetlands plant, Attracts butterflies, Suitable for cut flowers, Suitable for dried flowers. Dynamic accumulator.

dwatta Antipsoriatic Antirheumatic Diuretic Expectorant Febrifuge Malaria StomachicA tea made from the leaves is astringent, diuretic and expectorant, it is used in the treatment of high fevers[222]. The crushed leaves are used as a poultice on sores, swellings, snakebites and spider bites[222, 257]. The leaves are harvested as the plant comes into flower and are dried for later use[238]. A tea made from the flowers is used in the treatment of malaria and lung ailments[222, 257]. The flowering head and seeds are febrifuge, nutritive and stomachic[7]. The seed is also considered to be diuretic and expectorant[4, 218, 222]. It has been used with success in the treatment of many pulmonary complaints[4]. A decoction of the roots has been used as a warm wash on rheumatic aches and pains[257].

nrakta Western N. America. An occasional garden escape in Britain. ksacta Open dry or moderately moist soils on the plains[60].

propta Seed - sow in mid spring in situ. An earlier start can be made by sowing 2 - 3 seeds per pot in a greenhouse in early spring. Use a fairly rich compost. Thin to the strongest seedling, give them an occasional liquid feed to make sure they do not become nutrient deficient and plant them out in late spring or early summer. Seed, harvested at 12% moisture content and stored, will retain its viability for several years [269].

nwatta An easily grown plant, it succeeds in most soils[1, 34, 117], including poor soils provided they are deep and well-drained[269], but it grows best in a deep rich soil[1, 200]. Plants are intolerant of acid or waterlogged conditions[269]. Especially when grown for its edible seed, the plant prefers a sunny position[1, 34, 117, 269] though it also tolerates light shade[1]. Requires a neutral or preferably calcareous soil[200]. As sunflowers have highly efficient root systems, they can be grown in areas which are too dry for many other crops[269]. Established plants are quite droughtresistant except during flowering[117, 269]. The sunflower tolerates an annual precipitation of 20 - 400cm, an average annual temperature in the range of 6 - 28°C and a pH in the range of 4.5 - 8.7[269]. The young growth is extremely attractive to slugs, plants can be totally destroyed by them[K]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The sunflower is a very ornamental plant that is widely grown in gardens and is also a major commercial crop for its edible seed and many other uses[1, 4]. It grows well in Britain, but it does not ripen its seed reliably in this country and so is not suitable for commercial cultivation at the present[K]. It is the state flower of Kansas[85]. Three distinct groups of sunflowers are cultivated:- Giant types grow from 1.8 - 4.2 metres tall with flower heads 30 - 50cm in diameter. The seeds are large, white or gray in colour, sometimes with black stripes, and are the best for culinary purposes, though the oil content is lower than for other types. 'Grey Stripe', 'Hopi Black Dye', 'Mammoth Russian' and 'Sundak' are examples of this type[183, 200, 269]. Semi-dwarf types grow from 1.3 - 1.8 m tall, are early maturing and have heads 17 - 23 cm diameter. The seeds are smaller, black, gray or striped, the oil content is also higher. Examples include 'Pole Star' and 'Jupiter' Dwarf types grow from 0.6 - 1.4 m tall, are early maturing and have heads 14 - 16 cm in diameter[269. The seeds are small but the oil content is the highest. Examples include 'Advance' and 'Sunset'[269]. Some forms are being bred for greater cold tolerance and should be more reliable in Britain[117, 141].

Plants tend to grow better in the south and south-west of England[4]. Most forms require a four month frost-free growing season[117], though some Russian cultivars can mature a crop in 70 days[269]. When plants are grown in cooler latitudes the seed contains higher proportions of polyunsaturated fatty oils[117]. The plant has a strong taproot that can penetrate the soil to depth of 3 metres, it also has a large lateral spread of surface roots[269]. Sunflowers grow badly with potatoes but they do well with cucumbers and corn[18. 20, 201]. A very greedy and vigorous plant, it can inhibit the growth of nearby plants[20]. Plants tend to impoverish the soil if they are grown too often in the same place[117]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

## 7.2.15 Cephalotaxus harringtonia nana

Japanese Plum Yew

6 tlin 9 cyuc 5 kcak 3 tcan 0 dwat 2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cephalotaxus harringtonia nana is an evergreen Shrub growing to 2 m (6ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils.

It can grow in full shade (deep woodland) or semi-shade (light

woodland). It prefers moist soil.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Oil OilFruit. - raw or cooked. Plum-like and very sweet with a hint of pine in its flavour[183]. The fruit is about 2cm long[200]. This sub-species is said to produce the best fruit[200]. The fruit does not always ripen in Britain, before full ripeness it has a disgusting resinous flavour that coats the mouth and refuses to go away for hours[K]. Seed - raw or cooked[81, 105]. Oily[1]. The seed has a firm texture with a slightly resinous flavour[K].

tcanta Oil OilAn oil obtained from the seed is used as an illuminant[105].

nrakta E. Asia - N. Japan. ksacta An understorey shrub in woodlands[109, 200]. In deciduous forests from near sea level to elevations of 600 metres[275].

propta Seed - best sown as soon as it is ripe in a cold frame[113], it should then germinate in the following spring[K]. A hard seedcoat can delay germination, especially in if the seed is not sown as soon as it is ripe[81, K]. Stored seed should be cold-stratified and sown in a cold frame in the spring[200]. Germination can take 18 months or more. Prick out the seedlings as soon as they are large enough to handle and grow them on for at least their first winter under cover. Plant out in late spring after the last expected frosts. Greenwood cuttings of terminal shoots, August/September in a humid cold frame[1, 200]. Difficult[113]. Division of self-layered stems and suckers in early autumn or mid-spring.

nwatta Prefers a moist well-drained sandy soil but succeeds in most soils though it dislikes dry gravelly or chalky soils[1, 200]. Prefers a position in semi-shade but tolerates full shade[11, 81] and it also succeeds but does not usually thrive in full sun[200]. It grows very well in the mild wet coastal region of W. Scotland where it succeeds even in full sun[200]. Requires a humid sheltered site[200], strongly disliking very exposed positions[1]. The dwarf Japanese plum yew is a very slow growing plant[185] with an excellent potential as a food crop in Britain. The fruit and the seed are often eaten in Japan. In addition, the seeds seem to be immune to the predations of squirrels, the seed on trees growing at Kew Botanical gardens being untouched even though virtually every other nut tree there has its crop destroyed[K]. This

tcanta Dye Essential Repellent StrewingThe seed yields up to 5% of an essential oil[1, 4, 46]. This is used medicinally, as a food flavouring, in toothpastes, soaps, perfumery, air fresheners etc[1, 46, 238]. The flavour of fennel oil depends upon its two main constituents. 'Fenchone' is a bitter tasting element whilst 'anethole' has a sweet anise-like flavour[238]. The proportions of these two ingredients varies according to strain and region. Plants growing in the Mediterranean and southern Europe usually have a sweet oil whilst plants growing in central and northern Europe usually produce a more bitter oil[238]. The quality of the oil also depends upon how well the seed has been dried - the oil from fully ripened and dried seeds being much sweeter and more fragrant[245]. The dried plant is an insect repellent[14, 53], the crushed leaves are effective for keeping dogs free of fleas[201]. The plant was formerly used as a strewing herb[201]. Yellow and brown dyes are obtained from the flowers and leaves combined[168].

dwatta Analgesic Antiinflammatory Antispasmodic Aromatic Carminative Diuretic Emmenagogue Expectorant Galactogogue Hallucinogenic Stimulant Stomachic UrinaryFennel is a commonly used household remedy, being useful in the treatment of a variety of complaints, especially those of the digestive system. The seeds, leaves and roots can be used, but the seeds are most active medicinally and are the part normally used[4]. An essential oil is often extracted from the seed for medicinal use, though it should not be given to pregnant women[4, 238]. The plant is analgesic, anti-inflammatory, antispasmodic, aromatic, carminative, diuretic, emmenagogue, expectorant, galactogogue, hallucinogenic, laxative, stimulant and stomachic[4, 7, 9, 21, 147, 165, 176, 192, 238]. Fennel is often added to purgatives in order to allay their tendency to cause gripe, and also to improve the flavour[4]. An infusion of the root is used to treat urinary disorders[238]. An essential oil obtained from the seed is used in aromatherapy. Its keyword is 'Normalising'[210]. The essential oil is bactericidal, carminative and stimulant[218]. Some caution is advised, see notes above on toxicity[222].

nrakta A cultivar of F. vulgare. ksacta Not found in the

propta Seed - best sown in early spring in situ[1]. Division in March as the new growth appears[16, 200].

nwatta Succeeds in most soils[1] but prefers a sunny dry position[200]. A cultivar of F. vulgare, this is not the genuine Florence fennel since it does not have swollen leaf stems[200]. It is used in much the same way as fennel. See F. vulgare azoricum for the genuine Florence fennel[K]. The flowers attract bees and hoverflies[24]. Fennel is a poor companion plant in the garden, it inhibits the growth of nearby plants, especially beans, tomatoes and kohl rabi[14, 18]. It is itself inhibited by wormwood and coriander[14, 18].

#### 7.2.52 Sasa kurilensis

Chishima Zasa

6 tlin 9 cyuc 4 kcak 3 tcan 1 dwat 2.5 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sasa kurilensis is an evergreen Bamboo growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Seed Shoots StemEdible Uses: Young shoots - cooked[177]. They are so popular in Japan that a license is required in order to collect them[183]. Seed - used as a cereal[177]. The seed is only produced at intervals of many years.

tcanta Soil stabilization WoodThe plant has rampant roots and this can be utilized in soil stabilization schemes[195]. The canes are used for making particle boards such as hardboard[195]. The fibre dimensions mean that it is more suitable for thick paper and fibreboard than for thin papers[195]. Yields in Japan are around 45 tonnes per hectare though the cost of gathering and bundling the canes makes economic use problematic[195]. The canes are also used as plant supports etc. The plant has rampant roots and used as a tough, vigorous groundcover for difficult sites.

dwatta CancerA potential cure for cancer has been discovered in the leaf[195].

nrakta E. Asia - Japan, Korea. ksacta Forms compact clumps in thickets on high mountain slopes, C. and N. Japan[74, 58].

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°c. Stored seed is hest sown as soon as it is received. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good guality, though it can take 3 -6 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse until large enough to plant out, which could be a few years. Plants only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Take large divisions, trying to cause as little root disturbance to the main clump as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Divisions of less than 5 - 6 culms rarely succeed[200].

nwatta Prefers a damp humus rich soil in partial shade[200]. A very hardy species, it grows wild further north than any other bamboo, succeeding even in areas with heavy snow[195]. It tolerates temperatures down to about -20°c[200]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering. but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. A polymorphic species[200]. There is at least one named form, selected for its ornamental value[200]. The rootstock can be rampant and invasive[200], it is said to hamper the regeneration of forests in its native habitat[195]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

## 7.2.53 Brassica juncea tsatsai multiceps

Green In The Snow

6 tlin 10 cyuc 4 kcak 2 tcan 2 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Brassica juncea tsatsai multiceps is a ANNUAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers mells soil.

kcakta Edible Parts: Flowers Leaves Oil Seed Shoots StemEdible Uses: Condiment OilLeaves - raw or cooked[ 22, 33, 46, 52, 61]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[ 206 ]. The young raw leaves are pleasantly spicy but older leaves, particularly when the plant runs to seed, can become overpoweringly hot though they are still nice cooked at this stage[ 206 ]. The leaves can be finely shredded and added to mixed salads[ 206 ]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling 183 l. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133 ]. An edible semi-drying oil is obtained from the seed[ 1, 2 , 17 , 57 , 183 ]. The seed contains 25 - 30% oil[ 74 ]. The seed is used as a mustard flavouring[ 171 ]. It is the source of 'brown mustard'[ 183 ], a prepared mustard that is milder than that produced from other species [238]. Pungency of

The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - raw or cooked. Virtually free of acridity even when raw[195], they can be thinly sliced and eaten raw in salads but are usually boiled first[183]. The shoots are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta WoodThe canes are used in construction. They are said to have excellent technological properties[195].
nrakta E. Asia - E. China. ksacta Not known

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[2001]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position and plenty of moisture in the growing season. Tolerates dry conditions. This is generally a very hardy species, tolerating temperatures down to about -20°c, but persistent cold springs make the plant lazy in sending up new canes. It dislikes prolonged exposure to hard frosts. In warm parts of Britain this plant can reach 6 metres or more in height. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. A running rootstock, the plant does not produce enough new shoots to be invasive but it still wanders about a bit. New shoots appear in late May. Although classed as a sub-species, this is in fact the true wild form of the species (the cultivated variegated form was the first to be named and is thus treated as the species type!). It does not reach a good size in cooler

## 7.2.50 Castanea pumila ashei

Chinquapin

6 tlin 9 cyuc 4 kcak 2 tcan 1 dwat 5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli hionli

drutta Castanea pumila ashei is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[2, 61, 105]. Sweet with a nice nutty flavour[46, 82, 183], it is very acceptable raw[142, 161, K]. When baked it becomes even sweeter and develops a floury texture, it makes an excellent potato or cereal substitute[K]. The seed is quite small, about half the size of C. dentata[183]. Sold in local markets in America[82].

tcanta Tannin WoodThe bark, leaves, wood and seed husks all contain tannin. Wood - hard, strong, light. Used

for fence posts etc[46, 61].

dwatta Antiperiodic Astringent TonicThe leaves contain tannin and are antiperiodic, astringent and tonic[46, 61, 213]. An infusion of the leaves has been used as an external wash for the feverish condition common to colds[213, 257].

nrakta Eastern N. America. - Virginia to Texas. ks-acta By the coast, in dry thickets woods and borders of swamps[43, 200].

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K]. Division of suckers in winter[200]. They can be planted straight out into their permanent positions.

nwatta Prefers a good well-drained slightly acid loam but succeeds in dry soils[1, 11, 200]. Once established, it is very drought tolerant[1, 11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. Although it is winter-hardy in most areas of Britain, this species only really thrives in areas with hot summers[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Produces suckers, eventually forming a thicket[182]. An excellent soil-enriching understorey in pine forests[200]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus[200]. Fruits are produced within 2 - 3 years from seed[117]. One report dealing with the type species states that it never fruits in Britain[11]. However, a bush at Wisley fruits well in most years[K]. Therefore it is hoped that this sub-species will also fruit in Britain[K]. There are a few plants at Hilliers Arboretum, but we have never seen them produce fertilized fruits[K]. Plants in this genus are notably resistant to honey

#### 7.2.51 Foeniculum vulgare dulce

Sweet Fennel

6 tlin 9 cyuc 4 kcak 4 tcan 3 dwat 1.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Foeniculum vulgare dulce is a PERENNIAL growing to 1.5 m (5th). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Skin contact with the sap or essential oil is said to cause photo-sensitivity and/or dermatitis in some people[218, 222]. Ingestion of the oil can cause vomiting, seizures and pulmonary oedema[222].

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: Leaves - raw or cooked[52]. A delicious aniseed flavour[183], the young leaves are best since older ones soon become tough. They are often used as a garnish on raw or cooked dishes or added to salads[183]. The leaves are difficult to store dried[200]. Leaf stalks and flower heads - raw or cooked[14, 37, 52, 183]. An aniseed flavour[K]. The aromatic seeds are used as a flavouring in cakes, bread, stuffings etc[2, 4, 5, 21, 27, 183]. The sprouted seeds can be added to salads[183]. An essential oil from the seed is used as a food flavouring in similar ways to the whole seed[1, 46, 183]. Root -cooked[53]. The flavour is somewhat parsnip-like. The leaves or the seeds can be used to make a herb teal[6, 183].

sub-species is a small spreading shrub to 2 metres, spreading by means of suckers[81, 200]. It is said to have the best fruit of this genus[200], it is also a very frost-resistant plant, succeeding as far north as S. Sweden and Nova Scotia[200]. Plants are dioecious, but female plants sometimes produce fruits and infertile seeds in the absence of any male plants[11]. However, at least one male plant for every five females should be grown if you are growing the plants for fruit and seed. Plants have also been known to change sex[81]. Male cones are produced in the axils of the previous year's leaves, whilst female cones are borne at the base of branch-lets[200].

## 7.2.16 Malva verticillata

Chinese Mallow, Cluster mallow 6 tlin 12 cyuc 5 kcak 2 tcan 2 dwat 1.7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwali fyifxre7t hionli

drutta Malva verticillata is a ANNUAL/BIENNIAL growing to 1.7 m (5ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista When grown on nitrogen rich soils (and particularly when these are cultivated inorganically), the plant tends to concentrate high levels of nitrates in its leaves[76]. The leaves are perfectly wholesome at all other times.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves - raw or cooked[2, 51, 61, 100, 183]. The leaves of well-grown plants can be 15cm or more across. They have a mild and very pleasant flavour that makes an excellent addition to salads[K]. We use them as a tasty alternative to the lettuce[K]. Young seeds - raw or cooked. Used when green and immature[85]. A pleasant nutty taste but the seed is too small and fiddly for most people to want to harvest[K].

tcanta DyeCream, yellow and green dyes can be obtained from the plant and the seed heads[168]. An extract of the leaves, flowers and stems is used as an ingredient in commercial cosmetic preparations as a skin conditioner[1243]. An essential oil obtained from the seeds is used as an ingredient in commercial cosmetic preparations as an emollient and skin conditioner[1243]. The following were listed under Malva meluca and mohileviensis (both now considered to be synonyms of this species) The seed contains up to 10 - 20% of a greenish oil with an iodine number 116.9[74]. It is used for making soap[74]. The fibre obtained from the stem is a useful substitute for jute in cordage production. The fibre is strong, but somewhat coarse and brittle. It is inferior in quality to kenaf and hemp. The fibre has a breaking strength of 14 kilos without a knot and 9 - 10 kilos with a knot[74].

dwatta Demulcent Digestive Diuretic Emollient Galactogogue LaxativeThe seed contains mucilage, polysaccharides and flavonoids[279]. It is demulcent, diuretic, emollient, galactogogue and laxative[147, 176, 218]. The seeds are used in Tibetan medicine, where they are considered to have a sweet and astringent taste plus a heating potency[241]. They are used in the treatment of renal disorders, the retention of fluids, frequent thirst and diarrhoea[241]. The root is used to cause vomiting in the treatment of whooping cough[240]. The leaves and stems are said to be digestive[240]. They are given to women in the advanced stages of pregnancy[240].

nrakta E. Asia - China. ksacta On plains and in arable fields[74, 266].

propta Seed - sow early spring in situ. Germination should take place within 2 weeks.

nwatta A very easily grown plant, succeeding in ordinary garden soil[1], though it prefers a reasonably well-drained and moderately fertile soil in a sunny position[200]. This species is cultivated as a salad crop in parts of Europe[17, 50, 51]. There is at least one named variety: 'Crispa' has more tender leaves than the species with curled leaf edges that make it look more attractive in salads. This species was one of the earliest domesticated crops in China, it has been in cultivation for well over 2,500 years[183]. Plants seem to be

immune to the predations of rabbits[233]. Plants are prone to infestation by rust fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

# 7.2.17 Cephalotaxus harringtonia koreana

Korean Plum Yew

6 tlin 9 cyuc 5 kcak 3 tcan 0 dwat 1.5 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cephalotaxus harringtonia koreana is an evergreen Shrub growing to 1.5 m (5ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Oil OilFruit. - raw or cooked. Fairly large, about 3cm long[200]. We have no information on this sub-species but assume that the fruit and seed will be edible[K]. The fruit does not always ripen in Britain, before full ripeness it has a disgusting resinous flavour that coats the mouth and refuses to go away for hours[K]. Seed - raw or cooked. Oily.

tcanta Hedge Hedge Oil OilAn oil obtained from the seed is used as an illuminant[105]. Very tolerant of pruning, this plant makes a very good hedge in shady positions[200].

nrakta E. Asia - China, Korea. ksacta An understorey shrub in woodlands[109, 200].

propta Seed - best sown as soon as it is ripe in a cold frame[113], it should then germinate in the following spring[K]. A hard seedcoat can delay germination, especially in if the seed is not sown as soon as it is ripe[81, K]. Stored seed should be cold-stratified and sown in a cold frame in the spring[200]. Germination can take 18 months or more. Prick out the seedlings as soon as they are large enough to handle and grow them on for at least their first winter under cover. Plant out in late spring after the last expected frosts. Greenwood cuttings of terminal shoots, August/September in a humid cold frame[1, 200]. Difficult[113].

nwatta Prefers a moist well-drained sandy soil but succeeds in most soils though it dislikes dry gravelly or chalky soils[1, 200]. Prefers a position in semi-shade but tolerates full shade[11, 81] and it also succeeds but does not usually thrive in full sun[200]. It grows very well in the mild wet coastal region of W. Scotland where it succeeds even in full sun[200]. Requires a humid sheltered site[200], strongly disliking very exposed positions[1]. A very slow growing plant[185], a 20 year old specimen at Kew was only 1.3 metres tall[K]. Plants are dioecious, but female plants sometimes produce fruits and infertile seeds in the absence of any male plants[11]. However, at least one male plant for every five females should be grown if you are growing the plants for fruit and seed. Plants have also been known to change sex[81]. Male cones are produced in the axils of the previous year's leaves, whilst female cones are borne at the base of branchlets[200]. This sub-species is more frost hardy than the type species, it succeeds as far north as S. Sweden and Nova Scotia if given a sheltered position[200].

## 7.2.18 Gaultheria shallon

Shallon Salal

6 tlin 9 cyuc 5 kcak 3 tcan 2 dwat 1.2 m hkuc

pcimhmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Gaultheria shallon is an evergreen Shrub growing to 1.2 m (4ft) by 1 m (3ft 3in) at a medium rate. See

above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw, cooked or dried for later use[2, 3, 4, 183]. Sweet and juicy with a pleasant flavour[11, 95, 101], it makes good raw eating[K]. The fruit can also be made into preserves, pies, drinks etc or be dried and used like raisins[183]. The fruit is about 10mm in diameter[200] and is produced over a period of several weeks in late summer[K]. A pleasant tea is made from the leaves[101].

tcanta DyeA purple dye is obtained from the fruit[99]. It is dark green[168]. A greenish-yellow dye is obtained from the infused leaves[257]. A ground cover plant for a shady position under trees, spreading slowly by means of suckers[188]. It should be spaced about 90cm apart each wav[208].

dwatta Astringent Poultice StomachicA poultice of the toasted, pulverized leaves has been applied to cuts[257]. A poultice of the chewed leaves has been applied to burns and sores[257]. The leaves have been chewed to dry the mouth[257]. An infusion of the leaves have been used as a stomach tonic and a treatment for diarrhoea, coughs, TB etc12571.

nrakta Western N. America - British Columbia to California. Occasionally naturalized in Britain. ksacta Grows on sandy or peaty soils in shady positions from the coast up to elevations of 800 metres[60].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring when new growth is about 7cm tall. Divided plants can be rather slow to get established[182]. We have found that it is best to pot up the clumps and grow them on in a shady position in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses: Erosion control, Ground cover, Hedge, Massing. Prefers a moist but not boggy humus rich soil in shade or semi-shade[11, 182], but it can also succeed in full sun. A peat and moisture loving species, it requires a lime-free soil[11, 182]. One report says that it can succeed in dry shade[188] and another that it can withstand considerable drought once it is established[208]. Plants are hardy to about -20°c[184]. A vigorous suckering plant, it can be invasive when growing in good conditions, but responds to cutting back[1, 28]. It also succeeds when planted under trees[28, 49]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native. The plant is heat tolerant in zones 8 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is

a running thicket former forming a colony from shoots away from the crown spreading indefinitely [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

#### 7.2.19 Oxalis tuberosa

Oca

6 tlin 9 cyuc 5 kcak 0 tcan 0 dwat 0.5 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Oxalis tuberosa is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Tubers - raw or cooked[2, 103, 183]. An acid lemon flavour when first harvested, if left out in the sun the tubers turn sweet[183], so sweet in some varieties that they are said to resemble dried figs and are sold as fruits in local markets in S. America[34, 37, 97, 196]. The cooked root is delicious whether in its sweet or acid state, it can be boiled, baked etc in similar ways to potatoes[K]. The tubers tend to be rather smaller than potatoes, with good sized specimens reaching 8cm or more in length. The slightly waxy skin makes cleaning them very easy[K]. They contain about 70 - 80% moisture. 11 22% carbohydrate, 1% fat, 1% fibre and 1% ash[196]. The carbohydrate is rich in sugar and easy to digest[196]. Acid types are rich in oxalic acid (up to 500ppm) but sweet forms have much less oxalic acid than is found in potatoes[196]. Edible young leaves and flowers - raw or cooked[34, 37, 103]. Poor quality[33]. Use in moderation, see notes at top of sheet

nrakta S. America - Colombia, Peru. ksacta Unknown in a truly wild situation, though plants have been found growing at heights up to 4000 metres in the Andes[97].

propta Seed - best sown as soon as it is ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Seed is not usually produced in Britain. Harvest the tubers in late autumn after the frosts have killed off top growth. Store in a cool dry frost free place and plant out in April. Basal cuttings in spring[196]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Prefers a light rich soil in a warm sunny position[1, 37, 196]. Tolerates a pH range from 5.3 to 7.8[196]. Plants succeed in areas with an average rainfall ranging from 570 - 2150mm per year[196]. Oka is widely cultivated in the Andes for its edible tubers, there are many named varieties[33, 97]. This species has an excellent potential as a major root crop in temperate zones, it has the potential to yield as highly as potatoes but does not have the susceptibility to pests and diseases that are a bugbane for potato growers[K]. Plants are slightly more hardy than the potato, tolerating light frosts but the top-growth being severely damaged or killed by temperatures much below freezing. The main drawback is that development of the tubers is initiated by the number of hours of daylight in a day. In Britain this means that tubers do not begin to form until after the 21st of September and, if there are early frosts in the autumn, yields will be low[37]. There are possibly some forms in southern Chile that are not sensitive to daylength, these will be more

- ]. Prefers a very sunny position but tolerates part-day shade when grown on a warm wall[202
- ]. Requires a well-drained medium to light loam and some lime rubble incorporated into the soil[1]
- ]. Succeeds in dry soils. A heavy wet soil tends to encourage excessive plant growth at the expense of fruit production[1
- ]. Prefers a pH in the range 6 7, but tolerates 4.3 8.6[418
- ]. Seedling trees can commence cropping when only 3 4 years old, whilst cuttings can start fruiting in only 1 2 years[335
- ]. Up to three crops of fruit a year can be obtained in some countries[46
- ]. Trees have been known to live for as long as 200 years [418]
  - ]. There are many named varieties[183
- , 301
- J. There are two primary types of fig:- the Adriatic fig which produces fruit without pollination; and the Symrna fig that require the presents of a fig wasp for pollination[418]
- ]. Ît is a good idea to restrict the roots of fig trees on most soil types in order to discourage excessive vegetative growth at the expense of fruit production[3
- 1. This can be done by root pruning, but it is easier to place some kind of permanent restriction around the roots planting into a large tub that is then buried into the ground is one method. It is important to make sure that the tree still gets ample moisture, especially when the fruits are ripening. Fig trees have a unique form of fertilization, each species relying on a single, highly specialized species of wasp that is itself totally dependant upon that fig species in order to breed. The trees produce three types of flowers: a male. a long-styled female and a short-styled female flower, often called the gall flower. All three types of flowers are contained within the structure we usually think of as the fruit. The female fig wasp enters a fig and lays its eggs on the short styled female flowers while pollinating the long-styled female flowers. Wingless male fig wasps emerge first, inseminate the emerging females and then bore exit tunnels out of the fig for the winged females. Females emerge, collect pollen from the male flowers and fly off in search of figs whose female flowers are receptive. In order to support a population of its pollinator, individuals of a Ficus spp. must flower asynchronously. A population must exceed a critical minimum size to ensure that at any time of the year at least some plants have an overlap of emission and reception of fig wasps. Without this temporal overlap, the short-lived pollinator wasps will go locally

]. When grown outdoors in Britain only one crop is usually obtained, though in exceptionally hot years two crops are sometimes produced. The fruit usually takes about 12 months to mature in Britain, baby fruits no larger than about 15mm long in the autumn usually overwinter to form the following year's crop of fruit. If plants are grown in pots in a conservatory or cold greenhouse, two crops of fruit can be obtained, one in early summer and one in late summer to autumn[260]. Pinch back the new shoots to about six leaves in order to encourage the second crop[260]. Special Features: Attractive foliage, Not North American native, Invasive, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant [2-1].

## 7.2.48 Phyllostachys bambusoides

Madake, Japanese timber bamboo 6 tlin 9 cyuc 4 kcak 3 tcan 1 dwat 8 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys bambusoides is an evergreen Bamboo growing to 8 m (26ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked as a vegetable[25, 46, 105]. Large but somewhat acrid when raw[61], they require boiling in a lot of water or in several changes of water[183]. The shoots are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level. The shoots contain about 2.1% protein, 0.3% fat, 3.2% carbohydrate, 0.9% ash[179].

tcanta Soil stabilization WoodThe plant has an extensive root system and is used for erosion control. The stems are used for making furniture, plant supports etc[46, 61, 74]. Fairly thick walled, the canes are considered to be the most versatile of this genus and are used in construction and other industrial uses[195]. Splints made from the stems are good for weaving various bamboo articles[266]. Even the dead culms are durable[195].

dwatta AntipyreticThe leaves are antipyretic[218]. New shoots are used in the treatment of haematuria[218].

nrakta E. Asia - China, Japan. ksacta Woodland and especially on lower cleared slopes[162]. In open forest or bushwood at elevations up to 1800 metres[266].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 · 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Industrial Crop: Biomass Management: Managed Multistem Minor Global Crop Other Systems: MultistrataRequires a rich loamy soil and plenty of moisture in the growing season[1] plus a sheltered position[200]. A very hardy plant[11, 25], tolerating temperatures down to about -18°c, but it dislikes prolonged exposure to hard frosts[200]. Plants can reach 25 metres in height in their native habitat, they are much smaller in Britain but, even so, a height of 12 metres has been recorded in Cornwall. Cultivated for its edible shoots in China[183], it is the most widely grown bamboo in Japan for its useful canes[195]. It has been widely planted for ornament in the Mediterranean and is becoming naturalized there[50]. There are some named forms selected for their ornamental value[200]. 'Castillon' has smaller culms than the species type, the edible shoots are less bitter[195]. A plant of this cultivar at Trebah gardens in Cornwall was growing well in woodland shade, it was 5 metres tall with canes 20mm in diameter[K]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. The rootstock is running but not aggressively so, especially in the cooler climate of Britain[25]. New shoots are produced from late May[25]. Individual stems can be long lived, staying leafy for up to 20 years[195]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of several years, viable seed is usually produced[122]. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They usually die after flowering, but if left alone they will sometimes recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122].

# 7.2.49 Phyllostachys sulphurea viridis

Kou-Chiku

1069

6 tlin 9 cyuc 4 kcak 3 tcan 0 dwat 4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys sulphurea viridis is an evergreen Bamboo growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year.

Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil Oil Root SeedEdible Uses: Condiment Oil OilYoung leaves cooked[74, 105, 177]. Used as a potherb or added to soups[183]. The leaves have an acid flavour like sorrel[2]. Seed - roasted or ground into a flour and made into a kind of cake[105, 177, 183]. Root - it is edible but very fibrousy[144]. Mucilaginous, without very much flavour[144]. An edible oil is obtained from the seed[61, 183]. The yield varies from 2 -10 tonnes per hectare[74] (or is it per acre?).

tcanta Dve Fibre Friction sticks Oil Oil Paper Plant support Soap making Soil reclamation StringAgroforestry Uses: Kenaf plants accumulate minerals such as selenium and boron, and can be used as a bioremedial tool for removing these metals from contaminated soil[299, 1519] . Yields a fibre from the stem[1, 123], a very good jute substitute though it is a bit coarser[61]. The fibre strands, which are 1.5 - 3 metres long, are used for making rope, cordage, canvas, sacking, carpet backing, nets, table cloths etc[74, 123, 269]. For the best quality fibre, the stems should be harvested shortly after the flowers open[171, 269]. The best fibre is at the base of the stems, so hand pulling is often recommended over machine harvesting[269]. Yields of about 1.25 tonnes of fibre per hectare are average, though 2.7 tonnes has been achieved in Cuba[74, 269]. The pulp from the stems has been used in making paper[269]. The seed contains between 18 and 35% of an edible semi-drying oil[61, 74]. It is rather similar to groundnut oil, obtained from Arachis hypogaea[240]. The oil is also used for burning, as a lubricant and in making soap, linoleum, paints and varnishes[46, 61, 74, 269]. The seed yield varies from 2 to 10 tonnes per acre[74] (or is it per hectare?). The stems have been used as plant supports for growing runner beans etc[269]. The soot from the stems has been used as a black pigment in dyes[269]. The stem has been used as a base for drilling fire[269].

dwatta Antibilious Aphrodisiac Dysentery Poultice PurgativeThe juice of the flowers, mixed with sugar and black pepper, is used in the treatment of biliousness with acidity[240]. The seeds are aphrodisiac[240]. They are added to the diet in order to promote weight increase[240]. Externally, they are used as a poultice on pains and bruises[240]. The leaves are purgative[240]. An infusion of the leaves is used in the treatment of coughs[269]. In Avurvedic medicine. the leaves are used in the treatment of dysentery and bilious blood and throat disorders. The powdered leaves are applied to Guinea worms in Africa[269]. The peelings from the stems have been used in the treatment of anaemia, fatigue, lassitude, etc[269]. nrakta Original habitat is obscure, it probably arose in

the tropics of Asia or America. ksacta Not known in the wild. propta Seed - sow early spring in a warm greenhouse. Germination is usually fairly rapid. Prick out the seedlings into individual pots when they are large enough to handle. If growing them as annuals, plant them out into their permanent positions in early summer and protect them with a frame or cloche until they are growing away well. If hoping to grow them as perennials, then it is better to grow them on in the greenhouse for their first year and to plant them out in early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Overwinter them in a warm greenhouse and plant out after the last expected frosts.

nwatta Prefers a well-drained humus rich fertile soil in full sun[200]. Tolerates most soils but prefers a light sandy soil[123]. Plants are adapted to a wide range of soils and climatic conditions[171]. Kenaf is reported to tolerate an annual precipitation in the range of 57 to 410cm, an annual temperature range of 11.1 to 27.5°C and a pH in the range of 4.3 to 8.2 (though it prefers neutral to slightly acid)[269]. The plant is frost sensitive and damaged by heavy rains with strong winds[269]. Kenaf is widely cultivated in tropical and sub-tropical areas of the world, where it is grown mainly as a fibre crop but also for its seeds and leaves[269]. It is not very hardy outdoors in Britain, it really requires a frost free climate[123]. It can, however, probably be grown as an annual. A fast-growing plant, it can be harvested in 3 - 4 months from seed[50, 61]. The plant requires temperatures in the range of 15 - 25°c[169]. It succeeds as a crop as far north in N. America as Indiana, Iowa, Kansas and Nebraska[160]. Plants are daylight sensitive, they remain vegetative and do not flower until the daylength is less than 12.5 hr/day. Two weeks of very cloudy days will induce flowering as daylength

approaches 12.5 hr[269]. The plant has a deep-penetrating taproot with deep-seated laterals [269]. Plants, including any varieties, are partially self-fertile[269].

#### 7.2.47 Figure carica

Fig, Edible fig, Fig Common

6 tlin 10 cyuc 4 kcak 2 tcan 2 dwat 6 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyif hionli

drutta Ficus carica is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to September, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The sap and the half-ripe fruits are said to be poisonous[20, 89]. The sap can be a serious eye irritant[238].

kcakta Edible Parts: Fruit SapEdible Uses: Curdling agentFruit - raw or cooked[1, 3, 3, 4, 46]. Sweet and succulent, a fully ripe specimen is an exquisite fruit that almost literally melts in the mouth[K]. The fruit is often dried for later use[183] and this dried fruit is a major item of commerce. Figs are usually pear-shaped and up to 5cm in diameter[200]. A nutritional analysis is available[218]. The latex from the sap can be used to coagulate plant milks[183].

tcanta Landscape Uses: Container, Espalier, Specimen. Wood - pliable but porous and of little value[4, 89]. It is used for hoops, garlands, ornaments etc[89]. When saturated with oil and covered with emery is used as a substitute for a hone[4].

dwatta Cancer Demulcent Digestive Emollient Galactogoque Laxative Pectoral Stings Stomachic Tonic WartsA decoction of the leaves is stomachic[218]. The leaves are also added to boiling water and used as a steam bath for painful or swollen piles[218]. The latex from the stems is used to treat corns, warts and piles[4, 89, 218]. It also has an analgesic effect against insect stings and bites[7]. The fruit is mildly laxative, demulcent, digestive and pectoral[4, 7, 218]. The unripe green fruits are cooked with other foods as a galactogogue and tonic[218]. The roasted fruit is emollient and used as a poultice in the treatment of gumboils, dental abscesses etc[4]. Syrup of figs, made from the fruit, is a well-known and effective gentle laxative that is also suitable for the young and very old[254, K]. A decoction of the young branches is an excellent pectoral[7]. The plant has anticancer proper-

nrakta W. Asia - Turkey through to Pakistan; N. Africa -Algeria, Morocco, Tunisia, ksacta Amongst rocks, in woods and scrub on hot dry soils.

propta Seed - sow spring in a warm greenhouse. Prick out the seedlings as soon as they are large enough to handle and overwinter the young plants in a greenhouse for at least their first year. Plant out in late spring after the last expected frosts and give some protection for their first winter outdoors. Cuttings of mature wood 10 - 12cm with a heel, winter in a frame. Fairly easy, but the cuttings must be kept frost free. It is probably best if the cuttings are put in individual pots[78] Lavering

nwatta Figs are plants of temperate and subtropical climates. They do not generally grow well in the wet tropics, but can be grown at higher elevations in the drier to moist tropics[418]

- 1. The fruits develop best when plants are grown in relatively dry climates where a cool-season alternates with a hot season[335
- ]. They grow best in areas where annual daytime temperatures are within the range of 16 - 26°c, but can tolerate
- ]. Dormant plants are hardy to about -15°c[202
- ]. The top growth is susceptible to frost damage and can be killed back to the base in severe winters, though plants usually recover well[3
- 1. They prefer a mean annual rainfall in the range 700 -1,500mm, but tolerate 300 - 2,700mm[418

suitable to higher latitudes such as Britain[196]. It is said 11 through 1.) For polyculture design as well as the abovethat the varieties with white tubers are bitter because they contain calcium oxylate crystals whilst those with tubers that are of other colours are sweet[97]. However, we are growing one variety with white tubers and it most certainly is not bitter[K]. Yields tend to average about 7 - 10 tonnes per hectare but experimentally yields of 40 tonnes per hectare have been achieved[196]. Earthing up the growing stems as they start to form tubers can increase yields significantly[196].

## 7.2.20 Phyllostachys viridiglaucescens

Greenwax golden hamboo

6 tlin 9 cyuc 4 kcak 1 tcan 0 dwat 6 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phyllostachys viridiglaucescens is an evergreen Bamboo growing to 6 m (19ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked[61, 105, 177]. Virtually free of acridity even when raw[195], they are eaten in salads or added to soups etc[183]. The shoots on mature clumps can be 40mm or more in diameter [K]. Another report says the shoots are acrid when raw. The shoots are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta Plant supportThe canes are used as plant supports etc[61, 195].

nrakta E. Asia - E. China in Jiangsu and Zhejiang. ksacta Woodland on mountains and plains[162].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly guickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position[200] and plenty of moisture in the growing season[200]. Plants are very hardy, tolerating temperatures down to about -20°c[195], but they dislike prolonged exposure to hard frosts[200]. Plants can reach 10 metres in height in the warmer parts of Britain. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. A very ornamental plant, it will in time form a clump 7 or more metres in diameter so it is best grown in an isolated position[11]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. The rootstock is running[25], it is not too invasive in the cooler British climate[200] but can wander a little. New shoots appear from early April[25]. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones

ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

## 7.2.21 Amorphophallus konjac

Devil's Tonque, Devil's Tonque, Snake Plant, Konjac, Konnyaku Potato, Voodoo Lily

6 tlin 11 cyuc 4 kcak 2 tcan 2 dwat 1.3 m hkuc

woodland). It prefers moist soil.

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli frusflatpriklwis hpa7tmwatli hionli

drutta Amorphophallus konjac is an evergreen Perennial growing to 1.3 m (4ft 3in) by 1.3 m (4ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. The flowers are pollinated by Flies. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light

pcista We have one report that this plant is very toxic raw, though no more details are given[ 178 ]. It belongs to a family where most of the members contain calcium oxalate crystals. This substance is toxic fresh and, if eaten, makes the mouth, tongue and throat feel as if hundreds of small needles are digging in to them. However, calcium oxalate is easily broken down either by thoroughly cooking the plant or by fully drying it and, in either of these states, it is safe to eat the plant. People with a tendency to rheumatism, arthritis, gout, kidney stones and hyperacidity should take especial caution if including this plant in their diet[ 238 ]. (Parts of plant are poisonous if ingested)

kcakta Edible Parts: RootEdible Uses: Corm - cooked[ 200 ]. The root must be thoroughly boiled or baked, it is acrid when raw (see notes above on 'Known Hazards' K ])[ 200 ]. Very large, it can be up to 30cm in diameter 266 ]. In Japan the large brown tubers are peeled, cooked and pounded to extract their starch, which is solidified with dissolved limestone into an edible gel called 'Konnyaku' [183]. Konnyaku is a type of flour valued for its use in many dietary products 266 l. The flour is valued for its ability to clean the digestive tract without being a laxative 183 l. A nutritional analysis is available[ 218 ]. This root is very high in water and low in calories, so it is being promoted as a diet food in N. America[ 218 ]. Especially just before the foliage declines prior to dormancy, the tubers are a rich source of mannan, a polysaccharide of mannose and glucose[ 472 ]. The mannose is extracted and widely used in foods for diabetics 472 Glucomannan, a soluble fibre formed from mannan and glucose, cannot be metabolized by the human body, but is metabolized by intestinal bacteria. Inside the digestive system, glucomannan absorbs up to 200 times its weight in water without any negative action upon the digestive system. It therefore can give a feeling of fullness and be of use to aid in weight loss, it also relieves constipation and irritable bowel syndrome, as well as reducing serum cholesterol levels 472 ]. Glucomannan is widely used as an emulsifier and stabilizer in foods and drinks 472 ].

tcanta Other uses rating: Low (2/5). Agroforestry Uses: A system of cultivation, known as jinjenjo, is often practised in Japan. In this, the plants are grown in a natural plant community and heavily mulching the plants with grain straw or wild herbs. The plants thus grown are remarkably free from pests and diseases. The largest tubers are harvested at the end of the year, leaving the rest in the ground to grow on for harvest in later years 472 ]. Other Uses The plant has insecticidal properties 218 ]. Glucomannan, obtained from the tuber, has a wide range of used in various industries. It has gelling and film-forming properties and is widely used as an emulsifier and stabilizer in foods, drinks, cosmetics and the pharmaceutical industry. It is also used as a non-clay drilling fluid in the diamond and oil industries[ 472 ]. Ground cover.

dwatta The root is oxytocic and sialagoguel 178 l. It is used in the treatment of cancer[ 218 ]. Glucomannan, a soluble fibre obtained from the tuber, cannot be metabolized by the human body, but is metabolized by intestinal bacteria.

Inside the digestive system, glucomannan absorbs up to 200 times its weight in water without any negative action upon the digestive system. It therefore can give a feeling of fullness and be of use to aid in weight loss, it also relieves constipation and irritable bowel syndrome, as well as reducing serum cholesterol levels[ 472 ]. The flowers are febrifuge[ 218 ].

nrakta E. Asia - southwest China. ksacta Loose leafy detritus in moist shady habitats[ 200 ]. Forest margins and thickets at elevations of 830 - 1,200 metres in western Yunnan[ 266 ].

propta Seed - best sown in a pot in a warm greenhouse as soon as it is ripe and the pot sealed in a plastic bag to retain moisture. It usually germinates in 1 - 8 months at 24c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least a couple of years. Plant them out in late spring or early summer, after the last expected frosts, and give them some protection such as a cloche until they are growing away strongly. Division of offsets[1]. These are rarely produced[1].

nwatta Plants can tolerate a minimum temperature of 15c during the growing season, though the optimum range is 20 - 25c[ 472 ]. The best crops are produced on deep, fertile, alluvial soils that are slightly acid[ 300 ]. Dislikes heavy clay soils 300 l. Plants require some shade, especially when young 300 ]. Members of this genus generally require a moist but well-drained, humus-rich, fertile soil and a position in dappled shade 472 ]. The plant produces one enormous leaf and one flowering stem annually. When ripe for pollination, the flowers have a foetid smell to attract carrion flies and midges. This smell disappears once the flower has been pollinated[245]. The tubers are planted 15cm deep[1]. Like many species in the family Araceae, this plant has the ability to heat the flowering spadix as the pollen becomes ready for fertilization. This heat greatly increases the strength of the aroma released by the plant, thus attracting more pollinating insects. It can also have the effect of making the insects more active, thus increasing the level of fertilization[ 472 ]. The plant is heat tolerant in zones 12 through 10. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a corm swelling at the stem base

## 7.2.22 Phyllostachys nigra punctata

Kurodake

6 tlin 9 cyuc 4 kcak 0 tcan 3 dwat 6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phyllostachys nigra punctata is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organ) and is callingted by Wind. Suitable for light (cardy).

The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots -cooked. Somewhat acrid, they are prepared for eating by boiling in one change of water, the water being changed after 8 - 10 minutes. A distinctive taste and aroma. The shoots are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta Basketry Plant supportThe canes make good plant supports. The rhizome is used in making umbrella handles, wickerwork, canes etc.

dwatta Antiemetic Depurative Diuretic Expectorant Febrifuge SedativeThe leaves are antipyretic and diuretic[218]. They are used internally in the treatment of fevers (especially infantile convulsions), vomiting and nosebleeds[238]. The leave are harvested during the growing season and dried for later use[238]. The juice of the stems is antipyretic, antitussive, expectorant and sedative 147, 176, 218]. It is taken internally in the treatment of lung infections with cough and phlegm[238]. The sap is pressed from young stems in the summer and then dried for later use[238]. The epidermis of the stem bark is antiemetic and sedative[147. 176, 218]. It is used internally in the treatment of vomiting. nosebleeds, coughs etc[238]. The epidermis is collected from young stems in the summer and is dried for later use[238]. The root is astringent, antipyretic, depurative, diuretic and styptic[147, 176, 218]. It has been used in the treatment of rabies[147, 238]. A decoction is also used in the treatment of high fevers and nocturnal fretfulness in infants[147]. The roots are harvested in the winter and dried for later use[238].

nrakta E. Asia - E. and C. China. ksacta Fertile and moist places, also by streams[147].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 · 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position[200] and plenty of moisture in the growing season[1]. A very hardy plant, tolerating temperatures down to at least -7°c, but it dislikes prolonged exposure to hard frosts[200]. A very ornamental plant[1], this form of P. nigra is often grown for food and ornament. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. The plant has a running rootstock, though not aggressively so in the cooler climate of Britain[200], and it produces new shoots from May[25]. Dead stems can be removed at any time of the year[238]. It is also possible to thin the clumps in spring, leaving only the strongest stems and thus creating an open grove-like effect[238]. Cultivated for its edible young shoots in China[61]. This species has been widely planted for ornament in the Mediterranean and is becoming established[50].

## 7.2.23 Phyllostachys nigra henonis

Ha-Chiku

6 tlin 9 cyuc 4 kcak 0 tcan 3 dwat 6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phyllostachys nigra henonis is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness, It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots-cooked[25, 46, 105, 177]. Somewhat acrid when raw[61], they are prepared for eating by boiling in one change of water, the water being changed after 8 - 10 minutes[183]. A distinctive taste and aroma[183]. The shoots, which are about 5cm in diameter[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

mediocre[440]. The reddish-pink to red, obovoid fruit is about 15 - 25 mm long and 15 mm in diameter, with a large seed[365].

tcanta Agroforestry Uses: The plant has a very dense habit of growth and responds well to trimming. It is often grown as a hedge, especially the cultivar 'Brilliant'[K]. The reddish or yellowish wood is light, elastic and seasons well[46]. It is used for making oars, boat building etc. and was traditionally used for making boomerangs and shields[46]. We do not have any more specific information for the wood of this species, but the various species of Syzygium tend to have somewhat similar timber. The general description of syzygium timber is as follows:- The heartwood is a golden brown, grevish brown or brown, with pink or purplish glints; it is not clearly demarcated from the 1 - 4cm wide band of sapwood. The texture is fine; the grain slightly interlocked, sometimes wavy or irregular: there are resin deposits. The wood is heavy; moderately hard; somewhat durable, being moderately resistant to fungi and termites, but susceptible to dry wood borers. It seasons slowly, with a high risk of checking and distortion; once dry it is moderately stable in service. It works well with ordinary tools, nailing and screwing are good so long as the wood is pre-bored; gluing is correct. The wood is used for musical instruments, tool handles, furniture components, shipbuilding, heavy carpentry, flooring, joinery etc[848].

nrakta Australia - New South Wales. ksacta Along the coast and adjacent plateaux[265].

propta Seed - best sown when fresh. Either the whole fruit can be sown, or the seed can be separated from the flesh[397]. Germination usually takes 1 - 2 months but, especially if not sown fresh, maybe slow and spasmodic[397, 694]. Cuttings of firm, current season's growth[397].

nwatta A tree of warm temperate and subtropical climates, just reaching into tropical areas[397]. It is tolerant of occasional, light frosts[694]. Succeeds in full sun and in partial shade[694]. Prefers rich soils and assured moisture[397]. Succeeds in most soils[694]. Several named forms have been developed for ornamental purposes, including some compact forms that grow no larger than 2 metres[397].

## 7.2.45 Lycium barbarum

Goji, Box Thorn, Matrimony vine 6 tlin 9 cyuc 4 kcak 3 tcan 3 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lycium barbarum is a deciduous Shrub growing to 2.5 m (8ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista Although no records of toxicity have been seen, some caution should be exercised with this species, particularly with regard to its edible leaves, since it belongs to a family that often contains toxins. However, use of the leaves is well documented and fairly widespread in some areas. The unripe fruit might also be suspect though the ripe fruit is wholesome.

kcakta Edible Parts: Fruit Leaves ShootsEdible Uses: TeaFruit - raw or cooked[2, 105, 146]. The fruit is a berry about 2cm in diameter[200, 206]. A mild sweet liquorice flavour[206]. Only the fully ripe fruits should be eaten[K]. Young shoots - cooked[2, 46, 85, 105]. Used mainly as a flavouring, they can also be lightly cooked for 3 - 4 minutes and used as a vegetable, the flavour is somewhat cresslike but has also been described as peppermint-like[206]. The leaves wilt rapidly once they have been harvested[206]. Some caution is advised, see notes at top of the page. The leaves are a tea substitute[183].

tcanta Hedge Hedge Soil stabilizationCan be grown as an informal hedge, succeeding in maritime exposure[59, 200]. Plants have an extensive root system and can be planted to stabilize sandy banks[200, 206].

dwatta Antibacterial Anticholesterolemic Antipyretic Cancer Diuretic Hypoglycaemic Ophthalmic Purgative Skin Tonic VasodilatorA sweet tonic decoction made from the fruits is used to lower blood pressure and blood cholesterol levels[238]. It acts mainly on the liver and kidneys[61, 176, 238]. The fruit is taken internally in the treatment of high blood pressure, diabetes, poor evesight, vertigo, lumbago, impotence and menopausal complaints[238]. The fruit is harvested when fully ripe and is dried for later use[238]. The root bark is a bitter, cooling, antibacterial herb that controls coughs and lowers fevers, blood pressure and blood cholesterol levels[61, 176, 238]. It is taken internally in the treatment of chronic fevers, internal haemorrhages, nosebleeds, tuberculosis, coughs, asthma etc[238]. It is applied externally to treat genital itching[238]. The bark is harvested in the winter and dried for later use[238]. Diuretic, purgative, [61, 176]. The plant has a long history of medicinal use, both as a general, energy restoring tonic and also to cure a wide range of ailments from skin rashes and eyesight problems to diabetes[206]. A tonic tea is made from the leaves[206]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta Original habitat is obscure but probably S.E. Europe to S.W. Asia. Naturalized in Britain. ksacta Hedges, on walls and waste ground[17].

propta Seed - sow early spring in a greenhouse. Germination is usually good and fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Pinch out the shoot tips of the young plants in order to encourage bushy growth[78]. Cuttings of half-ripe wood, 5 - 10cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, autumn to late winter in a cold frame. High percentage[78, 200]. Division of suckers in late winter. Very easy, the suckers can be planted out direct into their permanent positions. Lavering.

nwatta An easily grown plant, it does not require a rich soil, flowering and fruiting better in a well-drained soil of moderate quality[1, 200]. Succeeds in impoverished soils[200], but more fertile soils are best if the plant is being grown for its edible young shoots[206]. Requires a sunny position[200]. Some plants at Kew are growing well in light shade[K]. Tolerates maritime exposure[11, 49, 200]. Plants are hardy to about -15°c[202]. There are some named varieties, selected for their ornamental value[206]. Plants are very tolerant of pruning and can regrow from old wood[202]. Any trimming is best carried out in the spring[188]. Plants produce suckers freely and can become invasive when in a suitable position. Otherwise they can be difficult to establish[202]. There is much confusion over the naming of this species. Most, if not all, of the plants being grown as L, chinense or L. europaeum are in fact this species[11]. In garden design, as well as the above-ground architecture of a plant root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from underground runners away from the plant

## 7.2.46 Hibiscus cannabinus

Kenaf, Brown Indianhemp 6 tlin 12 cyuc 4 kcak 3 tcan 2 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Hibiscus cannabinus is a ANNUAL/PERENNIAL growing to 1.8 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 10 and is frost tender. It is in flower from August to September, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil.

B. oleracea subauda. The savoy cabbages form large heads like the cultivated cabbages (B. oleracea capitata). They have a stronger flavour, crinkly leaves and are generally more cold-hardy so can provide a winter crop in areas with quite severe winters. B. oleracea sabellica. The curly kales have attractively curled leaves. These are guite cold-tolerant plants and are mainly used to provide edible leaves in winter and spring. B. oleracea viridis. Collards are a cold-hardy non-heading form of cabbage, used mainly to provide green leaves in the spring. The plant is heat tolerant in zones 6 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is flat with shallow roots forming a plate near the soil surface

#### 7.2.43 Prunus laurocerasus

Cherry Laurel, English Laurel 6 tlin 8 cyuc 4 kcak 5 tcan 3 dwat 6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus laurocerasus is an evergreen Shrub growing to 6 m (19ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to June, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerate atmospheric pollution.

pcista All parts of the plant contain hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Condiment-Fruit - raw or cooked. Sweet and reasonably pleasant when fully ripe[65, 74, K]. The cultivar 'Camelliifolia' bears huge quantities of fruit[K]. This is the size of a large cherry and. when fully ripe, has a reasonable flavour raw with a jellylike texture and a slight astringency[K]. Some sources suggest the fruit is poisonous, this probably refers to the unripe fruit[7]. We have eaten this fruit in quite large quantities without the slightest ill effects (this also includes a 2 year old child) and so any toxicity is of a very low order[K]. However, any fruit that is bitter should not be eaten in quantity because the bitterness is caused by the presence of the toxic compounds - see the notes above on toxicity. The fruit is about 8mm in diameter and contains one large seed[200]. Water distilled from the leaves is used as an almond flavouring[2, 46, 61, 183]. It should only be uses in small quantities, it is poisonous in large amounts[183]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on

tcanta Cleanser Dye Essential Hedge Hedge WoodVery tolerant of trimming, this plant makes an excellent hedge especially in shady areas[11, 29, 200]. Some forms of this plant, notably 'Cherry Brandy', 'Otto Luyken', 'Zabelina' and 'Schipkaensis' are low-growing and make very good ground

cover plants for sun or shade[182, 197]. Water distilled from the leaves is used in perfumery[4]. The bruised leaves, when rubbed within any container, will remove strong odours such as garlic or cloves so long as any grease has first been fully cleaned off[4]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Wood - pinkish grey. Used in turnery and lathe work[74]

dwatta Antispasmodic Narcotic Ophthalmic SedativeThe fresh leaves are antispasmodic, narcotic and sedative[4, 7]. They are of value in the treatment of coughs, whooping cough, asthma, dyspepsia and indigestion[4, 238]. Externally, a cold infusion of the leaves is used as a wash for eye infections[238]. There are different opinions as to the best time to harvest the leaves, but they should only be used fresh because the active principles are destroyed if the leaves are dried[4]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Europe to W. Asia. More or less naturalized in Britain[17]. ksacta Woods in Britain[17].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Cuttings of mature wood, October in a sheltered north facing border outdoors[113]. Layering in spring.

nwatta Landscape Uses:Border, Screen, Specimen. Requires a well-drained moisture retentive soil[1, 11]. Grows well in heavy clay soils. Thrives in a loamy soil, doing well on limestone[11]. Prefers some chalk in the soil but it is apt to become chlorotic if too much is present, growing badly on shallow chalk[98, 200]. Extremely tolerant of shade, it succeeds in the dense shade of trees with almost no direct light and in their drip line[197, 200], though it fruits better in a more sunny position[200]. A very ornamental plant, there are many named varieties[200]. The cultivar 'Otto Luyken' is a low growing narrow-leafed form that flowers in spring and autumn. The tiny flowers are powerfully fragrant[245] but have a rather offensive odour[182]. This is a matter of opinion, some people find the smell sweet and delightful[K]. A greedy plant, inhibiting the growth of nearby plants[11]. it should be introduced with care since it often self-sows in woodlands and can prevent the successful regeneration of native trees by shading out the seedlings[208]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. The flowers attract butterflies and moths[30]. This species is notably resistant to honey fungus[88, 200]. Subject to bacterial canker which can kill large branches[124]. Trim (preferably with secateurs) in spring or late summer[200]. Old plants can be cut back hard into the old wood in spring and will soon recover[200]. Special Features: Not North American native. All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or

## 7.2.44 Syzygium australe

Brush Cherry

6 tlin 12 cyuc 4 kcak 3 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Syzygium australe is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Fruit - raw or made into jellies[46, 397]. Crisp and juicy, it ranges in flavour from delicious to tcanta Basketry Hedge Hedge Plant supportThe canes make good plant supports. Thin walled but durable, the canes are also used for cabinet work and for decorative panels and inlays[195]. The rhizome is used in making umbrella handles, wickerwork, canes, musical instruments and various kinds of handicrafts[25, 74].

dwatta Antiemetic Depurative Diuretic Expectorant Febrifuge SedativeThe leaves are antipyretic and diuretic[218]. They are used internally in the treatment of fevers (especially infantile convulsions), vomiting and nosebleeds[176, 238]. The leave are harvested during the growing season and dried for later use[238]. The juice of the stems is antipyretic, antitussive, expectorant and sedative[147, 176, 218]. It is taken internally in the treatment of lung infections with cough and phlegm[238]. The sap is pressed from young stems in the summer and then dried for later use[238]. The epidermis of the stem bark is antiemetic and sedative[147, 176, 218]. It is used internally in the treatment of vomiting, nosebleeds, coughs etc[238]. The epidermis is collected from young stems in the summer and is dried for later use[238]. The root is astringent, antipyretic, depurative, diuretic and styptic[147, 176, 218]. It has been used in the treatment of rabies[147, 238]. A decoction is also used in the treatment of high fevers and nocturnal fretfulness in infants[147]. The roots are harvested in the winter and dried for later use[238]

nrakta E. Asia - E. and C. China, Japan. ksacta Fertile and moist places, also by streams[147]. Open forests on slopes at elevations around 1200 metres[266].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position[200] and plenty of moisture in the growing season[1]. A very hardy plant, tolerating temperatures down to at least -7°c, but it dislikes prolonged exposure to hard frosts[200]. Another report says that it tolerates temperatures down to about -20°c[195]. A very ornamental plant[1], this is the form of P. nigra that is most commonly met in the wild. It is believed that this form is the true wild form and that the species is in fact a garden cultivar. However, since that form was the first to be named botanical etiquette demands that this form is treated taxonomically as a cultivar[195]. It is this form 'Henonis' that is used medicinally in China[176]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. This species is notably resistant to honey fungus[2001. The plant has a running rootstock, though not aggressively so in the cooler climate of Britain[200]. and it produces new shoots from May[25]. Dead stems can be removed at any time of the year [238]. It is also possible to thin the clumps in spring, leaving only the strongest stems and thus creating an open grove-like effect[238]. Cultivated for its edible young shoots in China[61]. This species has been widely planted for ornament in the Mediterranean and is becoming established[50].

## 7.2.24 Hibiscus sinosyriacus

Rose Of Sharon 6 tlin 9 cyuc 4 kcak 3 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Hibiscus sinosyriacus is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil RootEdible Uses: Oil TeaThe following notes are for the closely related H. syriacus. They quite probably also apply to this species[K]. Young leaves - raw or cooked[2, 177, 179, 183]. A very mild flavour, though slightly on the tough side, they make an acceptable addition to the salad bowl[K]. A tea is made from the leaves[2, 177, 240] or the flowers[183]. Flowers - raw or cooked[74, 105, 183]. A mild flavour and mucilaginous texture, they are delightful in salads, both for looking at and for eating[K]. Root - it is edible but very fibrousy[144]. Mucilaginous, without very much flavour[144].

tcanta Dye Fibre Hair Hedge Hedge OilThe following notes are for the closely related H. syriacus. They quite probably also apply to this similar species[K]. A low quality fibre is obtained from the stems. It is used for making cordage and paper[74]. The seed contains about 25% oil[74]. No further details are given, but it is likely to be edible. A hair shampoo is made from the leaves[74]. A blue dye is obtained from the flowers[168]. This species is planted as a hedge in S. Furnoel501.

dwatta Anthelmintic Antiphlogistic Demulcent Diuretic Dysentery Emollient Expectorant Febrifuge Ophthalmic Skin Stomachic StypticThe following notes are for the closely related H. syriacus. They quite possibly also apply to this species[K]. Ophthalmic, styptic[147, 178]. The leaves are directic, expectorant and stomachic[218, 240]. A decoction of the flowers is diuretic, ophthalmic and stomachic[147, 218]. It is also used in the treatment of itch and other skin diseases[240]. dizziness and bloody stools accompanied by much gas[147]. A decoction of the root bark is antiphlogistic, demulcent, emollient, febrifuge, haemostatic and vernifuge[218, 240]. It is used in the treatment of diarrhoea, dysentery, dysmenorrhoea[240] and dermaphytosis[147].

nrakta E. Asia - China. ksacta Scrub in valleys at elevations of 500 - 1000 metres[266].

propta Seed - sow early spring in a greenhouse. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant them out into their permanent positions in late spring or early summer. Some reports say that the seed can be sown in situ outside and that it gives a good rate of germination[78, 80, 113]. Cuttings of half-ripe wood, July/August in a frame. Good percentage[113]. Cuttings of mature wood, early autumn in a frame. Good percentage[113]. Layering in mid summer to early autumn[1].

nwatta Prefers a well-drained humus rich fertile soil in a sheltered position in full sun[200]. Succeeds in any soil of good or moderate quality[11]. Dislikes shade or badly drained soils[11]. Plants grow best with their roots in cool moist soil and their tops in a hot sunny position. Plants are hardy in most parts of the country, tolerating temperatures down to around -15°c[200]. They are best grown in the milder areas, however, because of their habit of flowering late in the season and thus being subject to frost damage[200]. When planted in colder parts of the country they will need some protection for the first few winters[200]. This species is closely related to H. syriacus, differing mainly in the larger leaves and larger epicalyx[200]. Plants rarely require pruning[219], though they respond well to pruning and trimming and this is best carried out in the spring or just after flowering[219]. The flowers are produced on the current season's growth[200]. and they only open in sunny weather[219]. Plants are late coming into leaf, usually around the end of May or early June[182]. There are some named varieties selected for their ornamental value[11].

#### 7.2.25 Lomatium dissectum

Fernleaf Biscuitroot, Carrotleaf biscuitroot 6 tlin 10 cyuc 4 kcak 2 tcan 2 dwat 1.4 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis 7.2.26 Faqopyrum esculentum hpa7tmwatli fyifxre7t hjonli

drutta Lomatium dissectum is a PERENNIAL growing to 1.4 m (4ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Some people may experience a one-time detox rash.

kcakta Edible Parts: Leaves Root SeedEdible Uses: Root - cooked[105, 177, 183, 257]. Resinous and balsamic[207]. The root can be dried and ground into a powder and then be mixed with cereal flours or added as a flavouring to soups etc. The roots have been boiled to make a refreshing and nutritious drink[257]. Young seed sprouts - raw[105, 177, 257]. Seed[106, 257]. No more details are given, though it is most likely used as an aromatic flavouring in cooked foods[K].

tcanta Disinfectant IncenseThe pulverized root has been burnt as an incense[257].

dwatta Antidandruff Disinfectant Ophthalmic Pectoral Poultice Salve Stomachic TonicFernleaf biscuitroot was widely employed medicinally by many native North American Indian tribes who considered it to be a universal panacea and used it especially in treating chest problems and skin complaints[207, 257]. It is little, if at all, used in modern herbalism, but probably warrants investigation. The whole plant. but especially the root, is disinfectant, pectoral, salve, stomachic and tonic[257]. The dried root was used in the treatment of rheumatism, stomach complaints, coughs, colds, hay fever, bronchitis, influenza, pneumonia and tuberculosis[207, 257]. The root was burnt and the smoke inhaled in the treatment of asthma and other chest complaints[257], it was also used as a herbal steam bath for treating chest complaints[257]. The root was used to make a drink that was taken as a tonic to help people in a weakened condition gain weight[257]. A poultice of the peeled and crushed roots has been applied to open cuts, sores, boils, bruises and rheumatic joints[257]. The root has been soaked in water and then used as an antidandruff wash for the hair[257]. An infusion of the leaves and stems has been used as a tonic[257]. The root oil has been applied as a salve to sores and also used as an eve wash in the treatment of trachoma[257]. Some people may experience a one-time uncomfortable detox rash (please research more on this plant before taking it).

nrakta Western N. America - southwards from Alberta and British Columbia. ksacta Open, often rocky slopes and dry meadows, often on talus[60].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed can be rather slow to germinate, when sown in the spring it usually takes at least 12 months to germinate. Giving it a period of cold stratification might reduce this time. The seedlings need to be pricked out into individual pots as soon as they are large enough to handle, and should be planted out into their permanent positions in the summer. Fresh seed can be sown immediately in situ. Division may be possible in spring or autumn.

nwatta We have almost no information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in much of the country. It can be assumed that plants will require a dry to moist but well-drained soil in a sunny position. This is a taxonomically very difficult genus, many of the species now included in it have at times been included in other genera[60]. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

Buckwheat

6 tlin 12 cvuc 4 kcak 4 tcan 3 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Fagopyrum esculentum is a ANNUAL growing to 1.5 m (5ft) by 0.3 m (1ft in) at a fast rate. It is frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees, flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Buckwheat seed is considered to be one of the most important food allergens. It also contains compounds that can cause irritating skin disorders ('fagopyrism') mainly in sheep and pigs and occasionally in humans, especially in cases where there is heavy consumption and also exposure to sunlight[299

]. Fagopyrism has also been observed in humans after the consumption of buckwheat honey. It may also affect cattle when fed pure buckwheat silage 299

]. The plant has caused photosensitivity in some people, only the dehusked grain is considered to be safe.

kcakta Edible Parts: Leaves SeedEdible Uses: Rutin-Leaves - raw or cooked like spinach[4, 183, K]. Not that wonderful raw, they improve somewhat with cooking [K]. The leaves are rich in rutin[171] (see below for more details) and so are a very healthy addition to the diet[K]. Seed - raw or cooked. A nutty flavour, though it has a somewhat gritty texture that is not universally liked[K ]. It can be cooked like rice[299]. The seed can be soaked overnight in warm water then sprouted for a few days and added to salads[183]. It can also be ground into a powder and used as a cereal[2]. 4, 9, when it can be made into pancakes, noodles, bread etc or be used as a thickening agent in soups etc[46, 183] l. It is popular for use in mixtures with wheat, barley or rye flour to improve the taste and nutritional value of bread and other foodstuffs. Up to 30% of buckwheat flour may be mixed in the wheat dough for baking bread[299]. Due to the absence of gluten, buckwheat is suitable for the diet of people with coeliac disease[299]. Rich in vitamin B6[160]. Excellent beer can be brewed from the grain[244]. Fresh leaves and inflorescences are used for the industrial extraction of rutin, which is applied to strengthen the inner lining of blood vessels (however, it is rather the related species Fagopyrum tataricum (L.) Gaertn., which is commonly grown for rutin production). Rutin is also industrially used as a natural pigment, antioxidant, stabilizer, food preserving and absorber of UV light

tcanta Dve Green manure Soil reclamationA very good green manure plant, it can be used to reclaim badly degraded soils and subsoils[1, 18, 20, 201]. A blue dye is obtained from the stems[57, 106]. A brown dye is obtained from the flowers[4]. Livestock forage and feed: Buckwheat has historically been used as feed for cattle, pigs and chickens (Myers and Meinke, 1994). Green manure and cover crop:Buckwheat grows in the shortest time period of all cover crops (Biorkman and Shail, 2010) flowering within 3 to 6 weeks and completely maturing within 11 to 12 weeks (Biorkman et al., 2008). Weed suppressor: because buckwheat grows quickly, it is an excellent suppressor of weeds, and it has been used for this purpose in North America for several centuries. Cover crop: Buckwheat can also be grown as a cover crop to prevent erosion, improve soil aggregate stability, scavenge nutrients such as phosphorus and calcium, and mineralize rock phosphate (Clark, 2007; Bjorkman and Shail, 2010). Pollinator and beneficial insect habitat: Buckwheat is an excellent plant for bee pasture and insectary gardens(Mader et al., 2011; Lee-Mader et al., 2014). About one acre of buckwheat can provide enough forage for a hive of honey bees, producing about 150 pounds of honey in one season (Oplinger et al., 1989; Myers and Meinke, 1994). The flowers also attract beneficial insects such as parasitic wasps, minute pirate bugs, insidious flower bugs, tachinid flies, ladybeetles and hoverflies, which may prey on insect pests of neighboring crops (Clark, 2007; Bjorkman and

to honey fungus[200]. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

## 7.2.41 Rhynchosinapis wrightii

Lundy Cabbage

6 tlin 9 cvuc 4 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rhynchosinapis wrightii is an evergreen Perennial growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[105]. A flavour somewhere between a cabbage and a radish[K]. At its best for harvesting in the winter months, when it makes an acceptable addition to the salad bowl[K]. It is also a reasonable cabbage substitute when cooked[K]. Flowers and young flowering stems- raw or cooked[K]. The flowers make a decorative addition to the salad bowl, whilst the young flowering stems can be used like broccoli. A cabbage-like flavour but with a distinct bitterness[K]

nrakta Britain. ksacta Endemic to the cliffs and slopes on the eastern side of Lundy Island[17].

propta Seed - sow spring in a cold frame or outdoor seedbed. The seed usually germinates within a week. Prick out the pot-sown seedlings into individual pots as soon as they are large enough to handle and plant them out in the summer. Those in the outdoor seedbed can be thinned as required (the thinnings can be transplanted or eaten) and be moved to their permanent positions when they are 15 - 25cm

nwatta A very rare plant, it is only found growing wild on Lundy Island in the Bristol channel [17]. It requires a sunny position in a well-drained soil[K]. The plant is fairly hardy and should succeed outdoors in most parts of the country, though it tends to droop somewhat in very cold weather. It can provide edible leaves all year round, though there are scant pickings as the plant comes into flower and for a month or so afterwards[K]. Plants are generally quite short-lived perennials, though they usually self-sow freely when well-sited[K].

## 7.2.42 Brassica oleracea

Wild Cabbage, Broccoli, Tronchuda cabbage, Brussels sprouts, Kohlrabi, Sprouting broccoli 6 tlin 9 cyuc 4 kcak 3 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Brassica oleracea is a BIENNIAL/PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid,

neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[5]. Slightly bitter raw, they can be cooked in one or more changes of water[183]. We find that the slight bitterness actually enhances the flavour, and this is one of our favourite cooked leaves. The plant can usually be harvested all year round, though there will be little to pick in very cold winters[K]

tcanta A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anthelmintic Cardiotonic Diuretic Laxative StomachicThe leaves are cardiotonic and stomachic[240]. They have been used in the treatment of gout and rheumatism[240]. The leaves can be used as a poultice to cleanse infected wounds - the mid-rib is removed and the leaf ironed then placed on the affected area whilst still hot[254]. The poultice should not be left on too long or it an cause blisters[254]. The seeds are anthelmintic, diuretic, laxative and stomachic[240].

nrakta Coastal regions of the Mediterranean and W. Europe north to France and Britain, ksacta A rare plant of sea cliffs[5].

propta Seed - sow April in situ. Seedlings transplant very well and so, if you sow the seed too thickly, it is a simple matter to move some of the plants to give them more space. Cuttings root very easily at almost any time in the growing season[K]. Use shoots about 8cm long of the current year's growth and place them in individual pots in the cuttings frame[K].

nwatta Management Standard Minor Global Crop Staple Crop: ProteinAn easily grown plant, it succeeds in full sun in any reasonable soil, though it prefers a well-drained fertile preferably alkaline soil[200]. It does well in heavy clay soils. It is often found wild by the coast and tolerates considerable maritime exposure. The true wild cabbage is a short-lived perennial, though we have seen specimens 5 years old or more[K]. This species has long been cultivated for its edible leaves, stems etc and a wide diversity of forms have been developed, including cabbages, cauliflowers, broccolis and Brussels sprouts[5]. Most of these forms are biennial in cultivation, though there are also some perennial forms. These different forms are detailed below and have each been given their own entry in the database. We have chosen the most up to date classification we can find, as treated in 'World Economic Plants'. B. oleracea alboglabra. Chinese kales are fast-growing plants with tender edible leaves. Although perennials[200], they are usually grown as annuals and are eaten as a summer and autumn crop whilst still young. B. oleracea botrytis. Cauliflowers are grown mainly for their edible swollen inflorescence. Different cultivars can be used to provide crops all year round. B. oleracea botrytis aparagoides. A short-lived perennial form of cauliflower producing a small cauliflower head in the spring followed by a number of broccoli-like flowering shoots. B. oleracea capitata. These are the cultivated cabbages, grown for their edible leaves that usually form a compact head. Reasonably winter hardy, different cultivars can be used to provide edible plants all year round. B. oleracea costata. Couve tronchuda is a tall-growing form of cabbage. It is less hardy than most other forms of this genus. B. oleracea gemmifera. Brussels sprouts form large edible axillary buds 5cm or more long. They are mainly used as late autumn to spring crops. B. oleracea gongylodes. Kohl rabi produces an edible swollen stem 8cm or more in diameter. It is reasonably cold hardy and provides crops from mid summer to the winter. B. oleracea italica. The calabreses and sprouting broccolis, grown mainly for their edible flowering shoots. Calabrese is the less hardy and is used mainly as an autumn and early winter crop. The sprouting broccolis are very winter hardy and are grown outdoors through the winter to provide a spring to early summer crop. B. oleracea medullosa. Marrowstem kales have edible leaves and stems. B. oleracea palmifolia. The Jersey kale produces a very tall stem which has been used as a walking stick. B. oleracea ramosa. The thousand-headed and perennial kales are very cold hardy. Their flavour is stronger than most of the other cultivated forms and they are mainly used as a winter crop. This form is very close to the wild species and

has the most potential for developing perennial cultivars.

is attributed to chemicals that are given off as the plants decav[206].

dwatta Anodyne Aperient Diuretic Emetic Galactogogue Rubefacient StimulantReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[269]. The seed is used in the treatment of tumours in China[269]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[269]. The root is used as a galactagogue in Africa[269]. Ingestion may impart a body odour repellent to mosquitoes[269]. Mustard oil is used in the treatment of skin eruptions and ulcers[269]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[269]. In Java the plant is used as an antisyphilitic emmenagogue[269]. Leaves applied to the forehead are said to relieve headache[269]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[269].

nrakta A cultivar of garden origin. ksacta Not known in the wild.

propta Seed - sow in situ from June to October. Springsown crops tend to run quickly to seed, though they can be eaten whilst still small[206]. It is best not to sow the seed in very hot weather[206]. There are about 5,660 - 6,000 per 0.01 kg (1/3 oz)[269].

nwatta Succeeds in full sun in most well-drained moisture-retentive fertile soils[16, 200, 206]. Prefers a heavy soil and some shade[16]. Dislikes very hot weather[33]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[206]. A form of B, juncea that has been selected for its edible leaves, there are many named varieties[206]. They prefer a fairly high stable temperature and are well adapted to short day length[200]. Many are best grown in warmer climates than Britain but there are several cultivars that grow well in this country[206]. Plants have a rooting depth of between 90 - 120 cm[269]. A good bee plant[74]

#### 7.2.40 Prunus dulcis

Almond. Sweet almond

6 tlin 9 cyuc 4 kcak 3 tcan 3 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Prunus dulcis is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from March to April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers welldrained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Oil Oil SeedEdible Uses: Gum Gum Milk Oil OilSeed - raw, cooked or dried and ground into a powder for use in confections etc[7, 183]. The whole seed can also be roasted, sprouted or used in cakes, confectionery and pastry[183]. The sweet-flavoured forms have a delicious flavour but bitter forms should not be eaten in any quantity - see the notes above on toxicity. The seed is somewhat difficult to digest and so needs to be thoroughly masticated[4]. It can be blended with water to make almond milk[183]. An edible oil is obtained from the seed[183]. It is used mainly as a food flavouring and in cooking[57, 105]. An edible gum is obtained from points of damage on the stems[64].

tcanta Adhesive Cleanser Cosmetic Dye Gum Gum Miscellany Oil Oil Soap makingAn oil expressed from the seeds

tive in reducing soil-borne root rots in pea crops[206]. This is an excellent lubricant in delicate mechanisms such as watches[4]. It is often used in soaps and cosmetics because it has a softening effect on the skin[4, 7]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. A yellow dye is obtained from the roots and leaves[148]. The bruised leaves, when rubbed within any container, will remove strong odours such as garlic or cloves so long as any grease has first been fully cleaned off[4]. A gum from the stems is used as an adhesive[64]. The burnt shell yields a valuable absorbent for coal gas[74]. The burnt pericarp is rich in potassium, it is used in soap making[74]. The seed contains amygdallin, under the influence of water and in the presence of emulsion it can be hydrolized to produce benzaldehyde (the almond aroma, formula C6 H5 CHO) and prussic acid (the toxic principle)[74]. Espalier: tree or other plants that is trained to grow flat against a support (such as a trellis or wall).

dwatta Antiemetic Antitumor Demulcent Emollient Miscellany Nutritive PectoralAs well as being a tasty addition to the diet, almonds are also beneficial to the overall health of the body, being used especially in the treatment of kidney stones, gallstones and constipation[238]. Externally, the oil is applied to dry skins and is also often used as a carrier oil in aromatherapy[238, K]. The seed is demulcent, emollient, laxative, nutritive and pectoral[4, 7, 21]. When used medicinally, the fixed oil from the seed is normally employed4]. The seed contains 'laetrile', a substance that has also been called vitamin B17[218]. This has been claimed to have a positive effect in the treatment of cancer, but there does not at present seem to be much evidence to support this[K]. The pure substance is almost harmless, but on hydrolysis it yields hydrocyanic acid, a very rapidly acting poison - it should thus be treated with caution[218]. In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238]. The leaves are used in the treatment of diabetes[218]. The plant contains the antitumour compound taxifolin[218].

nrakta Europe - E. Mediterranean to C. Asia. ksacta Cultivated ground, thickets, hedges and rocky places near cultivation[89]

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Difficult. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Cuttings of mature wood, late autumn in a frame. Layering in spring.

nwatta Global Crop Management: Standard Staple Crop: Protein-oilThrives in a well-drained moisture-retentive loamy soil[11 200] Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. The almond is often cultivated in the temperate zone for its edible seeds, there are many named varieties[63, 200]. It prefers a Mediterranean climate with a clear distinction between winter and spring, in milder maritime areas it can be induced into flower too early in the season and is then very liable to be damaged by frosts[200]. There is also likely to be a shortage of pollinating insects around when the tree is in flower so hand pollination may improve the crop. Although partially self-fertile, better crops are obtained if at least 2 cultivars are grown[200]. There are two basic forms of almonds, one with bitter seeds and one with 'sweet' seeds. The bitterness is caused by the presence of hydrogen cyanide (see notes above). Although the bitter forms are used in making marzipan and as a food flavouring, the seeds themselves should not be eaten. Even the sweet forms should not be eaten in very large quantities. (Approximately 900 seeds at one time is considered to be a toxic dose for the average adult). Trees are hardier when grown on a plum rootstock[11]. Almond seedlings are the preferred rootstock when plants are grown on hot dry soils, peach rootstocks are better for heavier soils[200]. Trees are at least partially self-sterile. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible

Shail. 2010). Wildlife habitat: Buckwheat is sometimes an ingredient in birdseed mixes and planted with other crops for wildlife food plots(Oplinger et al., 1989). USDA.gov.

dwatta Acrid Astringent Eczema Galactogogue VasodilatorBuckwheat is a bitter but pleasant tasting herb that is frequently used medicinally because the leaves are a good source of rutin[238]. Rutin is useful in the treatment of a wide range of circulatory problems, it dilates the blood vessels, reduces capillary permeability and lowers blood pressure[238, 254]. The leaves and shoots of flowering plants are acrid, astringent and vasodilator[4, 141, 165]. It is used internally in the treatment of high blood pressure, gout, varicose veins, chilblains, radiation damage etc[4, 141, 165]. It is best used in conjunction with vitamin C since this aids absorption[254]. Often combined with lime flowers (Tilia species), it is a specific treatment for haemorrhage into the retina[254]. The leaves and flowering stems are harvested as the plant begins to flower and are dried for later use[238]. They should be stored in the dark because the active ingredients rapidly degrade in the light[238]. Some caution should be exercised in the use of this herb because it has been known to cause light-sensitive dermatitis[238]. A poultice made from the seeds has been used for restoring the flow of milk in nursing mothers[4]. An infusion of the herb has been used in the treatment of erysipelas (an acute infectious skin disease)[4, 244]. A homeopathic remedy has been made from the leaves[9]. It is used in the treatment of eczema and liver disorders[9]

nrakta Probably originating in China, the plant is cultivated in many temperate areas where it sometimes escapes and is found wild. ksacta Waste ground as an escape from cultivation[17]. Its original habitat is obscure.

propta Seed - sow from the middle of spring to early summer in situ. The seed usually germinates in 5 days[115]. The earlier sowings are for a seed or leaf crop whilst the later sowings are used mainly for leaf crops or green manure.

nwatta Fagopyrum esculentum is a plant of the temperate and subtropical zones, though it can also be grown at higher elevations, generally above 1,500 metres, in the trop-

]. It grows best in areas where annual daytime temperatures are within the range 17 - 27°c, but can tolerate 7 -40°c[418

It is very sensitive to frost[299]

]. It prefers a mean annual rainfall in the range 700 1,000mm, but tolerates 400 - 1,300mm[418

]. A very easily grown plant, it prefers dry sandy soils but succeeds in most conditions, including poor[57

, 141 , 171

], heavy[18

] or acid soils[141

l and even sub-soils[160

]. It prefers a pH in the range 5 - 6.5, tolerating 4.4 7.5[418

1. It prefers a cool moist climate, but it also succeeds in dry and arid regions[171

- ]. Hot drying temperatures and drying weather at blooming time blast the flowers and prevent seed formation[418
- ]. The plant has a poorly developed root system that makes it rather sensitive to drought[299]
- ]. Fagopyrum esculentum is cultivated in many parts of the world for its edible seed. It is a prolific producer of seeds, and these are often spread by animal activity. It easily escapes from cultivation and can become established as a weed of cultivated and waste ground, though it is easy to control and does not usually become a pest. Buckwheat is a fastgrowing plant that can reach its full height within 4 - 6 weeks. Flower formation starts 20 days after emergence, the plant continuing to flower until complete senescence and death of the whole plant. After the onset of flowering, the leaves and stems continue to grow while the fruits develop; hence seed ripening is very uneven, making harvesting difficult. From the middle of the flowering period onwards, when the leaf area has reached its maximum, further growth of the vegetative parts is slow, and producing ripe seed becomes the main focus of the plant. The seed is ready for harvesting 70 - 130 days after emergence, depending on cultivar and ecological conditions[141

, 183 , 299

418

1. The seed is harvested when most of it (at least 75%) is mature, and most leaves have vellowed and dropped. The crop is harvested by mowing, after which the stems are bundled and put in heaps to dry. Farmers prefer to harvest early in the morning or late in the afternoon, or even at night, when the plants are slightly damp from dew, to reduce grain shattering[299

1. The average seed yield in the United States is 0.9 - 1 tonne per hectare; in Kenya, it is 1 tonne, and in Russia 1 -1.3 tonnes: but up to 4 tonnes can be obtained[418]

]. The seed ripens irregularly over a period of several weeks, so it is difficult to harvest[141

]. Plants have poor frost resistance, but they are disease and insect resistant[166

]. They inhibit the growth of winter wheat[18

201

1. There are some named varieties[183]

The flowers have a pleasant sweet honey scent[245]

l and are extremely attractive to bees and hoverflies[4] . 171

## 7.2.27 Atriplex canescens

Grey Sage Brush, Fourwing saltbush 6 tlin 9 cvuc 4 kcak 3 tcan 1 dwat 1.8 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli nyanhjen hjonli

drutta Atriplex canescens is an evergreen Shrub growing to 1.8 m (6ft) by 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower in July, and the seeds ripen in August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not selffertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves.

kcakta Edible Parts: Leaves SeedEdible Uses: Colouring DrinkLeaves - cooked or raw[85, 94. A very acceptable taste with a salty tang[K]. The leaves can be used at any time of the year though winter harvesting must be light because the plant is not growing much at this time of year[K]. Seed - cooked[46, 61]. Ground into a powder, mixed with cereals and used in making cakes etc or used as a piñole[94, 95, 183]. It is small and very fiddly to utilize[K]. The ground up seed can also be mixed with water and drunk as a refreshing beverage[183]. The burnt green herb yields culinary ashes high in minerals and these are used by the Hopi Indians to enhance the colour of blue corn products[183, 257]. The ashes can be used like baking soda[257].

tcanta Dye Fire retardant Fodder Hedge Hedge PotashA good hedge in maritime areas, it responds well to trimming[K]. The leaves and stems were burnt by the Hopi Indians and the alkaline ash used to maintain the blue colour when cooking blue corn[216]. A yellow dye is obtained from the leaves and stems[257]. The leaves can be made into a soapy lather and used as a hair wash[257]. The plant has fire-retardant properties and can be used for barrier plantings to control bush fires[200].

dwatta Skin StingsThe leaves can be made into a soapy lather and used as a wash on itches and rashes such as chickenpox[257]. A poultice of the crushed leaves can be applied to ant bites to reduce the pain and swelling[257].

nrakta Central and southwestern N America - South Dakota to Kansas, Texas, California and Mexico. ksacta Sandy or gravelly, commonly non-saline but in other situations obviously saline, sites in Joshua tree, blackbrush, greasewood, salt desert shrub, sagebrush, mountain brush communities[270].

propta Seed - sow April/May in a cold frame in a compost of peat and sand. Germination usually takes place within 1 - 3 weeks at 13°c[134]. Pot up the seedlings when still small into individual pots, grow on in a greenhouse for the first winter and plant out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, July/August in a very sandy compost in a frame. Very easy. Pot up as soon as they start to root (about 3 weeks) and plant out in their permanent positions late in the following spring[K]. Cuttings of mature wood of the current season's growth, November/December in a frame. Very easy. Pot up in early spring and plant out in their permanent position in early summer[K].

nwatta Fodder: Bank Management: pice Management: Fodder Minor Global CropRequires a position in full sun in any well-drained but not too fertile soil[11, 134, 200]. Tolerates saline and very alkaline soils[200]. Plants are very tolerant of maritime exposure, though they dislike wet climates[K]. Resents root disturbance when large. Succeeds in a hot dry position. A very ornamental plant[60], though it is liable to succumb to winter wet when grown on heavy or rich soils[11, 200]. This species forms hybrids with Atriplex confertifolia and A. gardneri[270]. Dioecious. Male and female plants must be grown if seed is required. Occasional monoecious plants are found[274]. Individual plants can change sex. The change is more generally from female to male and is apparently associated with stress such as cold or drought. It would appear that the change confers a survival advantage on the plant[274].

## 7.2.28 Prinsepia utilis

Cherry prinsepia

6 tlin 9 cyuc 4 kcak 4 tcan 2 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prinsepia utilis is a deciduous Shrub growing to 3.5 m (11ft) by 3 m (9ft). It is in flower in February, and the seeds ripen in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit Oil OilĒdible Uses: Oil OilFruit-raw or cooked[1, 2, 177, 183]. Liked by children[272]. Sloe-like[146], it has rather an astringent flavour(K]. The fruit is up to 17mm long and contains a single large seed[K]. An edible oil is obtained from the seed[2, 51, 105, 146]. It is used in cooking[183, 272].

tcanta Hedge Hedge Miscellany Oil Oil Paint Soil stabilization WoodThe seed contains 21% of a fatty oil[240]. As well as being edible, it can also be used for lighting[2, 146, 158, 272]. The oilcake is used for washing clothes[272]. A deep purple colour btained from the fruits is used for painting windows and walls[272]. Plants are grown as a hedge in the Himalayas[1, 272]. Plants have an extensive root system and are used for binding the soil[272]. Wood - very hard, compact. very liable to split[158].

dwatta Eczema Miscellany Rubefacient SkinAn oil from the seed is rubefacient[240]. It is applied externally as a treatment for rheumatism and muscular pain caused by hard work[240]. The oil is also applied to the forehead and temples in the treatment of coughs and colds[272]. The heated oilcake is applied as a poultice to the abdomen in the treatment of stomachaches[272]. A paste of this seedcake is used as a poultice to treat ringworm or eczema[272]. The fruit is used in Chinese medicine[129]. We have no more details.

nrakta E. Asia - Himalayas from Pakistan to W. China. ksacta Forest, scrub and hedges, 1200 - 2700 metres[51]. Usually found in sunny open places on dry hillsides near any spring or water-course[146, 158].

propta Seed - best if given 2 months cold stratification [113]. Sow the seed in autumn if possible, otherwise in late winter or early spring in a cold frame in light shade. Germination may be inhibited by light[113]. Prick out the seedlings when they are large enough to handle into individual pots. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early

1058

summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113].

nwatta Agroforestry Services: Living fence Managemen Standard Regional Crop Staple Crop: OilSucceeds in any moderately fertile well-drained soil in full sun or light shade[200]. Requires a light not too fertile soil[11]. Plants are hardy to about -10°c[184]. The plants produce flowers and fruits better when they are growing in full sun[200]. Flowers are produced on the previous seasons wood[200] and can be produced on the autumn as well as the spring. The flowers are produced on the current years wood according to another report[182]. Autumn flowers can produce ripe fruit in the following spring. Unfortunately, the plants only produce fruit in Britain after long hot summers[200].

## 7.2.29 Actinidia chinensis

Kiwi

6 tlin 9 cyuc 4 kcak 2 tcan 2 dwat 7.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia chinensis is a deciduous Climber growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to June, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit rav or cooked. A delicious flavour. The fruit is up to 3cm across[198]. Fresh fruits contain 100 - 420mg vitamin C per 100g and 8 - 14% carbohydrate[218]. Acidity is 1 - 2%, mainly citric acid[218]. The fruit contains a number of small seeds, but these are easily eaten with the fruit[K]. The leaves are eaten cooked in times of need as a famine food[179].

tcanta Insecticide Paper PencilPaper is made from the bark[178]. If the bark is removed in one piece from near the root and placed in hot ashes, it becomes very hard and can be used as a tube for a pencil[178]. The plant is said to have insecticidal properties (no more details)[218].

dwatta Diuretic Febrifuge Sedative Urinary Vitamin CThe fruits, stems and roots are diuretic, febrifuge and sedative[147]. They are used in the treatment of stones in the urinary tract, rheumatoid arthralgia, cancers of the liver and oesophagus[147]. A decoction of the leaves is used to treat mange in dogs[218]. The stem-juice is used in the treatment of gravel[218].

nrakta E. Asia - China. ksacta Thickets and oak forests on slopes or in ravines, 200 - 2300 metres[109, 198].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood. October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. The dormant plant is hardy to about -15°c[184], though new growth in spring is very susceptible to frost damage[11]. This species is the parent of the cultivated Kiwi fruits, these cultivars are now included under the name A. deliciosa[200]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. The flowers are sweetly scented[245]. This is a climbing plant, supporting itself by twining around branches

method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

## 7.2.38 Broussonetia papyrifera

Paper Mulberry

6 tlin 11 cyuc 4 kcak 3 tcan 2 dwat 9 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Broussonetia papyrifera is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from August to September, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Fruit - raw[2, 105, 177, 179]. The fruit comprises a ball about 1.5cm in diameter with numerous small edible fruits protruding - there is not much edible flesh but it has a lovely flavour[K]. Prolonged ingestion is said to weaken the bones[179]. Leaves - cooked[105]. The dried leaf contains 1% calcium carbonate[179] (this report does not mention edibility). Flowers[179]. No more details.

tcanta Fibre Fodder Leather Paper WoodA fibre from the bark is used in making paper, cloth, rope etc[46, 61, 114, 171]. The fibre can be produced by beating strips of bark on a flat surface with a wooden mallet. A very fine cloth can be made in this way, the more the bark is beaten the finer the cloth becomes. Larger sizes can be made by overlapping 2 pieces of bark and beating them together. A leather substitute can also be made from the bark[171]. When used for making paper branches are harvested after the leaves have fallen in the autumn, they are steamed and the fibres stripped off. In humid areas this can be done without steaming the branches. The inner and outer bark are then separated by scraping (or simply peeling in humid areas) and the fibres are cooked for 2 hours with lye before being hand pounded with mallets. The paper varies in colour if the outer and inner barks are used together or separately[189]. Wood - coarse grained, soft, easily worked, light, not very durable. Used for cups, bowls, furniture etc[149, 158, 178, 229, 266]. Its timber does not have high commercial value. Animal feed, fodder forage. Fodder/animal feed. Invertebrate food for silkworms. Environmental Uses: Agroforestry. Erosion control or dune stabilization. Revegetation. Shade and shelter. Soil improvement, Windbreak, [1d].

dwatta Astringent Diaphoretic Diuretic Dysentery Galactogogue Haemostatic Laxative Ophthalmic Skin Stimulant Stomachic Tonic VulneraryAstringent, diuretic, tonic, vulnerary[178]. The leaf juice is diaphoretic and laxative it is also used in the treatment of dysentery[218]. It is also poulticed onto various skin disorders, bites etc[218]. The stem bark is haemostatic[218]. The fruit is diuretic, ophthalmic, stimulant, stomachic and tonic[218]. The root is cooked with other foods as a galactogogue[218].

nrakta E. Asia - China. Occasionally naturalized in S.E. Europe[50]. ksacta Thickets, mountain ravines and forests[109].

propta Seed - no pre-treatment is required. Sown in the autumn or spring in a greenhouse, germination usually takes place within 1 - 3 months at  $15^{\circ}$ c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their

first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8 - 12cm long with a heel, July/August in a frame. High percentage[11, 78]. Cuttings of mature wood of the current season's growth, November in a frame[200]. Root cuttings in winter[200]. Layering in spring[200].

nwatta Management: Coppice Regional CropEasily cultivated in a warm sunny position in any soil of reasonable quality[11]. A drought resistant species once established[149], thriving on poor sandy or gravelly soils[200, 229]. Another report says that it does not thrive on poor soils[146]. Tolerates atmospheric pollution[200]. A fastgrowing tree according to one report[227], but whilst it might be fast in relation to other members of the genus, it is only of moderate growth compared to some species[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -10°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. There is a superb specimen of this tree at Cambridge Botanical gardens, in the late summer of 1996 it was about 12 metres tall and 16 metres wide and was bearing a huge crop of immature fruit[K]. The leaves on the same tree can vary widely in shape and size[K]. The paper mulberry is widely cultivated in E. Asia for the fibre in its bark, there are many named varieties[11, 200]. Trees are coppiced annually for this purpose[4], though the coppice interval in countries such as Britain would probably be 2 -3 years. This is a very adaptable tree, it is found growing in tropical climates but its range also extends well into the temperate zone. Dioecious. Male and female plants must be grown if seed is required. Special Features:Not North American native, Invasive, Inconspicuous flowers or blooms.

## 7.2.39 Brassica juncea multiceps

Green In The Snow

1063

6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica juncea multiceps is a ANNUAL growing to 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves OilEdible Uses: Condiment OilLeaves - raw or cooked[22, 33, 46, 52, 61]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[206]. The young raw leaves are pleasantly spicy but older leaves, particularly when the plant runs to seed, can become overpoweringly hot though they are still nice cooked at this stage [206]. The leaves can be finely shredded and added to mixed salads[206]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling[183]. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133]. An edible semidrying oil is obtained from the seed[1, 2, 17, 57, 183]. The seed contains 25 - 30% oil[74]. The seed is used as a mustard flavouring[171]. It is the source of 'brown mustard'[183]. a prepared mustard that is milder than that produced from other species[238]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles[238]. They are often heated in oil to destroy their pungency and give them a nutty flavour[238]. The root of some forms of this species is edible[183]. Sprouted seeds can be added to salads.

tcanta Green manure Oil RepellentThere is some evidence that if this plant is grown as a green manure it is effec-

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta Europe - S.E. France. ksacta Dry stony slopes in the Maritime and Cottian Alps[11, 50].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil, growing well on limestone[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Three shrubs at Kew in September 1993 were about 1.5 metres tall and still had a few fruits on them, though there was evidence that they had carried a large crop[K]. They fruited well again in 1994[K]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

## 7.2.36 Cephalotaxus sinensis

Chinese Plum Yew

6 tlin 9 cvuc 4 kcak 3 tcan 1 dwat 5 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nvanhien hionli

drutta Cephalotaxus sinensis is an evergreen Shrub growing to 5 m (16ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit[81]. Fairly large, about 25mm x 17mm[200]. No more details. though it is closely related to C. harringtonia, the fruit of which is edible raw if fully ripe[K]. The fruit does not always ripen in Britain, before full ripeness it has a disgusting resinous flavour that coats the mouth and refuses to go away for hours[K]. It is quite likely that the seed of this species is also edible. More research is required[K].

tcanta Hedge Hedge WoodVery tolerant of pruning, this plant makes a very good hedge in shady positions[200]. The wood is used to make furniture, farm implements, crafts, and utensils[266]

dwatta CancerExtracts from the plant have shown anticancer activity[218]. The branches, roots, leaves, and seeds are a source of many alkaloids, which are used to treat leukaemia and lymphosarcoma[266].

nrakta E. Asia - E. and C. China. ksacta Montane coniferous or mixed forests, thickets, stream valleys, valley bottoms, open situations, on granite, sandstone, and limestone substrates at elevations of 600 - 3200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[113], it should then germinate in the following spring[K]. A hard seedcoat can delay germination, especially in if the seed is not sown as soon as it is ripe[81, K]. Stored seed should be cold-stratified and sown in a cold frame in the spring[200]. Germination can take 18 months or more. Prick out the seedlings as soon as they are large enough to handle and grow them on for at least their first winter under cover. Plant out in late spring after the last expected frosts.

Greenwood cuttings of terminal shoots, August/September in a humid cold frame[1, 200]. Difficult[113].

nwatta Landscape Uses: Specimen, Woodland garden. Prefers a moist well-drained sandy soil but succeeds in most soils though it dislikes dry gravelly or chalky soils[1, 200]. Prefers a position in semi-shade but tolerates full shade[11. 81] and it also succeeds but does not usually thrive in full sun[200]. It grows very well in the mild wet coastal region of W. Scotland where it succeeds even in full sun[200]. Requires a humid sheltered site[200], strongly disliking very exposed positions[1]. Although the dormant plant is coldhardy, the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Closely related to C. harringtonia[11, 200]. Plants are dioecious, but female plants sometimes produce fruits and infertile seeds in the absence of any male plants[11]. However, at least one male plant for every five females should be grown if you are growing the plants for fruit and seed. Plants have also been known to change sex[81]. Male cones are produced in the axils of the previous year's leaves, whilst female cones are borne at the base of branchlets[200]. Special Features:Not North American native, Inconspicuous flowers or blooms.

## 7.2.37 Amaranthus hybridus

Rough Pigweed. Slim amaranth

6 tlin 12 cvuc 4 kcak 1 tcan 1 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hionli

drutta Amaranthus hybridus is a ANNUAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 6 and is frost tender. It is in flower from July to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is selffertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista No members of this genus are known to be poisonous, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and young seedlings - cooked as a spinach, added to soups etc or eaten raw[46, 61, 62, 159, 183]. The nutritious leaves have a mild flavour[K]. Seed - raw or cooked[22, 46, 61, 85]. Used as a cereal substitute, the seed is usually ground into a flour for use in porridges, bread etc. It is rather small. about 1mm in diameter[266], but is easy to harvest and very nutritious[K]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K].

tcanta DyeYellow and green dyes can be obtained from the whole plant[168].

dwatta AstringentA tea made from the leaves is astringent[105, 222]. It is used in the treatment of intestinal bleeding, diarrhoea, excessive menstruation etc[222, 257].

nrakta Tropics. Naturalized in Europe[50]. ksacta Of uncertain origin, it grows wild in cultivated fields and waste nlaces[43]

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. Cultivated as a food crop in India[46, 1051, there are many named forms[183]. This species has the potential, through crossbreeding, of imparting early maturity to the white seeded grain amaranths[183]. Most if not all members of this genus photosynthesize by a more efficient author as yet) is found in Taiwan from 1300 - 2600m[198]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

## 7.2.30 Asphodeline lutea

King's Spear, Yellow Asphodel, Jacob's Rod 6 tlin 9 cyuc 4 kcak 2 tcan 0 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Asphodeline lutea is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Root - roasted. This food was highly valued by the ancient Greeks, who roasted the roots like potatoes and ate them with salt and oil or mashed them with figs[2, 183]. The roots are not very thick but are abundantly produced and have a nice nutty flavour[K]. They can be harvested at any time of the year, but are best used when the plant is dormant in late summer and early autumn[K]. They do not store well and should be used within a few weeks of harvest[K]. Young shoots - cooked[K]. They smell less than pleasant whilst cooking but have a fairly bland flavour[K]. Some people find that they have a very pleasant flavour[K]. The plant comes into growth in late summer and the autumn, the young shoots can be harvested in moderation all through the winter[K]. Flowers - raw. A delightful sweetness, they are a very decorative and tasty addition to the salad bowl but should be used as soon as possible after harvesting because they soon start to decompose[K]. The flowers are very short-lived and are best picked in the late afternoon - thus you can enjoy them visually during the day and gastronomically in the evening[K]. There is also said to be a double-flowered form[245], which will have twice the quantity of petals, though we do not know

tcanta Scented plant. Attractive edible flowers.

nrakta Mediterranean in Southern and Eastern Europe, North Africa and east to the Caucasus. ksacta Dry grassland[50], rocky and stony places[45], usually on limestone[187]

propta Seed - sow March/April in a greenhouse and only just cover the seed. Germination usually takes place in 1 - 3 months at 15°c[134]. Once the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring. Division in spring or autumn, with care since the roots are easily damaged[1]. Ensure each division has at least one growing bud[200]. Large divisions can be planted out straight into their permanent positions, smaller ones are best potted up until they are growing away strongly and can then be panted out. We have found that this plant can be successfully divided throughout the growing season so long as it is watered in dry weather[K].

nwatta Landscape Uses:Container, Foundation, Massing. An easily grown plant, it succeeds in ordinary garden soil[1, K], tolerating partial shade[200]. Requires a welldrained soil[42, 134], doing well in sandy soils[188]. Prefers a deep rich soil[111]. Prefers a soil that is not too rich and a warm sunny position[200]. Plants are hardy to about -15°c[187]. A very ornamental plant[1], though it looks very untidy in late summer when it dies down after flowering[K]. It seems to be very wind resistant, tolerating maritime exposure on an exposed site in Cornwall[K]. The flowers are sweetly scented[245]. Plants seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Naturalizing, Suitable for dried flowers, Fragrant flowers. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on

etc[200]. The ssp. A. chinensis setosa.(newly named, no the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is tuberous with swollen potato-like

## 7.2.31 Crataegus caesa

6 tlin 9 cvuc 4 kcak 2 tcan 2 dwat 3 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli

flatpriklwis hpa7tmwatli xre7t hjonli drutta Crataegus caesa is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A good size fruit, about 20mm in diameter, with a sweet taste and a fair fruit to seed ratio it has a mealy texture, is fairly juicy and makes very pleasant eating[K]. It ripens in mid to late September and can hang on the tree for several weeks[K]. The fruit can be used in making pies, preserves, etc, and can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained, Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta Eastern N. America. ksacta Not known

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years

nwatta We have very little information on this species, and do not know how hardy it will be in this country, or even its country of origin. However, a specimen growing in an open position at Kew Botanical Gardens is about 3 metres tall and wide and regularly carries a heavy crop of fruit[K].

A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

## 7.2.32 Atriplex confertifolia

Shadscale, Shadscale saltbush 6 tlin 9 cyuc 4 kcak 0 tcan 1 dwat 1.8 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli nyanhjen hjonli

drutta Atriplex confertifolia is an evergreen Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in June, and the seeds ripen in August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves -cooked[105, 177] and used as greens[216, 257]. The water in which the leaves is cooked is used in making corn pudding[161, 183]. Seed - used in piñole or ground into a meal and used as a thickener in making bread or mixed with flour in making bread[95, 105. 161, 183].

dwatta Antispasmodic Epilepsy PoulticeThe plant has been burnt and the smoke inhaled as a treatment for epilepsy[257]. The boiled leaves have been used as a limiment for sore muscles and aches[257]. A poultice of the mashed leaves have been applied to the chest and a decoction of the leaves drunk to treat colds[257].

nrakta Western N. America ksacta Gravelly to finetextured soils in greasewood, mat-atriplex, other salt desert shrub, sagebrush, pinyon-juniper, and ponderosa pine communities. 600 - 2200 metres[270].

propta Seed - sow April/May in a cold frame in a compost of peat and sand. Germinates in 1 - 3 weeks at 13°c[134]. Pot up the seedlings when still small into individual pots, grow on in a greenhouse for the first winter and plant out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy. Pot up as soon as they start to root (about 3 weeks) and plant out in their permanent positions late in the following spring(KI. Cuttings of mature wood of the current season's growth, November/December in a frame. Very easy. Pot up in early summer(KI.

nwatta Requires a light or medium well-drained but not too fertile soil in a sunny position[11, 200]. Tolerates saline and very alkaline soils[200]. Succeeds in a hot dry position. Plants resent root disturbance when they are large[134]. Plants are apt to succumb to winter wet when grown on heavy or rich soils. Shadscale forms hybrids with Atriplex canescens, A. garrettii, A. corrugata, and A. gardneri varieties. It is, however, closely allied to A. parryi and A. spinifera[270]. Dioecious. Male and female plants must be grown if seed is required.

#### 7.2.33 Pinus armandii

Chinese White Pine, Armand pine 6 tlin 9 cyuc 4 kcak 2 tcan 2 dwat 15 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus armandii is an evergreen Tree growing to 15 m (49ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: SeedEdible Uses: CondimentSeed - raw or cooked[63]. Esteemed as a great delicacy[105, 177, 183], the oil-rich seed has a slightly resinous flavour. Up to 13mm x 11mm[200]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - soft. The timber is used for construction, railway sleepers, furniture, and wood fibre[46, 61, 266].

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta E. Asia - W. China, Korea, Formosa. ksacta Moderate to high elevations[120]. Mountains, river basins; 1000-3300 m. S Gansu, C and NW Guizhou, Hainan, SW Henan, W Hubei, S Shaanxi, S Shanxi, Sichuan, C Taiwan, SE Xizang, Yunnan[266].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Thrives in a light well-drained sandy or gravelly loam[1]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. This species grows well in Britain[120]. The best growth in this country is found in Sussex, trees also grow well in Ireland. Annual increases in height are normally moderate but the best trees have been increasing by 60cm a year. Increase in girth can be as high as 5cm a year[185]. A plant at Kew, accession no 000-69.10663, was bearing a good crop of cones in 2000[K]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus [200]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 8 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. An evergreen. The root pattern is a tap root similar to a carrot going directly down [1-2].

## 7.2.34 Phyllostachys edulis

Moso-Chiku, Tortoise shell bamboo 6 tlin 10 cyuc 4 kcak 0 tcan 1 dwat 8 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tlmvatli xre7t hionli

drutta Phyllostachys edulis is an evergreen Bamboo growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked[1, 11, 105]. Very palatable when cooked but acrid raw[25, 74, 183]. Not of the highest quality, but their large size makes them very popular[195]. Extensively eaten in China, they are usually cooked in one change of water[183]. The shoots are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level. The dormant young shoots, harvested in the winter before they emerge above the ground, are especially relished as a delicacy[183, 195].

tcanta Containers Fodder Pipes WoodThe canes make good water pipes[74], they are also used for household utensils etc[25]. The short internodes at the lower end of the cane are used as flasks, vases etc[74]. Although the wood is relatively soft, the canes are much used for heavy construction, weaving various types of handicrafts and paper making[195]. The rhizomes are used as walking sticks and umbrella handles. Carbon farming - Industrial Crop: biomass. Fodder: bank, Other Systems: multistrata.

dwatta Antiemetic AntirheumaticThe leaves are used in the treatment of arthritic inflammations[218]. The sheaths of the stem are used in the treatment of nausea and sour stomach[218].

nrakta E. Asia - China. ksacta Woodland[162]. Mountain slopes at elevations up to 1600 metres or more[266].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and

small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Industrial Crop: Biomass Management: Managed Multistem Minor Global Crop Other Systems: MultistrataRequires a rich damp soil in a sheltered position[200] with plenty of moisture in the growing season[162]. Likes abundant sunshine[11]. A fairly cold-hardy plant, succeeding outdoors in many areas of Britain. It tolerates temperatures down to about -15°c according to one report, but the plants are slow to recover from damage caused by cold weather[11]. They also dislike prolonged exposure to hard frosts[200]. Plants grow well in Cornwall making a very good sized clump. The young shoots are very fast growing, up to 30cm per day[11], and are produced from late April[25]. The rootstock is running but it is practically static in cool climates[25]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. Young plants can be difficult to establish, new plantings only grow slowly at first and often fail completely if soil and water conditions are less than the best[195]. This species, but especially its cultivar 'Pubescens' [266] is extensively cultivated for its edible young shoots and other uses in China and Japan [46, 183, 266], it is the most commonly cultivated bamboo in China and the second most common in Japan[195]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. Carbon Farming - Cultivation: minor global crop. Management: managed multistem.

## 7.2.35 Prunus brigantina

Briancon Apricot

6 tlin 9 cyuc 4 kcak 0 tcan 1 dwat 6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prunus brigantina is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit Oil SeedEdible Uses: OilFruit - raw or cooked. A yellow plum about 3cm in diameter with a single large seed[K]. Scarcely edible according to one report[177], but we found it to have a pleasant mealy texture and a sweet flavour[K]. We have found it bearing quite freely, even on young trees no more than 6 years old[K]. An edible oil called 'huille des marmottes' is obtained from the seed[1, 2, 11, 46]. It is used as an olive oil substitute in France[105, 183]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye OilThe oil obtained from the seed is also used for lighting[11]. It is aromatic[61]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruitf1681.

#### 7.2.161 Anthriscus cerefolium

Chervil, Garden chervil 6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.5 m hkuc pcimhmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anthriscus cerefolium is a BIENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: CondimentEdible leaves - raw in salads or used as a flavouring in cooked foods such as soups and stews[2, 14, 21, 27, 46, 61, 100, 2441. A mild aromatic flavour[183] that is suggestive of aniseed[238]. The leaves are often used as a flavouring, they form the basis of the seasoning 'fines herbes' [200] and are an essential ingredient of 'bouquet garni'[244]. The leaves should always be used fresh because the delicate flavour does not withstand drying or prolonged cooking[238, 244]. The leaves are ready for harvesting in about 8 weeks from sowing, the plant responds well to cut and come again harvesting[200]. The flowers are used as a seasoning[183]. The root is said to be edible[177, 183].

tcanta RepellentThe growing plant is said to repel slugs[238].

dwatta Digestive Digretic Expectorant Ophthalmic Poultice StimulantChervil is not widely used as a medicinal herb, though it is sometimes employed as a 'spring tonic' for cleansing the liver and kidneys, is a good remedy for settling the digestion and is said to be of value in treating poor memory and mental depression[238, 244, 254]. The fresh plant, harvested just before flowering, is digestive, diuretic, expectorant, poultice and stimulant[9, 21, 201]. The juice is used in the treatment of dropsy, arthritis and chronic skin ailments[9]. The bruised leaves are used as a poultice for slowhealing wounds[9] and a warm poultice is applied to painful joints[268]. An infusion of the fresh leaves is also used as an eyewash to treat sore or inflamed eyes[244].

nrakta South-eastern Europe. Naturalized in Britain[17]. ksacta Hedgebanks, roadsides and waste places[9, 17].

propta Seed - sow in situ in succession from February to October. The seed usually germinates in 2 - 3 weeks[200]. The February, September and October sowings should be made in a very sheltered warm and sunny position outdoors or under some protection such as a frame. Other sowings can be made in a position that has at least some shade from the midday sun since the plant runs to seed quickly if it gets too hot or the soil is dry[238]. The seed only remains viable for about a year[238].

nwatta Prefers a well-drained moisture retentive soil[200]. Plants dislike hot dry summers[200], it is best to give summer crops a cool shady position but winter crops require a sunny position[14, 18, 37, 52]. Tolerates a pH in the range 5.8 to 7.6. Plants are hardy to about -10°c[200]. Chervil is occasionally cultivated as a salad plant, especially in France[268]. There are some named varieties[183]. It can supply fresh leaves all year round from successional sowings, especially if given some protection in winter[238]. Although a biennial, it is usually cultivated as an annual[238]. It often self-sows when grown in a suitable position[18, 200]. Be careful if harvesting this plant from the wild because it is superficially similar to some poisonous species such as young plants of hemlock, Conjum maculatum[244], Chervil is an aromatic plant with pleasantly scented leaves[245]. It is said to be a good companion plant for growing with carrots and radishes[18, 201], the radishes becoming hotter and crisper[201]. It also grows well with dill and coriander[201]. When grown with lettuces it is said to protect them from aphids and ants, the plant is also said to repel slugs[238].

# ornamental garden[50]. The flowers are very attractive to 7.2.162 Ornithogalum umbellatum

Star Of Bethlehem, Dove's Dung 6 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ornithogalum umbellatum is a BULB growing to 0.3 m (1ft) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Skin contact with the bulb can cause dermatitis in sensitive people[65]. The bulb contains alkaloids and is poisonous[2, 62]. Another report says that the bulb is poisonous to grazing animals[183].

kcakta Edible Parts: Flowers RootEdible Uses: Bulb raw or cooked[2, 5, 46, 61, 183]. The bulbs can be dried and ground into a powder[207]. Whilst the bulbs are palatable and wholesome according to some reports[2, 4, 115], some caution is advised. See the notes above on toxicity. Flowers baked in bread[183].

dwatta BachA homeopathic remedy is made from the bulbs[4]. It is useful in the treatment of certain forms of cancer[4]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'After effect of shock, mental or physical'[209]. It is also one of the five ingredients in the 'Rescue remedy'[209].

nrakta Europe, including Britain, from Scandanavia south and east to the Mediterranean. ksacta Grassy places in eastern England[5, 17].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Sow the seed thinly and leave the seedlings undisturbed in the pots for their first dormancy, but apply liquid feed at intervals, especially in their second year of growth. Divide the bulbs at the end of their second year of growth, putting 2 - 3 bulbs in each pot. Grow them on for one more year and them plant them out into their permanent positions whilst they are dormant. The seed can also be sown in a cold frame in early spring. Division of offsets in September/October[200]. The larger bulbs can be replanted immediately into their permanent positions. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in late summer.

nwatta Landscape Uses:Border, Container, Woodland garden. An easily grown plant, succeeding in an ordinary garden soil[1, 42]. Tolerates partial shade[200]. Hardy to about -20°c[200]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°c[214]. A very ornamental plant[1], but it can be invasive where conditions suit it[200]. It can be naturalized in short turf or thin grass below shrubs[200], though this should not be mown from the time the bulbs start to grow until they have set seed and the leaves are dying down. Special Features:Not North American native, Invasive, Naturalizing, Suitable for cut flowers.

#### 7.2.163 Allium drummondii

Prairie Onion, Drummond's onion 6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium drummondii is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

in a nursery bed for more than 2 growing seasons without 7.2.73 Elymus hispidus being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, but trees usually grow well in Britain[200]. The seed takes two years to ripen but is seldom produced in this country[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11].

# 7.2.72 Allium ramosum

Chinese Chives

6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium ramosum is a BULB growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. The small bulbs are about 10mm in diameter[200]. Leaves - raw or cooked. The flavour is somewhat between that of garlic and chives[183]. An excellent taste, the leaves have a pleasant sweetness mixed with a strong onion flavour[K]. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20]

dwatta DysenteryThe leaves and bulbs contain sulphur compounds (which give them their onion flavour), saponins and bitter substances[283]. They possess antibacterial properties and are used in Vietnam in the treatment of haemontysis, epistaxis, cough, sore throat, asthma, dysentery, dyspepsia etc[283]. When added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K]. The seed contains alkaloids and saponins[283]. It is used in the treatment of spermatorrhoea, haematuria, incontinence, lumbago etc[283].

nrakta E. Asia - China, Mongolia, Russia. ksacta Meadows and grassy slopes[90]. Sunny hills and pastures at elevations of 500 - 2100 metres in northern China[266].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta An easily grown plant[203], it prefers a sunny position in a light well-drained soil[1, 42]. The bulbs should be planted fairly deeply[1]. A very ornamental plant, the flowers are especially attractive. Very closely related to A. tuberosum[42, 90, 203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes [18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

Wild triga. Pubescent wheatgrass.

6 tlin 9 cyuc 4 kcak 4 tcan 0 dwat 0.8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom

hpa7tmwatli fyif hjonli

drutta Elymus hispidus is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. The flowers are pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil.

pcista None Known

kcakta Edible Parts: SeedEdible Uses: Edible Portion: Seeds, Grain, Cereal, Seed - raw or cooked[646]. A sweet, mild, nutty flavout[646]. Usually ground into a powder and used as a flour, it can also be eaten raw when sprouted or can be cooked whole in a similar manner to rice, or be added to stews etc[646, K]. The grain has higher levels of protein (20.8%), fat (3.21%) and ash (2.64%) than wheat [646]. The protein is nutritionally limiting in lysine as is wheat, but the grain has higher levels than wheat of all the other essential amino acids[646]. No functional gluten was found in samples of the grain tested by USDA. However no tests have been conducted to determine if individuals with wheat or gluten allergies can tolerate this grain and, since it is closely related to wheat, there is a possibility that this may cause similar problems[646]. Most of the grain will have the hulls still attached after harvesting. Dehulling can be accomplished with any piece of equipment that will rub the grain vigorously. A brush machine in which brushes rotate rapidly inside a cylindrical screen is an effective dehuller 646 ]. Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta Widely planted and naturalized in western North America, used for forage and erosion control. An excellent food source for grazing and browsing animals. Left unharvested, the vegetation is a good nesting habitat for some birds and waterfowl. Generally, it is not an invasive plant and coexists well with native plant species. Erosion control and land rehabilitation are additional uses for this plant. This species is well adapted to the stabilization of disturbed soils. It can be used in critical and urban areas where irrigation water is limited; and to stabilize ditchbanks, dykes, roadsides and airport landing strips[277, 646]. The plant can also be use to build soils because of its heavy root production. Levels as high as 7,500 kilos (dry weight) per hectare of root production in the upper 20cm of soil have been measured in five-year-old stands[277]. It can be used as a reclamation grass for mine sites[646]. It establishes guickly to form a protective mat of roots and rhizomes, even when planted on soils degraded by earth moving or mining. Within five years, stands have produced up to 7000 pounds of the dry root mass per acre in the top 8 inches of soil. Heavy root production holds the soil in place and restores its natural fertility by increasing the soil carbon. Attractive to pets who often chew on it to aid their digestion.

dwatta None Known

nrakta Eurasia - Germany, south to Portugal and Spain, east through Turkey and the Caucasus to central Asia, Afghanistan and Pakistan. Western United States and Western Canada. ksacta Steppes, on open stony and smallgrained hillsides, among shrubs, up to the lower mountain belt; at elevations up to 2,300 metres[1145].

propta Seed - if sufficient moisture is available, the seed can be sown shallowly in situ in late summer. It germinates within a few days and grows rapidly before becoming dormant for the winter. New growth in spring is rapid, the plant flowering in early summer and maturing the seed in mid to late summer[646]. In drier soils the seed is better sown in the spring, but will generally only give a light crop or no crop of seed in its first year[277]. If seed is in short supply then it can be sown in containers in a greenhouse, pricked out into individual pots when large enough to handle and then planted out when 15cm or more tall. Division of the rhizomes

nwatta Management: Standard Staple Crop: Balanced carb Under DevelopmentClimate: cold to warm temperate.

Humidity: semi-arid to humid. When grown at higher elevations (from 1,000 - 2,700 metres) Thinopyrum intermedium can tolerate a minimum annual rainfall of around 300mm, though rainfall requirements are greater at lower elevations[277]. The plant can tolerate up to 1,160mm per annum[418]. Plants can withstand considerable cold, with temperatures down to around -25°c, so long as this is not accompanied by heavy rain[277, 418]. Requires a sunny position. It prefers well-drained loamy to clavey textured soils: the pubescent form performs best on loamy to sandy to shallow soils[277]. It can tolerate slightly acidic to mildly saline conditions[277]. Plants, especially the pubescent form, can tolerate low fertility[277]. Plants are tolerant of moderate, short-lasting seasonal inundation of the soil in spring[277]. Plants are very tolerant of fire - top growth is killed but the plant usually resprouts freely from the roots[277]. Seed production when the plant has ample moisture in the growing season can reach 500 - 600 kilos per hectare in the first year of harvest, though this diminishes in subsequent years unless the plant is fertilized and preferably also divided[277, 646 ]. During the seed conditioning process, some of the seeds lose their hulls, producing naked hull-less grain. The hull-less seeds tend to lose viability more quickly and are therefore not sold for planting hay and forage crops. This grain is now being sold as Wild Triga, the first commercially available perennial grain[646]. There are two main forms of this species and at one time the two were treated as distinct (as Agropyron intermedium (Host) P.Beauv., with leaves and flower spikes mainly smooth; and Agropyron trichophorum (Link) K.Richt., which is densely hairy). The two interbreed freely and the commercial seed will often produce a mix of the two forms. The hairy form is considered to be slightly more drought tolerant and winter hardy[277]. Carbon Farming Solutions - Cultivation: under development. Researchers estimate that Elymus hispidus could be yielding as well as wheat within 20 years. However, seed size will be smaller. Gluten quality is not as good as wheat. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

# 7.2.74 Brassica rapa chinensis

Pak Choi

6 tlin 9 cyuc 4 kcak 0 tcan 1 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis

hpa7tmwatli fyifxre7t hjonli

drutta Brassica rapa chinensis is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Leaves Oil StemEdible Uses: Oil-Leaves - raw or cooked[46, 52, 61, 116]. They can be eaten at any stage from seedling to mature plant[206]. Well-flavoured, they are sweet with a hint of mustard[206]. The leaves are also dried for winter use[206]. The leaves have pronounced stems and these can also be eaten, they tend to have a mild, almost bland flavour[206]. A nutritional analysis is available[218]. Immature flowering stems - cooked like broccoli[206]. A sweet flavour[206]. An edible oil is obtained from the seed.

dwatta Antirheumatic Antiscorbutic ResolventThe leaf is antiarthritic, antiscorbutic and resolvent[218].

nrakta A cultivar of garden origin. ksacta Not known in

propta Seed - sow in situ May to August. Spring sown crops are prone to run quickly to seed if there is a spell of cold weather[206]. Some varieties can also be sown in a cold greenhouse in autumn or early spring to provide leaves overwinter and in late spring.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Prefers a pH of 5.5 to 7[200]. Tolerates a pH in the range 4.3 to 7.5. Prefers a cool moist reasonably fertile soil[52]. The plant is shallow rooted and intolerant of drought, it needs to be grown in a moist fertile soil for the best quality leaves[206]. Plants are not tremendously

cold-hardy, though they will withstand light frosts[133]. Pak choi is widely cultivated, especially in China, for its edible leaves which are produced mainly in the summer and autumn. A fast-growing plant, there are many named varieties and some can be ready in as little as five weeks from sowing the seed[88, 206, 264]. Forms with green stems tend to stand up better to adverse conditions than white-stemmed forms[206].

#### 7.2.75 Gaultheria humifusa

Alpine Wintergreen, Alpine spicywintergreen 6 tlin 9 cyuc 4 kcak 3 tcan 0 dwat 0.1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Gaultheria humifusa is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit-raw or cooked[183]. Aromatic and delicious[2, 62, 106] with a flavour of wintergreen. Often used in preserves[183]. The fruit is about 6mm in diameter[200]. Leaves - raw[62]. Used as a wayside nibble[85]. The young tender leaves are especially suited for use as greens[183]. They have a delicate flavour of wintergreen. A tea is made from the fresh or dried leaves[62, 85, 183].

tcanta DyeA ground cover plant for positions in the sun or light shade. A black dye has been made from the plant[257].

nrakta Western N. America. ksacta Moist alpine and sub-alpine slopes[60].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring. Layering.

nwatta Prefers a moist but not boggy humus rich soil in sun or semi-shade[11]. This species requires a lot of shade[1]. A peat and moisture loving species, it requires a lime-free soil[11]. The plant can make a good nesting place for mice, these mice then eat the bark of the stems in winter causing die-back. Grows well in a rock garden[11]. This species is closely allied to G. ovatifolia[11]. Plants in this genus are notably resistant to honey fungus[200].

# 7.2.76 Brassica rapa pekinensis

Chinese Cabbage

6 tlin 9 cyuc 4 kcak 2 tcan 1 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica rapa pekinensis is a ANNUAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

seed might require a period of up to 3 months cold stratification [113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Not fully hardy in Britain, it is best grown in the milder areas of the country and is reluctant to flower in colder areas[1, 11, 182]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Occasionally cultivated for its edible fruit, there are some named varieties. 'Well's Delight' grows only 12 - 20cm tall, forming a nearly solid evergreen carpet and is recommended as an ornamental low-maintenance ground cover plant [183]. The fruit has a slight aromatic flavour[183]. 'Bloodstone' is another cultivar that has been recommended for ground cover[200]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2].

# 7.2.158 Camelina sativa

Gold Of Pleasure

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Camelina sativa is a ANNUAL growing to 0.6 m (2ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Oil OilEdible Uses: Oil OilAn edible oil is obtained from the seed[2, 17, 105, 177, 183].

tcanta Broom Fibre Oil OilAn oil from the seed is used as a luminant and as an emollient for softening the skin[100]. A fibre is obtained from the stems[2, 200]. The stems are used for making brooms[2].

nrakta E. Europe to W. Asia. Occasionally naturalized in Britain[17]. ksacta A weed of corn and flax fields in Britain[17]

propta Seed - sow mid spring in situ.

nwatta An easily grown plant, succeeding in most soils and preferring a sunny position[K]. It does well on poor land[115]. Plants can self-sow when well-sited[K]. 'Gold of Pleasure' is occasionally cultivated for the oil in its seed[17, 171]. This species is a bad companion plant, depressing the growth of nearby plants[18]. It has become a noxious weed of cultivated fields in some of the areas into which it has been introduced[2].

# 7.2.159 Umbilicus rupestris

Pennywort

6 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Umbilicus rupestris is an evergreen Perennial growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects? Self. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves-raw or cooked[2, 105, K]. A very acceptable mild flavour in the winter and early spring, they can be used in quantity in salads at this time[K]. The leaves become rather stronger-tasting in the summer and are not so pleasant then[K].

dwatta Analgesic Diuretic Epilepsy PoulticeThe leaves are mildly analgesic[7]. The juice and extract of the plant have an old reputation for the treatment of epilepsy[4]. The leaves are also made into a poultice and used in the treatment of piles, slight burns and scalds[4, 7]. A decoction of the leaves is considered to be cooling and diuretic and the juice taken inwardly is said to be excellent for treating inflammations of the liver and spleen[4].

nrakta Europe, from Britain and France south and east to N. Africa and the Mediterraean. ksacta Crevices of rocks and walls, especially in acid and damp conditions[17, 53]. Avoids alkaline soils[200].

propta Seed - sow spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. Division in spring. Very easy, pant them straight out into their permanent positions. Leaf cuttings[200].

nwatta An easily grown plant, succeeding in any near neutral, gritty, moisture retentive but well-drained soil in sun or light shade[200]. Plants are often found growing on walls, even succeeding on old brick and mortar walls[K] Plants are hardy to about -15°c[200]. A very attractive plant for the rock garden[53], the leaves often stay green all winter[4].

#### 7.2.160 Lallemantia iberica

6tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lallemantia iberica is a ANNUAL/BIENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness, It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil Oil SeedEdible Uses: Oil OilLeaves - cooked and used as a potherb[46, 61, 105, 177, 183]. Seed - raw or cooked. It is rich in oil[2]. An edible oil is obtained from the seed[2, 6, 105, 177, 183].

tcanta Oil OilThe seed contains up to 30% of a drying oil[61]. It is used for lighting, as a varnish, in paints and as a lubricant[46, 57, 74]. It is a linseed substitute[114]. Linseed oil has a very wide range of applications including use as a wood preservative, an ingredient of oil-based paints, furniture polishes, printer's inks, soap making etc[46, 57, 244]. It is also used in the manufacture of linoleum[169].

nrakta W. Asia. Naturalized in C. and E. Europe. ksacta Roadsides, slopes and fallow fields, also as a weed of cultivation, to 2150 metres in Turkey[93].

propta Seed - sow April in situ[1]. Very fast germination[K]

nwatta Requires a light well-drained soil in a sunny position[200]. Prefers a cool situation[1]. Often grown in the

1082

6 tlin 10 cyuc 3 kcak 0 tcan 3 dwat 0.3 m hkuc htut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Acorus gramineus is an evergreen Perennial growing to 0.3 m (1ft) by 0.2 m (0ft 8 in). See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water.

pcista Although no records of toxicity have been seen, this species belongs to a family where most of the species are poisonous, at least in the fresh state. The following notes are from the related A. calamus - the fresh root can be poisonous[7]. When using the plant medicinally, the isolated essential oil should not be used[165].

kcakta Edible Parts: RootEdible Uses: CondimentRoot-raw or cooked[105, 177]. It should be peeled, finely chopped and soaked in several changes of water first[183]. A stronger and more pleasing taste than A. calamus[2, 183]. The root is also used as a ginger substitute[177]. Some caution is advised, see the notes above on toxicity.

tcanta Essential Insecticide Parasiticide RepellentThe dried root repels insects[178]. It is probably also insecticidal[178, 240] and is used in Vietnam to kill lice, bugs and leas[283]. An essential oil is obtained from the plant[240]. A useful ground cover plant, forming a spreading clump[208].

dwatta Anodyne Antibacterial Antifungal Antiperiodic Antirheumatic Antispasmodic Aromatic Cardiac Carminative Diaphoretic Diuretic Emmenagogue Epilepsy Expectorant Febrifuge Parasiticide Sedative Stimulant Stomachic Tonic VermifugeThe root is antifungal, antibacterial, antiperiodic, antirheumatic, antispasmodic, aromatic, cardiac, carminative, diaphoretic, emmenaggue, febrifuge, sedative, stimulant, stomachic, tonic and vermifuge[4, 7, 9, 21, 61, 147, 165, 176, 178, 218, 238, 240, 2791. It is also powdered and applied to bleeding gums[218, 238]. It is used internally in the treatment of digestive problems - particularly gastralgia and diarrhoea[283], cough, bronchial asthma, neurasthenia, depression, epilepsy etc[176, 238, 283]. Externally, it is used to treat body parasites, dermatosis and haemorrhoids[283]. The root can be harvested at any time of the year, except when the plant is in flower[238]. The root contains an essential oil consisting of asarone and asaryl aldehyde, plus a bitter glucoside acorin[176, 283]. Asarone increases the hypnotic effect of barbiturates and ethanol, lowers blood pressure and is antibacterial against Staphylococcus aureus, streptococci and mycobacterium[176]. The whole plant is anodyne. antiperiodic, antispasmodic, digestive, diaphoretic, diuretic, expectorant, sedative, stimulant, stomachic, sudorific, tonic, vermifuge[218].

nrakta E. Asia - China, Japan, India. ksacta Wet places by streams and around ponds in C. and S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe. Stand the pot in about 3cm of water. Pot up young seedlings as soon as they are large enough to handle, keep them wet by standing the pots in shallow water and overwinter for the first year in a greenhouse or cold frame. Division in spring just before growth starts[1]. Very easy, the plants can be divided at any time in the growing season and can be planted direct into their permanent positions[K].

nwatta Landscape Uses:Container, Foundation, Ground cover, Massing, Rock garden, Seashore. Grows well in shallow water margins of ponds etcl., 2], though it can also succeeds in drier habitats[56]. Requires a sunny position[200]. A very ornamental plant, there are some named varieties[208, 238]. The cultivar 'Pusillus' can be grown as a submerged aquatic plant[238]. Special Features:Attractive foliage, Fragrant foliage, Not North American native, Naturalizing, Wetlands plant, Inconspicuous flowers or blooms.

## 7.2.156 Salvia columbariae

Chia, Ziegler's sage 6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.7 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli drutta Salvia columbariae is a ANNUAL/PERENNIAL growing to 0.7~m (2ft 4in) by 0.5~m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Condiment DrinkSeed - raw or cooked[92, 94, 95, 257]. Usually ground into a powder and used as piñole or made into dark-coloured cakes and loaves[183], it has a nutty flavour[92]. It can also be mixed with corn meal when making mush or with ground wheat for gruel[183]. Rich in niacin, thiamine, zinc, calcium and manganese[160], it is also a good source of protein and easily digested fats[274]. It has a high food value and is easily digested[92]. The sprouted seeds can be added to salads and sandwiches[160, 183]. A refreshing drink can be made by steeping the seed in cold water[92, 94, 95, 183]. Alternatively, the seed can be roasted and ground into a powder then mixed with water when it soon becomes a copious gelatinous mass[2]. It is very palatable and nutritious[2]. The seed has been used to render water palatable by removing the alkalis[257]. The leaves are occasionally used as a sage-like seasoning[183].

dwafta Digestive Disinfectant Febrifuge OphthalmicThe seed is digestive, disinfectant, febrifuge and ophthalmic[94, 257]. An infusion can be used in the treatment of fevers[257]. A poultice of the seed mush can be applied to infections[257]. The seeds have been kept in the mouth, and chewed during long journeys on foot, in order to give strength[257]. The seeds have been used to cleanse the eyes or remove foreign matter from the eyes[257]. No more information is given here, but in other instances the seed has been placed in the eye, it then forms a gelatinous covering to which any foreign matter in the eye adheres. The seed is washed out of the eye by the eyes own tears[K].

nrakta South-western N. America - California. ksacta Dry open places below 1200 metres[92].

propta Seed - sow April in situ. The plant dislikes root disturbance. If seed supplies are limited then it can be sown in a pot in a greenhouse in March/April, potted up into individual pots as soon as the seedlings are large enough to handle then planted out in May. Germination usually takes 10 - 14 days at 20°c.

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Plants are lodge resistant[160]. This plant was a staple food crop of the Aztecs[142]. It is often cultivated for its edible seeds, which are used to make a refreshing and nourishing drink. A good bee plant[61]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 7.2.157 Vaccinium crassifolium

Creeping Blueberry

6 tlin 9 cyuc 3 kcak 2 tcan 0 dwat 0.1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium crassifolium is an evergreen Shrub growing to 0.1 m (0ft 4in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitĒdible Uses: Fruit - raw or cooked[105, 183]. The flavour is sweet but bland[43]. The fruit is about 4mm in diameter[200].

tcanta Plants can be grown as a ground cover, the cultivars 'Bloodstone' and 'Well's Delight' have been specially recommended[183, 200].

nrakta South-eastern N. America. ksacta Sandy and peaty pinelands and barrens[43].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[116, 160, 171]. A crisp, watery texture with a naturally sweet taste, it is best eaten raw in salads[116, 206]. The plant can be eaten as a young seedling, or left to grow into a mature plant[206]. The flavour is quickly ruined by prolonged cooking[206]. Leaves can also be dried for winter use[206]. The heads of mature plants can be 50cm long and weigh up to 4.5 kg[200, 206]. Fresh leaves do not store well and are best used within a day or two of harvesting[206]. A nutritional analysis is available[218]. Flowering shoots - raw or cooked[206]. Sweet and tender[133].

tcanta Dynamic accumulator.

dwatta DepurativeThe leaves are depurative[218].

nrakta A cultivar of garden origin. ksacta Not known in the wild, it is possibly a cross between B. campestris rapa (the turnip) and B. napus chinensis (Pak-choi)[206].

propta Seed - it can be sown from late May to September in situ[206]. The spring sown crops often run to seed very quickly but 'barrel' types can be sown at this time. If seedlings are germinated at a temperature of 18 - 20°c and then grown on at this temperature for their first few weeks, they are then less likely to bolt[206]. Seed usually germinates within 3 - 4 days[206]. A late summer sowing under protection can provide leaves in the winter[206]. Seedlings can be transplanted when about 3 - 4 weeks old[206].

nwatta Succeeds in a well-drained fertile preferably alkaline soil[16, 52, 200]. Succeeds in acid and alkaline soils[166, 200]. Prefers a pH in the range 6.5 to 7[206]. Tolerates a pH in the range 4.3 to 6.8. Prefers a heavy soil[16] and grows badly in sandy ones[200]. Prefers full sun[200, 206] and a sheltered position[206]. Likes some shade[16]. Drought resistant according to one report[160], whilst another says that the plants are shallow-rooted and have very little resistance to drought[206]. They require about 5 gallons of water from sowing to maturity[206]. Plants are not fully winter hardy in Britain, though mature plants withstand light frosts to about -3°c[160, 206]. Plants prefer coolish weather during their growing season, a temperature range of 13 - 20°c is ideal[206]. The Chinese cabbage is widely cultivated, especially in China and Japan, for its edible leaves[88]. It looks like a large cos lettuce or cabbage and has a crisp, watery texture with a mustard-like taste[264]. There are many named varieties[88, 206]. Those forms with loose heads were developed for areas with hotter summers, whilst compact-headed forms were developed for cooler areas[206]. The loose-headed forms are less prone to bolt, are more resistant to cold and are more diseaseresistant[206]. An annual to biennial species, it is normally grown as an annual [206]. Plants take from 55 - 100 days from sowing to maturity, depending on variety, the loose-headed forms are usually 2 - 3 weeks faster than compact-headed forms[206]. Plants do not like root disturbance so should not be transplanted unless grown in individual pots[206]. Plants are highly resistant to fungus attacks and the cabbage moth[160], they are also slow to bolt in hot weather[160]. Some cultivars are more resistant to bolting when sown in spring than other forms[206]. There is some evidence that interplanting this species with dill and garlic can lessen the attacks of caterpillars[206]. A good bee plant[108].

# 7.2.77 Satureja montana

Winter Savory 6 tlin 11 cyuc 4 kcak 4 tcan 3 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Satureja montana is an evergreen Shrub growing to 0.4 m (1ft 4in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils

and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked[2, 4, 9, 20, 34, 37, 52]. A peppery flavour, they are used mainly as a flavouring for cooked foods, especially beans, and also as a garnish for salads etc[183]. They have a stronger, sharper flavour than sumer savory (S. hortensis)[183]. The leaves can be used fresh or dried[183]. A herb tea is made from the fresh or dried leaves[183]. The leaves are harvested just before the plant comes into flower[183]. A tangy, marjoram-like flavour[183].

tcanta Companion Essential RepellentThe growing plant repels insects[18, 20, 201]. An essential oil is obtained from the leaves. Plants can be grown as a ground cover when spaced about 45cm apart each way[208]. A good bee plant[200]. The leaves have an aromatic fragrance[245]. A good companion plant to grow in the garden, it does especially well with onions and beans and helps to repel insect pests[201]. The plant is said to inhibit the germination of certain seeds[18]. Winter savory seeds can prevent the germination of nearby seeds[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Edible, Fragrant foliage, Not North American native. Dynamic accumulator.

dwatta Antiseptic Aromatic Carminative Digestive Expectorant Stings StomachicWinter savory is most often used as a culinary herb, but it also has marked medicinal benefits, especially upon the whole digestive system[254]. The plant has a stronger action than the closely related summer savory, S. hortensis[254]. The whole herb, and especially the flowering shoots, is mildly antiseptic, aromatic, carminative, digestive, mildly expectorant and stomachic[4, 7, 9, 14. 21]. Taken internally, it is said to be a sovereign remedy for colic and a cure for flatulence[4], whilst it is also used to treat gastro-enteritis, cystitis, nausea, diarrhoea, bronchial congestion, sore throat and menstrual disorders[9, 238]. It should not be prescribed for pregnant women[238]. A sprig of the plant, rubbed onto bee or wasp stings, brings instant relief[4, K]. The plant is harvested in the summer when in flower and can be used fresh or dried[238]. The essential oil forms an ingredient in lotions for the scalp in cases of incipient baldness[7]. An ointment made from the plant is used externally to relieve arthritic joints[7].

nrakta S. Europe to N. Africa. Occasionally naturalized in Britain. ksacta Old walls, dry banks and rocks on hillsides, usually on calcareous soils[17, 100].

propta Seed - surface sow in April in a greenhouse. Do not allow the compost to dry out. Germination can be slow and erratic[1] but usually takes place within a month[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle. It is usually possible to plant out into their permanent positions during the summer, but if the plants have not grown sufficiently, or if you live in an area of cold winters, it might be best to grow them on in a cold frame for their first winter and plant them out in late spring or early summer of the following year[K]. Cuttings of half-ripe wood, 5 - 8cm taken at a node, July/August in a frame. Pot up in autumn and overwinter in a frame, planting out in late spring or early summer of the following year. A high percentage usually succeed[78]. Cuttings of young wood, preferably with a heel, April/May in a frame[1, 37]. Plant out in the summer if the plants grow well, otherwise overwinter them in a cold frame and plant out in late spring or early summer of the following year [K]. Division in early spring as growth commences[78, 200]. This works best if soil has been mounded up into the bottom 20cm of the plant early in the previous summer[78]. Pot up the divisions and grow them on in a cold frame until they are established. Plant them out in the sum-

nwatta Landscape Uses:Alpine garden, Border, Rock garden, Specimen. An easily grown plant when given suitable conditions, it prefers a well-drained poor stony soil[4, 14, 27, 52] and succeeds in a hot dry sunny position[200]. It prefers an alkaline soil[200] though it is not too fussy. It is very intolerant of soils that remain damp, especially in the winter, and dislikes shade[200]. Plants are less hardy when they are grown in rich soils and also in wet conditions[4, K]. Winter savory is often grown in the garden as a culinary herb, there are some named varieties[183]. The flavour is said to be more coarse than that of the annual savory (S. hortensis). The plants live for several years, but as they grow older they do not make so much new growth and so are best replaced

every two years[4].

# 7.2.78 Allium chinense

6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli tcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium chinense is an evergreen Bulb growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves Root SeedpodEdible Uses: Bulb - raw or cooked[116, 177]. The bulb has an excellent crisp texture with a strong onion flavour[183], it can be 4 - 5cm in diameter, though it does not reach this size until the second or third year[206]. It contains about 3.1% protein, 0.12% fat, 18.3% soluble carbohydrate, 0.7% ash[179]. Leaves - raw or cooked[179]. Flowers and young seedpods - raw[179]. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Astringent Carminative Dysentery Expectorant-The whole plant is astringent, carminative and expectorant[176]. It is used in the treatment of stuffiness sensation and pain in the chest, angina pectoris, pleurisy, bronchitis, diarrhoea and tenesmus in cases of dysentery[176]. Although no other specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta E. Asia - China ksacta Often cultivated, plants can be found wild on the edges of fields[203].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required.

nwatta Prefers a sunny position in a light well-drained soil[1]. Tolerates poor soils[206]. Plants often die-back in hot weather mid-summer, coming back into growth in late summer and flowering in the autumn[206]. The flowers seldom set seed in Britain[206]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile. but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other [201]. This species is widely cultivated for its edible bulb and leaves, mainly in the tropical and sub-tropical areas of Japan. China and many other parts of eastern Asia [58, 183]. 266]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 7.2.79 Lomatium nudicaule

Pestle Parsnip, Barestem biscuitroot 6 tlin 8 cyuc 4 kcak 2 tcan 2 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lomatium nudicaule is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

kcakta Edible Parts: Leaves Root StemEdible Uses: Tea-Root - raw or cooked[207]. The taste is rather like a hot spicy parsnip[207]. The root can be roasted and used as a vegetable, or can be dried and ground into a powder then used as a flavouring in soups etc[105, 161]. Leaves and young shoots - eaten as a vegetable or used as a celery-like flavouring in soups etc[177, 183, 257]. The leaves, stems and flowers are infused and used as a beverage[161, 183, 257]. Seed - raw or cooked[257]. The immature seed is chewed as a refreshing snack and can be used as a flavouring in soups etc[257]. The vitamin C content of young plants is remarkably high, one cup providing more than the recommended daily allowance[183]. (the part of the plant is not referred to, it is probably the leaves)

tcanta Incense RepellentThe seed is spicy and aromatic, it is used as a house fumigant and deodorant. It also repels mosquitoes[99].

dwatta Analgesic Diaphoretic Febrifuge Laxative Pectoral Poultice Vitamin CThe seeds are analgesic, diaphoretic, febrifuge, laxative and pectoral[257]. They have been chewed in the treatment of fevers, colds and sore throats[257]. An infusion has been used by pregnant women to ensure an easy delivery[257]. A poultice of the crushed seeds has been applied to the head to relieve the pain of headaches[257]. The poultice has also been applied to sore places, pains and itches[257].

nrakta Western N. America - South British Columbia to California, ksacta Dry open or lightly wooded areas at low to moderate elevations[60]

propta Seed - best sown as soon as it is ripe in a cold frame[188]. Stored seed can be rather slow to germinate. when sown in the spring it usually takes at least 12 months to germinate. Giving it a period of cold stratification might reduce this time. The seedlings need to be pricked out into individual pots as soon as they are large enough to handle, and should be planted out into their permanent positions in the summer. Fresh seed can be sown immediately in situ[188]. Division may be possible in spring or autumn.

nwatta Requires a sunny position in a fertile welldrained soil[188]. Plants are frost hardy[188]. This is a taxonomically very difficult genus, many of the species now included in it have at times been included in other genera[60]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 7.2.80 Claytonia perfoliata

6 tlin 10 cyuc 4 kcak 2 tcan 1 dwat 0.2 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Claytonia perfoliata is a ANNUAL growing to 0.2 m (Oft 8in). It is not frost tender. It is in leaf all year, in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw or cooked[2, 5, 12, 27, 52, 62]. A fairly bland flavour with a mucilaginous texture, it is guite nice in a salad[183, K]. The young leaves are best[85], older leaves can turn bitter especially in the summer and if the plant is growing in a hot dry position[K]. Although individual leaves

being eaten. The cress seed should be sown about 3 - 4 days 7.2.154 Satureja spicigera before the mustard for them both to be ready at the same time[264]

nwatta An easily grown plant, it succeeds in most soils[52]. For the best results, however, it requires a moist soil and also some shade during the summer to prevent it running straight to seed[27, 37, 52]. Garden cress is often cultivated as a sprouted seed, there are some named varieties[183]. It is the cress of 'mustard and cress'. A very easy and fast crop, it can be ready within 7 days from sowing the seed[27]. It can also be grown outdoors as full grown plants and can provide fresh leaves for the salad bowl all year round from successional sowings. Plants can be overwintered outdoors to provide edible leaves all year round, though they will require some protection if temperatures fall below -5°c[200]. This plant is cultivated in Ethiopia for the edible oil from its

# 7.2.153 Allium geveri

Gever's Onion, Bulbil onion 6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.5 m hkuc

htut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium geyeri is a BULB growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers welldrained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[85, 105, 161]. Used mainly as an onionflavouring in soups etc. though they were also occasionally eaten raw[257]. The bulbs are eaten by the Navajo Indians[183]. The bulbs are up to 25mm long and 20mm in diameter[200, 270], Leaves - raw or cooked[85, 105, 161], Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Western N. America - Washington, Texas, Oregon, New Mexico, Nevada, ksacta Low meadows and by streams in the Rocky Mountains[85].

propta Seed - sow spring in a greenhouse. The seed can also be sown as soon as it is ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division of the plants in summer as they die down. The divisions can be planted direct into their permanent positions if required.

nwatta Prefers a sunny position in a light well-drained soil[1]. Plants are not hardy in the colder wetter conditions of N.W. Britain and are probably best grown in a bulb frame in most parts of the country[203]. The sub-species A. geveri tenerum forms bulbils in its flowering head[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing

Creeping Savory

6 tlin 9 cvuc 3 kcak 3 tcan 2 dwat 0.1 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasilut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Satureja spicigera is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought

kcakta Edible Parts: Edible Uses: CondimentLeaves - raw or cooked[238]. A peppery flavour, they are used mainly as a flavouring for cooked dishes, especially beans, but are also used as a garnish for salads etc[183]. They have a stronger flavour than summer savory (S. hortensis)[238]. The leaves can be used fresh or dried[183].

tcanta A good companion plant in the garden, growing especially well with onions and beans[201]. The plant is said to inhibit the germination of certain seeds[18]. Secretions from the seeds can prevent the germination of nearby seeds[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Dynamic accumulator

dwatta Antirheumatic Antiseptic Aromatic Carminative Digestive Expectorant Stings StomachicThe whole herb, and especially the flowering shoots, is antiseptic, aromatic, carminative, digestive, expectorant and stomachic[4, 7, 14] 21]. Taken internally, it is said to be a sovereign remedy for colic and a cure for flatulence[4], whilst it is also used to treat nausea, diarrhoea, bronchial congestion, sore throat and menstrual disorders[238]. It should not be prescribed for pregnant women[238]. A sprig of the plant, rubbed onto bee or wasp stings, brings instant relief[4]. The plant is harvested in the summer when in flower and can be used fresh or dried[238]. The essential oil forms an ingredient in lotions for the scalp in cases of incipient baldness[7]. An ointment made from the plant is used externally to relieve arthritic

nrakta W. Asia - Iran, Caucasus. ksacta Not known

propta Seed - surface sow in April in a greenhouse. Do not allow the compost to dry out. Germination can be slow and erratic[1] but usually takes place within a month[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle. It is usually possible to plant out into their permanent positions during the summer, but if the plants have not grown sufficiently, or if you live in an area of cold winters, it might be best to grow them on in a cold frame for their first winter and plant them out in late spring or early summer of the following year[K]. Cuttings of half-ripe wood, 5 - 8cm taken at a node, July/August in a frame. Pot up in autumn and overwinter in a frame, planting out in late spring or early summer of the following year. A high percentage usually succeed[78]. Cuttings of young wood, preferably with a heel, April/May in a frame[1, 37]. Plant out in the summer if the plants grow well, otherwise overwinter them in a cold frame and plant out in late spring or early summer of the following year[K]. Division in early spring as growth commences[78, 200]. This works best if soil has been mounded up into the bottom 20cm of the plant early in the previous summer[78]. Pot up the divisions and grow them on in a cold frame until they are established. Plant them out in the sum-

nwatta An easily grown plant when given suitable conditions, it prefers a well-drained poor stony soil[4, 14, 27, 52] and succeeds in a hot dry sunny position[200]. It prefers an alkaline soil[200], though is not too fussy. It is intolerant of soils that remain damp and dislikes shade[200]. Plants are hardy to at least -10°c[200] when grown in suitable conditions, but are less hardy in rich soils or damp conditions[K]. A good bee plant[200].

#### 7.2.155 Acorus gramineus

Grass-leaved Sweet Rush, Japanese Sweet Flag, Dwarf Sweet

# 7.2.150 Conopodium majus

Pignut.

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Conopodium majus is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Tubers - raw or cooked[2, 5, 12, 17, 63, 100]. A very pleasant food with a flavour somewhat between a sweet potato and hazelnuts, with a hot aftertaste of radish[115, 183, K]. We have never detected this hot aftertaste, and feel that the flavour is reminiscent of brazil nuts[K]. There is only one tuber on each plant, this is rather small and difficult to harvest, but the size could probably be increased by cultivation[115, K].

nrakta Europe, including Britain, from Norway to Spain, east to Italy and Corsica. ksacta Woods, hedgerows and fields. It is never found on alkaline soils[12].

propta Seed - sow spring in a cold frame. Germination is usually quick and good[K]. Prick out the seedlings into inidividual pots as soon as they are large enough to handle and plant them out when in early summer. It is also possible to sow in situ, though this requires a lot more seed to produce the same amount of plants from a protected sowing. Division in late summer as the plant dies down.

nwatta Never found on alkaline soils in the wild[12]. See the plants native habitat for other ideas on its cultivation needs. This species responds to cultivation by producing larger tubers[115]. With careful selective breeding it is probably possible to produce a much more productive plant[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

# 7.2.151 Mahonia pumila

**Dwarf Barberry** 

6 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia pumila is an evergreen Shrub growing to 0.3~m (1ft) by 2~m (6ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. We have seen no reports of edibility for this species, but it is certainly not poisonous. The fruit is likely to have an acid flavour and be suitable for making jams. jellies etc. The fruit is about 10mm in diameter[200].

tcanta DyeA yellow dye is obtained from the inner bark of the stem and roots[155, 257]. It is green[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168]. This species forms suckers freely and should make a good dense ground cover in a sunny position[11].

dwatta Antibacterial Antitumor Blood tonic Dysentery TonicA decoction of the roots is used as a blood tonic and as a treatment for coughs[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the

berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta South-western N. America - California and southern Oregon. ksacta Mountains[11]. Open woods and rocky areas at elevations of 300 - 1200 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown plant, it thrives in any good well-drained garden soil[11], preferring one on the dryish side. Prefers a sunny position[11], but also succeeds in the light shade of trees[K]. This species is hardy to about -15°c if growing in a sheltered position[184]. Established plants sucker freely and form quite dense thickets[200]. Resistant to honey fungus[88].

# 7.2.152 Lepidium sativum

Cress, Gardencress pepperweed 6 tlin 9 cyuc 3 koak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lepidium sativum is a ANNUAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: Leaves Oil OilEdible Uses: Condiment Oil OilYoung leaves - raw or ccoked[2, 5, 27, 34, 52, 183]. A hot cress-like flavour, it makes an excellent addition (in small quantities) to the salad bowl[K]. An analysis is available. Root is used as a condiment[46, 61]. A hot pungent flavour, but the root is rather small and woody[K]. The fresh or dried seedpods can be used as a pungent seasoning[183]. The seed can be sprouted in relatively low light until the shoots are a few centimetres long and then be used in salads[183]. They take about 7 days to be ready and have a pleasantly hot flavour. An edible oil is obtained from the seed[46, 61, 105].

tcanta Oil OilThe seed yields up to 58% of an edible oil that can also be used for lighting [74].

dwatta Antiasthmatic Antiscorbutic Aperient Diuretic Galactogogue Poultice Stimulant Vitamin CThe leaves are antiscorbutic, diuretic and stimulant[46, 240]. The plant is administered in cases of asthma, cough with expectoration and bleeding piles[240]. The root is used in the treatment of secondary syphilis and tenesmus[240]. The seeds are galactogogue. They have been boiled with milk and used to procure an abortion, they have been applied as a poultice to pains and hurts and have also been used as an aperient[240]. Fresh foliage has 37% Ascorbic acid - vitamin C

nrakta Of uncertain origin, possibly Iran. Naturalized in Britain. ksacta Not known in a truly wild situation.

propta Seed - if you want a succession of young leaves the tit is possible to sow the seed in situ every 3 weeks in succession from early spring to early autumn. Germination is very rapid, usually taking place in less than a week. When sowing seed for use in mustard and cress, the seed is soaked for about 12 hours in warm water and then placed in a humid position. Traditionally, it is sown in a tray on a thin layer of soil, or on some moist blotting paper, and the tray is placed in a warm dark place for a few days to encourage rapid and rather etiolated growth. The seedlings can then be placed in a lighter position for a couple more days to turn green before

are fairly small, they are produced in abundance and are easily picked[K]. Stalks and flowers - raw[52]. A nice addition to the salad bowl[K]. Bulb - raw[5, 53, 62]. Although very small and labour-intensive to harvest, the boiled and peeled root has the flavour of chestnuts[244]. Another report says that the plant has a fibrous root system[62] so this report seems to be erroneous[K].

tcanta Although only an annual, this species makes an excellent ground cover in a cool acid soil under trees. In such a position it usually self-sows freely[208] and grows all year round[K]

dwatta Antirheumatic Laxative Vitamin CThe leaves are gently laxative[94]. Apart from its value as a nourishing vegetable that is rich in vitamin C, it can also be taken as an invigorating spring tonic and an effective diuretic[254]. A poultice of the mashed plants has been applied to rheumatic ioints[257].

nrakta Western N. America - British Columbia to California and Mexico. Naturalized in Britain. ksacta Disturbed and waste ground, moist banks and slopes, often in partial shade, especially on light soils[17, 85]. Also found on rather dry sandy soils[50].

propta Seed - sow spring or autumn in situ. The seed usually germinates rapidly.

nwatta Prefers a moist peaty soil[1, 60]. It is often found growing wild on sandy soils[264]. An easily grown plant, it can succeed on very poor and dry soils[52, 60]. Plants grow well the dappled shade of trees, producing a better quality crop in such a situation[52, 60, 264]. Although only an annual[208], it usually self-sows when well sited. A very hardy plant, tolerating temperatures down to at least -15°c. Miner's lettuce is occasionally cultivated as a salad plant[1, 46]. It's main value is as a reliable producer of leaves in the winter, though it can provide leaves all year round[141, 200, 264]. It can be grown as a cut and come again crop[183]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A self-seeding annual [1-2]. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2].

# 7.2.81 Brassica juncea integrifolia crispifolia

Curled Mustard

6 tlin 10 cyuc 4 kcak 2 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Brassica juncea integrifolia crispifolia is a AN-NUAL growing to  $0.3~\mathrm{m}$  (1ft) by  $0.3~\mathrm{m}$  (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay soils, prefers well-drained soil and can grow in heavy clay soils, Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Seed Shoots StemEdible Uses: CondimentLeaves - raw or cooked[ 22, 33 . 46 . 52 . 61 l. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[ 206 ]. The leaves can also be finely shredded and added to mixed salads[ 206 ]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling[ 183 ]. Flowers and young flowering stems - raw or cooked[ 52 ]. Sweet and succulent[ 133 ]. An edible semidrying oil is obtained from the seed[1,2,17,57,183]. The seed contains 25 - 30% oil[ 74 ]. The seed is used as a mustard flavouring[ 171 ]. It is the source of 'brown mustard'[ 183], a prepared mustard that is milder than that produced from other species[ 238 ]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[ 238 ]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles [238]. They are often heated in oil to destroy their pungency and give them a nutty flavour [238]. Sprouted seeds can be added to salads.

dwatta Anodyne Antiarthritic Antiinflammatory Antirheumatic Antitumor Aperient Diuretic Emetic Galactogogue Laxative Rubefacient Skin Stimulant TonicReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[ 269 ]. The seed is used in the treatment of tumours in China[ 269 ]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[ 269 ]. The root is used as a galactagogue in Africa[ 269 ]. Ingestion may impart a body odour repellent to mosquitoes [269]. Mustard oil is used in the treatment of skin eruptions and ulcers[ 269 ]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[ 269 ]. In Java the plant is used as an antisyphilitic emmenagogue 269 l. Leaves applied to the forehead are said to relieve headachel 269 l. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[ 269 ].

nrakta A cultivar of garden origin ksacta Not known in

propta Seed - sow in situ from August to October. Spring and early summer-sown crops tend to run quickly to seed, though they can be eaten whilst still small[ 206 ]. It is best not to sow the seed in very hot weather[ 206 ]. There are about 5,660 - 6,000 per  $0.01\ kg$  ( $1/3\ oz)[ <math display="inline">269$  ].

nwatta A form of B. juncea with curled leaves that has been selected in the Orient for its edibility. There are some named varieties [ 206 ]. Very hardy in cold weather, it is used more in temperate areas than in tropical ones. Succeeds in full sun in most well-drained moisture-retentive fertile soils [ 6, 200, 206 ]. Prefers a heavy soil and some shade[ 16 ]. Dislikes very hot weather[ 33 ]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[ 206 ]. Plants have a rooting depth of between 90- 120 cm[ 269 ]. A good bee plant[ 74 ].

# 7.2.82 Brassica napus napobrassica

Swed

6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik wis hpa7tmwatli fyifxre7t hjonli

drutta Brassica napus napobrassica is a BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness, It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves cooked as a potherb[183]. A mild, cabbage-like flavour[K]. Root - raw or cooked[1, 16, 46, 171, 183]. A richer flavour than turnips, it makes a good cooked vegetable and, when finely grated, is acceptable in mixed salads[183, K]. The root can be 30cm or more in diameter, though it is usually eaten smaller since it then is more tender[K]. It is available from early autumn, and can either be left in the ground over winter to be harvested as required, or can be harvested and stored in a cool, frost-free place where it will keep for 6 months[K].

tcanta The seed contains up to 45% of an edible semidrying oil, it is used as a luminant, lubricant, in soap making etc[13, 21, 57, 142].

dwatta Diuretic EmollientThe root is emollient and diuretic[240]. The juice of the roots is used in the treatment of chronic coughs and bronchial catarrh[240, 269]. The seed, powdered, with salt is said to be a folk remedy for cancer[269]. Rape oil is used in massage and oil baths, it is believed to strengthen the skin and keep it cool and healthy. With camphor it is applied as a remedy for rheumatism and stiff joints[269].

nrakta A hybrid of garden origin between B. napus and B. campestris. ksacta Not known in the wild.

propta Seed - sow April to June in situ.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[16, 200]. Prefers a stiff moist soil and a fairly high rainfall[16, 20, 26]. Another report says

that it prefers a light but rich soil and an open sunny position[264]. Succeeds in any reasonable soil[52]. Sunny days and cool nights are favourable for plant growth whilst dry weather at harvest time is essential[269]. Swede is reported to tolerate an annual precipitation of 30 to 280cm, an annual average temperature range of 5 to 27°C and a pH in the range of 4.2 to 8.2[269]. Very young plants are susceptible to cold damage, -4°C either killing or injuring seedlings, whereas -2°C has no affect when the plants are more than one month old[269]. The garden swede is often cultivated for its edible root, there are several named varieties[183]. The plant is somewhat hardier than turnips and in most parts f Britain it can usually be left outdoors all winter and harvested as required. Plants take 4 - 6 weeks longer to mature than turnips [183]. Swede is 70% self-pollinating and 30% cross-pollinated. Even if wind and insects are absent, seed are still produced. Yield increases with honeybees[269]. A good companion plant for peas but it dislikes growing with hedge mustard and knotweed[18].

# 7.2.83 Brassica juncea integrifolia subintegrifolia

Leaf Mustard

6 tlin 10 cyuc 4 kcak 2 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Brassica juncea integrifolia subintegrifolia is a ANNUAL growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil Seed Shoots StemEdible Uses: Condiment OilLeaves - raw or cooked[22, 33 , 46 , 52 , 61 ]. A peppery flavour that can range from mild to hot, this is one of the most highly prized cooked vegetables in the Orient[ 206 ]. The leaves can also be finely shredded and added to mixed salads [206]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling[ 183 ]. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133]. An edible semidrying oil is obtained from the seed[1,2,17,57,183]. The seed contains 25 - 30% oil[ 74 ]. The seed is used as a mustard flavouring[ 171 ]. It is the source of 'brown mustard'[ 183 ], a prepared mustard that is milder than that produced from other species[ 238 ]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[ 238 ]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles[ 238 ]. They are often heated in oil to destroy their pungency and give them a nutty flavour 238 ]. Sprouted seeds can be added to salads.

dwatta Anodyne Antiarthritic Antiinflammatory Antirheumatic Antitumor Diuretic Emetic Emmenagogue Foot care Galactogogue Laxative Rubefacient Stimulant TonicReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[ 269 ]. The seed is used in the treatment of tumours in China[ 269 ]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders [269]. The root is used as a galactagogue in Africa [269]. Ingestion may impart a body odour repellent to mosquitoes[ 269 ]. Mustard oil is used in the treatment of skin eruptions and ulcers[ 269 ]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant [ 269 ]. In Java the plant is used as an antisyphilitic emmenagogue[ 269 ]. Leaves applied to the forehead are said to relieve headache 269 l. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[ 269 ].

nrakta A cultivar of garden origin. ksacta Not known in the wild.

propta Seed - sow in situ from August to October. Spring

and early summer-sown crops tend to run quickly to seed, though they can be eaten whilst still small[ 206 ]. It is best not to sow the seed in very hot weather[ 206 ]. There are about 5,660 - 6,000 per 0.01 kg (1/3 oz)[ 269 ].

nwatta Originating from the central Asian Himalayas to China, the plant has long been cultivated and many forms have been developed that can be grown from the temperate to the tropical zones. Succeeds in full sun in most well-drained moisture-retentive fertile soils [16], 200, 206]. Prefers a heavy soil and some shade [16]. Dislikes very hot weather [33]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant [206]. A form of B. Juncea with entire leaves that has been selected in the Orient for its ediblity. There are many named varieties [206]. A very fast growing variety, usually maturing within 40 days of sowing [206]. The plants in this group are fairly cold-tolerant [206]. Plants have a rooting depth of between 90 - 120 cm [269]. A good bee plant [74].

# 7.2.84 Brassica juncea integrifolia strumata

Large Petiole Mustard
6 tlin 10 cyuc 4 kcak 2 tcan 2 dwat 0.8 m hkuc
hmimhtut cyutli tcup hwicli hrasilutnyikfrip hpa7tli flatprikl-

wis hpa7tmwatli fvif hionli

shade. It prefers moist soil.

drutta Brassica juncea integrifolia strumata is a AN-NUAL growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. The flowers are pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no

kcakta Edible Parts: Flowers Leaves Oil Seed Shoots StemEdible Uses: Condiment OilLeaves and leaf stems - raw or cooked. Flowers and young flowering stems - raw or cooked[ 52 ]. Sweet and succulent[ 133 ]. An edible semidrying oil is obtained from the seed[1,2,17,57,183]. The seed contains 25 - 30% oil[ 74 ]. The seed is used as a mustard flavouring[ 171 ]. It is the source of 'brown mustard'[ 183], a prepared mustard that is milder than that produced from other species 238 l. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[ 238 ]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles [238]. They are often heated in oil to destroy their pungency and give them a nutty flavour 238 l. Sprouted seeds can be added to salads.

tcanta Green manure Oil Repellent Soil reclamationOther uses rating: Low (2/5). Agroforestry Uses: There is some evidence that if this plant is grown as a green manure it is effective in reducing soil-borne root rots in pea crops[206]. This is attributed to chemicals that are given off as the plants decay[206].

dwatta Anodyne Antiarthritic Antiinflammatory Antirheumatic Antitumor Diuretic Emetic Emmenagogue Foot care Galactogogue Laxative Rubefacient Stimulant TonicReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[ 269 ]. The seed is used in the treatment of tumours in China[ 269 ]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders [269]. The root is used as a galactagogue in Africa [269]. Ingestion may impart a body odour repellent to mosquitoes [269]. Mustard oil is used in the treatment of skin eruptions and ulcers [269] ]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[ 269 ]. In Java the plant is used as an antisyphilitic emmenagogue[ 269 ]. Leaves applied to the forehead are said to relieve headache[ 269 ]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[ 269 ].

nrakta A cultivar of garden origin. ksacta Not known in

propta Seed - sow in situ from August to October. Spring

drutta Commelina communis is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves, flowers and young shoots - raw or cooked[2, 105, 177]. Chopped finely and added to salads or cooked as a potherb[183]. A sweet taste with a mucilaginous texture[179].

tcanta DyeA bright blue dye is obtained from the petals [74].

dwatta Antibacterial Astringent Depurative Diuretic FebrifugeThe leaves are depurative, diuretic and febrifuge[116, 147]. Used as a throat gargle to relieve sore throats and tonsilitis[116, 266]. A decoction of the dried plant is used to treat bleeding, diarrhoea, fever etc[218]. Extracts of the plant show antibacterial activity[218].

nrakta E. Asia - S. China, Japan, India. ksacta Partly shaded grassy places, cultivated fields and roadsides usually in moist places all over Japan[58, 147].

propta Seed - sow March in a greenhouse. The seed usually germinates in 4 - 5 weeks at 20°c[164]. When they are large enough to handle, prick the seedlings out into individual pots plant them out in late spring or early summer, after the last expected frosts. Division in early spring. Make sure that each portion has at least one growing bud[111, K]. Cuttings during the growing season. Very easy[200].

nwatta Prefers a light well-drained loam with added leafmold[1, 42]. Requires a sheltered position[42]. This species is commonly cultivated as a vegetable in China[2]. The plant can be invasive[42], the stems sprawling along the ground and rooting as they go[K].

# 7.2.149 Borago officinalis

Borage, Common borage,Cool-tankard, Tailwort 6 tlin 9 cyuc 3 kcak 3 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Borago officinalis is a ANNUAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista The plant, but not the oil obtained from the seeds, contains small amounts of pyrrolizidine alkaloids that can cause liver damage and liver cancer[238]. These alkaloids are present in too small a quantity to be harmful unless you make borage a major part of your diet, though people with liver problems would be wise to avoid using the leaves or flowers of this plant[K].

kcakta Edible Parts: Flowers Leaves OilEdible Uses: Colouring Oil TeaLeaves - raw or cooked[2, 5, 7, 14, 115, 183]. They can be used as a pot-herb or be added to salads[4]. They are also added whole as a flavouring to various drinks such as Pimms and wine-based drinks[238]. The leaves are rich in potassium and calcium, they have a salty cucumber flavour[200]. Very hairy, the whole leaves have an unpleasant feeling in the mouth and so they are best chopped up finely and added to other leaves when eaten in a salad[K]. The leaves should always be used fresh, because they lose their flavour and colour if dried[244]. Flowers - raw. They are used as a decorative garnish on salads and summer fruit drinks[2, 5, 7, 14, 183]. The flowers are very nice, both to look at and to taste with a sweet slightly cucumber-like flavour[K]. A refreshing tea is made from the leaves and/or the flowers[21, 183]. The dried stems are used for flavouring beverages[183]. The seed yields 30% oil, 20% of which

is gamma-linolenic acid[141]. Total yields are  $0.35 \cdot 0.65$  tonnes per hectare[141]. Unfortunately, the seed ripens intermittently over a period of time and falls from the plant when it is ripe, this makes harvesting the seeds in quantity very difficult[K]. An edible blue dye can be obtained from the flowers. It is used to colour vinegar[183].

tcanta Dye Oil RepellentThe growing plant is said to repel insects[14]. A blue dye is obtained from the flowers[7]. This turns pink on contact with acids[238].

dwatta Antirheumatic Demulcent Depurative Diaphoretic Diuretic Emollient Expectorant Febrifuge Hypotensive Lenitive Poultice Sedative Skin Women's complaintsBorage is a fairly common domestic herbal remedy that has been used since ancient times[244]. It has a particularly good reputation for its beneficial affect on the mind, being used to dispel melancholy and induce euphoria[244]. It is a soothing saline, diuretic herb that soothes damaged or irritated tissues[238]. The leaves, and to a lesser extent the flowers, are demulcent, diaphoretic, depurative, mildly diuretic, emollient, expectorant, febrifuge, lenitive and mildly sedative[4, 7, 9, 14, 201, 238]. An infusion is taken internally in the treatment of a range of ailments including fevers, chest problems and kidney problems[4], though it should not be prescribed to people with liver problems. Externally it is used as a poultice for inflammatory swellings[4, 7]. The leaves are harvested in late spring and the summer as the plant comes into flower. They can be used fresh or dried but should not be stored for more than one year because they soon lose their medicinal properties[238]. The seeds are a rich source of gamma-linolenic acid, this oil helps to regulate the hormonal systems and lowers blood pressure[238]. It is used both internally and externally, helping to relieve skin complaints and pre-menstrual tension[238]. Used for the treatment of phlebitis (inflammation of the veins) [301].

nrakta C. Europe. A garden escape in Britain[17]. ks-acta Waste ground near houses in Britain[17].

propta Seed - sow April/May in situ. The plants quickly develop a stout tap-root and do not transplant successfully[238]. The seed can also be sown in situ in the autumn, this will produce larger plants and earlier flowering[4]. The plant usually self-sows prolifically.

nwatta Landscape Uses:Border, Foundation, Massing. A very easily grown plant, succeeding in ordinary garden soil[1], preferring a dry soil[37] and a sunny position[138]. It grows particularly well in loose, stony soils with some chalk and sand[244]. Plants are tolerant of poor dry soils, though much bigger specimens are produced when the plants are growing in better conditions[238]. Tolerates a pH in the range 4.8 to 8.3. Borage is often grown as a culinary plant in the herb garden[1, 7]. Although an annual, it usually maintains itself by self-sowing, sometimes in quite a prolific manner, as long as the soil is disturbed by hoeing etc[14, 188]. Plants often develop mildew when growing in dry conditions or towards the end of the growing season[238]. Flowers are a deeper blue when grown in poorer soils[138]. The flowers are rich in a sweet nectar and are very attractive to bees[7, 14, 20, 108, 244]. The growing plant is a good companion for strawberries, tomatoes, courgettes and most other plants[14, 201, 238]. It is said to deter Japanese beetle and tomato hornworms[238]. Special Features: Edible. Fragrant foliage. Not North American native. Invasive. Naturalizing, Suitable for dried flowers, Extended bloom season in Zones 9A and above. The plant is heat tolerant in zones 12 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. A self-seeding annual [1-

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20?c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until the seedlings are large enough to plant out, which could take a few years. Seed is rarely available. Division in late spring[25]. Best done as the new shoots first appear above ground[25]. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings[25].

nwatta Yushania maculata is a large and fast-growing perennial bamboo forming clumps of blue stems with reddish clum sheaths and sparse narrow, glossy green leaves. A temperate plant growing in pine forests 1,800-3,500m above sea level. Canes are 1-2cm diameter and 3-5m high. The Yushania genus are a large group of spreading thornless frosthardy bamboos. Yushania has long-necked rhizomes that enable the plants to spread further, giving it a semi-running habit under suitable conditions. The name Yushania refers to the mountain 'Yu Shan' of the central mountain range of Taiwan. Yushania maculata has attractive bluey-green canes with the plant shape looks like a waterfall of leaves. pH Range: 5.5 to 6.5. Soil Range: Sandy Loam to Clay Loam. Water Range: Normal to Moist. Drought- and wind-tolerant, it grows up to 3.5m (12ft) in 10 years. Light: Partial Shade, Full Shade, Full Sun but prefers full sun to light shade. It does Poorly in high Heat and high Humid conditions (e.g. southeast USA).

## 7.2.146 Viola cornuta

Horned Violet, Bedding Pansy, Tufted Pansy, 6 tlin 11 cyuc 3 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Viola cornuta is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[172]. When added to soup they thicken it in much the same way as okra[85, 159]. Flowers - raw[172]. A tea can be made from the leaves[85].

tcanta A useful ground cover plant for a cool open situation[197]. It needs weeding for the first year or two[197] but then forms an effective weed-excluding cover[233]. Plants are best spaced about 60cm apart each way[208].

nrakta S. W. Europe - Spain, Pyrenees. Occasionally naturalized in Britain. ksacta Mountain pastures.

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Landscape Uses:Border, Container, Rock garden, Woodland garden. Easily grown in any fertile soil in full sun or partial shade[233]. Prefers a well-drained moisture-retentive soil[188]. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5[200]. A very ornamental plant, there are many named forms[200]. If the plants are cut back after flowering they will flower again in late summer[208]. All members of this genus have more or less edible leaves and flower

buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159]. This species has deep-violet flowers[233]. Special Features: Naturalizing, Suitable for cut flowers.

#### 7.2.147 Mentha cervina

Hart's Pennyroyal

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha cervina is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, large quantities of some members of this genus, especially when taken in the form of the extracted essential oil, can cause abortions so some caution is advised.

kcakta Edible Parts: Edible Uses: TeaThe leaves have a strong spearmint fragrance and can be used to make a herb tea[183]

tcanta Essential Repellent StrewingAn essential oil is obtained from the whole plant. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244].

dwatta Antiseptic Carminative FebrifugeA tea made from the leaves of most mint species has traditionally been used in the treatment of fevers, headaches, digestive disorders and various minor ailments[222]. The leaves are harvested as the plant comes into flower and can be dried for later use[238]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta S.W. Europe. ksacta Damp places.

propta Seed - sow spring in a cold frame. Germination is usually fairly guick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more guickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[1, 16, 200]. Prefers a slightly acid soil[16]. Grows well in heavy clay soils. A sunny position is best for production of essential oils, but it succeeds in partial shade. Most mints have fairly aggressive spreading roots and, unless you have the space to let them roam, they need to be restrained by some means such as planting them in containers that are buried in the soil[K]. Hybridizes freely with other members of this genus. The leaves have a strong pepermint smell. The flowers are very attractive to bees and butterflies[24]. A good companion plant for growing near cabbages and tomatoes, helping to deter insect pests. Members of this genus are rarely if ever troubled by browsing deer[233].

## 7.2.148 Commelina communis

Day Flower, Asiatic dayflower 6 tlin 9 cyuc 3 kcak 1 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

and early summer-sown crops tend to run quickly to seed, though they can be eaten whilst still small[ 206 ]. It is best not to sow the seed in very hot weather[ 206 ]. There are about 5,660-6,000 per 0.01 kg (1/3 oz)[ 269 ].

nwatta Originating from the central Asian Himalayas to China, the plant has long been cultivated and many forms have been developed that can be grown from the temperate to the tropical zones. Succeeds in full sun in most well-drained moisture-retentive fertile soils[ 16 , 200 , 206 ]. Prefers a heavy soil and some shade[ 16 ]. Dislikes very hot weather[ 33 ]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[ 206 ]. A form of B. Juncea that has been selected in the Orient for its edible swollen stem, there are many named varieties[ 206 ]. Plants are reasonably cold-tolerant[ 206 ]. They prefer a fairly high stable temperature and are well adapted to short day length[ 200 ]. Plants have a rooting depth of between 90 - 120 cm[ 269 ]. A good bee plant[ 74 ].

# 7.2.85 Bunias orientalis

Turkish Rocket, Turkish wartycabbage 6 tlin 9 cyuc 4 kcak 0 tcan 0 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Bunias orientalis is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves StemEdible Uses: Leaves and young stems - raw or cooked[17, 61, 105, 177, 183]. The young leaves have a mild cabbage flavour that goes very well in a mixed salad, though some people find them indigestible[K]. The leaves are a bit hairy so we find them less than wonderful when eaten raw on their own[K]. The cooked leaves make an excellent vegetable[K]. The leaves are available early in the year, usually towards the end of winter, and the plant will continue to produce leaves until late autumn, with a bit of a gap when the plant is in flower[27, K]. Flower buds and flowering stems - raw or cooked[264]. A pleasant mild flavour with a delicate sweetness and cabbage-like flavour, they make an excellent broccoli substitute though they are rather smaller[K].

nrakta N. America. Europe - Caucasus, S. Russia. Naturalized in Britain[17]. ksacta A weed of cultivated and waste ground[50, 200].

propta Seed - sow April in a cold frame. Germination is usually very quick and good. Prick out the seedlings into pots as soon as they are large enough to handle and plant them out in early summer. The seed can also be sown in situ in the spring, though the seedlings are rather prone to slug damage[K]. Division in spring. Quick and easy. Root cuttings 2 - 5cm in length succeed at any time during the growing season, though early spring as the plant comes into growth is best[K]. If the top 7 - 10cm of the plant is removed to supply root cuttings and divisions, the roots remaining in the soil usually regrow very quickly[K].

watta A very easily grown plant, it succeeds in any soil in a sunny position[1, 200]. Plants have also been seen growing exceedingly well in the dappled shade of a woodland garden[K]. Plants are quite tolerant of neglect, growing well amongst long grass on our Cornish trial ground[K]. The young spring growth can be quite badly damaged by slugs, though more mature plants grow away so quickly that this does not seem to be a problem[K]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

# 7.2.86 Brassica juncea napiformis

Root Mustard 6 tlin 9 cyuc 4 kcak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica juncea napiformis is a ANNUAL growing to 0.8 m (2H 7in). See above for USDA hardiness. It is bardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil RootEdible Uses: Condiment OilLeaves - raw or cooked[206]. A peppery flavour that can range from mild to hot, they make a good cooked vegetable[206]. The leaves can also be finely shredded and added to mixed salads[206]. The protein extracted from the leaves mixes well with banana pulp and is well adapted as a pie filling[183]. Flowers and young flowering stems - raw or cooked[52]. Sweet and succulent[133]. An edible semi-drying oil is obtained from the seed[1, 2, 17, 57. 1831. The seed contains 25 - 30% oil[74]. The seed is used as a mustard flavouring[171]. It is the source of 'brown mustard'[183], a prepared mustard that is milder than that produced from other species[238]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238]. Black mustard comes from B. nigra and white mustard from Sinapis alba. The seed is also used whole in curries and pickles[238]. They are often heated in oil to destroy their pungency and give them a nutty flavour[238]. Sprouted seeds can be added to salads. Root - raw or cooked[183]. Usually sliced and made into pickles[206].

tcanta Green manure Oil RepellentThere is some evidence that if this plant is grown as a green manure it is effective in reducing soil-borne root rots in pea crops[206]. This is attributed to chemicals that are given off as the plants decay[206].

dwatta Anodyne Aperient Diuretic Emetic Galactogogue Rubefacient StimulantReported to be anodyne, aperitif, diuretic, emetic, rubefacient, and stimulant, the plant is a folk remedy for arthritis, foot ache, lumbago, and rheumatism[269]. The seed is used in the treatment of tumours in China[269]. In Korea, the seeds are used in the treatment of abscesses, colds, lumbago, rheumatism, and stomach disorders[269]. The root is used as a galactagogue in Africa[269]. Ingestion may impart a body odour repellent to mosquitoes[269]. Mustard oil is used in the treatment of skin eruptions and ulcers[269]. Believed to be aperient and tonic, the volatile oil is used as a counterirritant and stimulant[269]. In Java the plant is used as an antisyphilitic emmenagogue[269]. Leaves applied to the forehead are said to relieve headache[269]. The Chinese eat the leaves in soups for bladder, inflammation or haemorrhage[269].

nrakta A cultivar of garden origin. ksacta Not known in the wild.

propta Seed - sow in situ from June to October. Springsown crops tend to run quickly to seed, though they can be eaten whilst still small[206]. It is best not to sow the seed in very hot weather[206]. There are about 5,660 - 6,000 per 0.01 kg (1/3 oz)[269].

nwatta Succeeds in full sun in most well-drained moisture-retentive fertile soils[16, 200, 206]. Prefers a heavy soil and some shade[16]. Dislikes very hot weather[33]. Plants tolerate high rainfall and, although fairly deep rooted, are not very drought resistant[206]. A form of B. juncea that has been selected in the Orient for its edible root[206]. It is fairly hardy, surviving temperatures down to at least - 4°c[206]. Plants have a rooting depth of between 90 - 120 cm[269]. A good bee plant[74].

# 7.2.87 Brassica rapa parachinensis

False Pak Choi 6 tin 9 cyuc 4 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica rapa parachinensis is a BIENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[206]. They can be eaten at any stage from seedling to mature plant[206]. The leaves are tougher and stronger flavoured than standard Pak choi[206]. The flavour is enhanced after a touch of frost[206]. The leaves are said to be very nutritious, with up to twice the mineral content of Pak choi[206]. Immature flowering stems - cooked like broccoli[206]. A sweet flavour[206]. An edible oil is obtained from the seed

nrakta A cultivar of garden origin, ksacta Not known in the wild.

propta Seed - sow in situ July/August. Spring sown crops are prone to run quickly to seed if there is a spell of cold weather[206]. Some varieties can also be sown in a cold greenhouse in autumn or early spring to provide leaves overwinter and in late spring

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Prefers a pH of 5.5 to 7[200]. Prefers a cool moist reasonably fertile soil[52]. The plant is shallow rooted and intolerant of drought, it responds well to a moist fertile soil but succeeds in poorer soils than standard Pak choi[206]. Hardy to about -10°c, the plants stand up well to snow but are less likely to stand up to prolonged winter wet[206]. The prostrate forms are hardier than semiprostrate forms[206]. The rosette pak choi is widely cultivated in China for its edible leaves, there are several named varieties[206]. It is slower-growing than standard Pak choi, B. rapa chinensis[206].

# 7.2.88 Pinus lambertiana

Sugar Pine

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 75 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus lambertiana is an evergreen Tree growing to 75 m (246ft 1in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: SeedEdible Uses: Condiment Gum SweetenerSeed - raw or cooked[1, 2, 62, 63, 92, 257]. A good size, up to  $15mm \times 10mm[200]$ . A pleasant sweet nutty flavour[11, 183], with a hint of resin[2]. The nut, together with the shell, can be pulverised into a nut butter[84]. A sugar is obtained from boiling off the water in the sap[1, 2, 63, 92, 94]. Some caution is advised since it is laxative if used in large quantities[95]. A sweet sugar-like substance exudes from wounds made in the heartwood of the tree[81, 82, 183] and also from the cones. It is sometimes used for sweetening foods, though in large quantities it is laxative[2, 183]. The pitch obtained from the trunk is allowed to harden and is then used as a chewing gum[257]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Adhesive Dve Gum Herbicide Pitch WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Yields a pitch, though it is not commercially important[64]. Oleoresins are present in the tissues of all species of pines, but

these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. The resin is used as an adhesive [257]. Wood - light, soft, straight but coarse grained. Used for lumber, interior finishes etc[46, 82, 84, 171, 229].

dwatta Carminative Laxative Ophthalmic PoulticeThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4]. The sap is carminative and laxative[257]. The dried sap powder has been eaten in the treatment of stomach gas, constipation, ulcers etc[46, 61, 84, 92, 94]. It has also been used to make eve drops to treat sore eyes[257].

nrakta South-western N. America - California to Oregon. ksacta Cool, usually fairly moist, mixed coniferous woods in mountainous areas[60], growing best on deep well-drained

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Plants have a deep taproot that anchors them firmly when growing in a windy site[229]. A very vigorous tree in Britain, capable of growing 1 metre per year when young[185]. The trees are longlived in their native environment, but can take 100 years or more before they come into reliable seed bearing[229]. Even then seed production is sparse, with good yields only every 4 - 5 years[229]. The cones open and shed their seed in early autumn whilst still attached to the tree[82, 226]. They are up to 45cm long and often drip with a sweet sap[81]. Unfortunately the cones are seldom borne in Britain[11], though a tree at Hawkestone Park in Shropshire often bears cones[11]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow beneath the tree[18]. Trees are susceptible to the 'white pine blister rust' and should not be grown near to blackcurrants[120. 2001. This rust killed off all the plantings of this species that were made prior to 1960[185]. Plants in this genus are notably susceptible to honey fungus[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus [200]. The crushed leaves and shoots have a sweet grapefruit-like aroma[185].

to the face will keep gnats away in the summer[245]. The medium (loamy) soils and prefers well-drained soil. Suitable aromatic leaves are used as an ingredient of pot-pourri[238].

dwatta Antiseptic Antispasmodic Carminative Diaphoretic Eczema Emmenagogue Sedative Stimulant Uterine tonicPennyroyal has been used for centuries in herbal medicine. Its main value is as a digestive tonic where it increases the secretion of digestive juices and relieves flatulence and colic[254]. Pennyroyal also powerfully stimulates the uterine muscles and encourages menstruation, thus it should not be prescribed for pregnant women since it can procure abortions, this is especially the case if the essential oil is used[238, 254]. The herb is antiseptic, antispasmodic, carminative, diaphoretic, emmenagogue, sedative and stimulant[4, 9, 46, 165]. A tea made from the leaves has traditionally been used in the treatment of fevers, headaches, minor respiratory infections, digestive disorders, menstrual complaints and various minor ailments[222, 238, 254]. It is occasionally used as a treatment for intestinal worms[254]. Externally, an infusion is used to treat itchiness and formication, inflamed skin disorders such as eczema and rheumatic conditions such as gout[254]. The leaves are harvested in the summer as the plant comes into flower and are dried for later use[4]. The essential oil in the leaves is antiseptic, though it is toxic in large doses[222].

nrakta Centraland southern Europe, including Britain, Mediterranean region, Macaronesia, ksacta Moist meadows and sandy soils by streams etc[9, 17].

propta Seed - sow spring in a cold frame. Germination is usually fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Mentha species are very prone to hybridisation and so the seed cannot be relied on to breed true. Even without hybridisation, seedlings will not be uniform and so the content of medicinal oils etc will vary. When growing plants with a particular aroma it is best to propagate them by division[K]. Division can be easily carried out at almost any time of the year, though it is probably best done in the spring or autumn to allow the plant to establish more quickly. Virtually any part of the root is capable of growing into a new plant. Larger divisions can be planted out direct into their permanent positions. However, for maximum increase it is possible to divide the roots up into sections no more than 3cm long and pot these up in light shade in a cold frame. They will quickly become established and can be planted out in the summer.

nwatta Succeeds in most soils and situations so long as the soil is not too dry[200]. Plants are very quickly diminished by dry conditions[4]. Prefers a stiff moist soil that is slightly acid[16, 27, 37, 200]. A sunny position is best for production of essential oils, but plants succeed in partial shade. Pennyroval is often grown in the herb garden and is also cultivated commercially as a medicinal plant[4, 115]. There are two main forms of this species. One has weak prostrate stems and spreads by rooting where the stems touch the ground, it is only 10cm tall[4]. The other is erect, does not spread so freely and grows about 30cm tall, thus making it easier to harvest[4]. There is also at least one named form, called 'Dwarf' it is only a few centimetres tall[183]. The whole plant a strong spearmint smell. The flowers are very attractive to bees and butterflies[24]. A good companion plant for cabbages and tomatoes[20], helping to repel cabbage root fly and other burrowing insects[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

#### 7.2.144 Allium bolanderi

Bolander's Onion

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.2 m hkuc

htut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Allium bolanderi is a BULB growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[105, 161, 177, 257]. The bulb is 10 -25mm wide[200]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta South-western N. America - California. ksacta Heavy soils and openings in brush and woods below 900 me-

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained soil[1]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 7.2.145 Yushania maculata

6 tlin 10 cvuc 3 kcak 3 tcan 0 dwat m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprikl wis hpa7tmwatli hionli

drutta Yushania maculata is an evergreen Bamboo growing to 5 m (16ft) by 2.5 m (8ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. The flowers are pollinated by Wind. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric

pcista None Known

kcakta Young stems. Shoots emerge summer to early autumn. Shoots have pleasant taste and are free of bitterness[1-9]. Harvested shoots are steamed, cut lengthwise, cleaned and sterilized for 15 minutes in pure or salted boiling water before eating or canning 310 ].

tcanta Canes are used as plant supports, they must be properly ripened[25, 158, 195]. The plant makes an attractive hedge or screen, eventually becoming very dense[195]. Erosion Control. Suggested landscape design uses: Ornamental - bluey-green canes and the shape looks like a waterfall of leaves, Architectural, Hedging/Screens, tropical garden effect. Roof terrace. Wildlife Shelter for birds and small mammals. Drought- and wind-tolerant.

dwatta None Known

1113

nrakta Native to Asia-temperate: Yunnan and Sichuan, China. Introduces Europe including UK, USA. ksacta A temperate plant. Grows in pine forests at elevation 1.8-3.5 km.

nrakta S. Europe. A rare casual in Britain[17]. ksacta Fields and roadsides[89], usually on rather poor soils[132].

propta Seed - sow March to August in situ in order to obtain a succession of fresh young leaves. The seed usually germinates within  $2\ weeks$ .

nwatta Succeeds in most soils[1], including poor ones[132], preferring a sunny position[200].

## 7.2.141 Triteleia ixioides

Pretty Face, Cook's triteleia, Golden brodiaea 6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Triteleia ixioides is a BULB growing to 0.6~m (2ft) 0.1~m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August, and the seeds ripen in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[105, 257]. Small[161]. Rich in starch, they can be used like potatoes.

nrakta South-western N. America - Oregon to California. ksacta Sandy soils near the coast[71], in oak and pine forests to 1500 metres[90].

propta Seed - best sown as soon as it is ripe in a cold frame. Alternatively, the seed can be sown in spring in a cold frame. Germination usually takes place within 1 - 3 months at 15°c. Sow the seed thinly so that there is no need to prick them out and grow the seedlings on in the pot for their first year. Give an occasional liquid feed to ensure that they do not become mineral deficient. Seedlings are prone to damping off so be careful not to overwater them and keep them well ventilated. When they become dormant, pot up the small bulbs placing about 3 in each pot. Grow them on in the greenhouse for another year or two until the bulbs are about 20mm in diameter and then plant them out into their permanent positions when they are dormant in the autumn. Division of flowering size bulbs in autumn. Dig up the clumps of bulbs, replanting the larger ones direct into their permanent positions. It is best to pot up the smaller ones and grow them on in a greenhouse for a year before planting them out when they are dormant in early autumn.

nwatta Easily grown in a bulb frame or a warm sunny position outdoors[90]. Requires a rich well-drained sandy loam[1]. Likes plenty of moisture whilst in growth followed by a warm dry period in late summer and autumn[200]. Bulbs can flower in 2 years from seed[K].

#### 7.2.142 Asarum caudatum

Wild Ginger, British Columbia wildginger 6 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 0.1 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Asarum caudatum is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is poliniated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been found for this plant, at least 3 other members of this genus have reports that the leaves are toxic[7, 19]. Some caution is therefore advised in the use of this plant.

kcakta Edible Parts: Edible Uses: Condiment TeaThe root can be used as a ginger substitute[183]. The root has a pungent, aromatic smell like mild pepper and ginger mixed, but more strongly aromatic. It can be harvested all year round, but is best in the autumn[K]. It can also be dried for later use[K]. Leaves are a tea substitute[177, 183].

tcanta A useful ground-cover plant for deep shade[187], spreading by its roots[208].

dwatta Analgesic Antirheumatic Appetizer Laxative Poultice Stomachic TonicThe root is laxative, stomachic and tonic[61, 257]. A tea made from the root is used in the treatment of colds, colic, indigestion and stomach pains[213, 257]. The root is harvested in the autumn and dried for later use[238]. The whole plant is analgesic, antirheumatic, appetizer and tonic[257]. A decoction is used externally to treat headaches, intestinal pain and knee pains[257]. A poultice made from the heated leaves is applied to boils, skin infections and toothaches, whilst a decoction of the leaves is used as a wash on sores[257].

nrakta Western N. America - British Columbia to California. ksacta Deep shade in moist pine woods and redwood forests[60, 187]. Understory of conifer forests, usually in mesic or wet places from sea level to 1200 metres and occasionally to 2200 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Landscape Uses:Ground cover, Woodland garden Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Plants are hardy to at least -15°c[200]. The flowers are malodorous and are pollinated by flies[200]. Plants often self-sow when growing in a suitable position[200]. Special Features:Attractive foliage, North American native, Fragrant foliage, Inconspicuous flowers or blooms.

# 7.2.143 Mentha pulegium

Pennyroyal

6 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 0.4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mentha pulegium is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista In large quantities this plant, especially in the form of the extracted essential oil, can cause abortions so it should not be used by pregnant women[165]. Avoid if patient has fits or seizures and those with liver or kidney disease. oral intake may cause abdominal cramps, fever, nausea, vomiting, confusion, delirium, auditory and visual hallucinations [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked[2, 9, 27]. Used as a flavouring in salads or cooked foods[183]. A spearmint-like flavour, though rather coarser, it is not used very often in Britain[4]. A herb tea is made from the fresh or dried leaves[183]. For drying, it should be harvested as the plant comes into flower[4].

tranta Cleanser Essential Pot-pourri Repellent StrewingAn essential oil is obtained from the whole plant, used in soap making[46, 61] and as a cleanser for fabrics[169]. A yield of 14kg of oil per hectare is considered good[4]. The plant has a low spreading habit and can be used as a ground cover, though it is somewhat sparse in the winter and can be invaded by the more aggressive weeds[K]. The growing or dried plant repels fleas, ants, moths, mice tet[18, 20, 148, 169, 201, 238]. Rats and mice intensely dislike the smell of mint. The plant was therefore used in homes as a strewing herb and has also been spread in granaries to keep the rodents off the grain[244]. A strong infusion applied

#### 7.2.89 Aesculus indica

Indian Horse Chestnut

6 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 30 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus indica is a deciduous Tree growing to 30 m (98ft) by 12 m (39ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is rich in saponins[20, 65]. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. It can be dried, ground into a powder and used as a gruel[2, 63, 145, 146, 158]. The seed is roasted then eaten in Nepal[272]. It is also dried then ground into a flour and used with wheat flour to develop the flavour when making bread[272]. The seed is quite large, about 35mm in diameter[194], and is easily harvested. Unfortunately it also contains toxic saponins and these need to be removed before it can be eaten. The seed is used as an emergency food in times of famine when all else fails[177]. It is dried and ground into a powder, this is then soaked in water for about 12 hours before use in order to remove the bitter saponins and can be used to make a 'halva'[194]. It is estimated that mature trees yield about 60kg of seeds per annum in the wild[194]. See also the notes above on toxicity.

tcanta Soap WoodSaponins in the seed are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. Wood - soft, close grained. Used for construction, cases, spoons, cups etc[145, 146, 158].

dwatta Acrid Anthelmintic Antirheumatic Astringent Narcotic StomachicThe seed is astringent, acrid and narcotic[272]. An oil from the seed is applied externally in the treatment of skin disease and rheumatism[240, 243, 272]. The juice of the bark is also used to treat rheumatism[272]. A paste made from the oil cake is applied to the forehead to relieve headaches[272]. The seed is given to horses suffering from colic[240, 243]. It is also used as an anthelmintic on horses to rid them of intestinal parasites[272].

nrakta E. Asia - North-western Himalayas. ksacta Wet temperate forests and shady ravines to 3,000 metres[51, 243].

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable[80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Prefers a deep loamy well-drained soil but is not too fussy[1, 11, 200]. Succeeds on chalk[11]. Dislikes dry soils[11]. This species does very well in south-west England, growing best in areas where the minimum temperatures do not fall below about -5°c[200]. Young shoots in the spring can be cut back by late frosts in low-lying districts[11, 126]. Trees cast quite a dense shade[194]. Most members of this genus transplant easily, even when fairly large[11].

# 7.2.90 Corylus jacquemontii

Indian Tree Hazel

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 25 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyif hjonli

drutta Corylus jacquemontii is a deciduous Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[51, 105]. Rich in oil. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

nrakta E. Asia - N.W. Himalayas. ksacta Forests and shrubberies to 3000 metres[51].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 2001.

nwatta An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. This species is cultivated for its edible seed in Asia[51], it frequently sets fruit at Kew[11]. Closely allied to C. colurna[11], and considered to be no more than a sub-species by some botanists, it is an upright growing tree that does not produce suckers[183]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

#### 7.2.91 Pinus gerardiana

Chilghoza Pine

1089

6 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 25 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus gerardiana is an evergreen Tree growing to 25 m (82ft 0in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: SeedEdible Uses: CondimentSeed-raw or cooked[4, 63, 158]. Rich in oil, they have a pleas-ant flavour with a hint of resin and can be used as a staple food[2]. Used like pistachio nuts[183]. A very good size, up to 2.5cm (1 inch) long[200]. The seed is an important local food source[11, 146], and is considered to be a great delicacy[51, 183]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Basketry Containers Dye HerbicideA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. The bark of the tree is made into baskets and also into rough buckets for fetching water[146]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc.

dwatta Anodyne Antiseptic Diuretic Poultice Rubefacient Stimulant VermifugeThe seed is anodyne and stimulant[240]. The oil obtained from the seeds is used as a dressing on wounds and ulcers, it is also used externally in the treatment of head diseases[240]. The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta E. Asia - Afghanistan and the N. W. Himalayas. ksacta Dry inner valleys[51], usually on limestone[120], to 3000 metres. Gregarious on dry steep rocky slopes on granite or clav slate in areas bevond the reach of the S.W. monsoons[146].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Found on clay soils in the wild[146]. Forms so far introduced into Britain are hard to establish and grow on, other provenances may be better[120]. A slow growing tree[81]. This species is cultivated for its edible seed in Asia[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow beneath the tree[18]. Plants in this genus are notably susceptible to honey funaus[200].

# 7.2.92 Toona sinensis

Chinese Cedar

6 tlin 11 cyuc 3 kcak 4 tcan 2 dwat 20 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Toona sinensis is a deciduous Tree growing to 20 m (65ft) by 8 m (26ft) at a fast rate. See above for USDA

hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist

kcakta Edible Parts: Fruit Leaves ShootsEdible Uses: TeaYoung shoots and leaves - cooked[11, 105, 177, 183]. This is a highly esteemed food in China[109], it is said to resemble onions in flavour and is usually boiled. Rich in vitamin A, the leaves also contain about 6% protein, 1% fat, 6.6% carbohydrate, 1.5% ash[179]. The leaves can be used as a tea substitute[183]. Fruit[177, 183] . No further details are

tcanta Incense WoodWood - very durable, easily worked. takes a good polish. It is a very valuable timber, resembling mahogany, and is used for making furniture, window frames etc[109, 178]. The wood is delicately scented and is burnt in temples as an incense[245].

dwatta Astringent Carminative Dysentery Febrifuge Ophthalmic StypticThe bark is astringent, carminative, febrifuge, ophthalmic and styptic[147, 178]. A decoction is used in the treatment of diarrhoea, chronic dysentery, flatulence, bloody stools, seminal emissions, leucorrhoea,, metrorrhagia and gonorrhoea[147].

nrakta E. Asia - China, northern India, Bhutan, Myanmar, Thailand, Laos, Malaysia, Indonesia. ksacta Wood-

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed germinates better if given a 3 month cold stratification[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider giving them some protection from the cold in their first winter outdoors. Root cuttings, 4 - 5cm long, taken in December and potted up horizontally in pots in a greenhouse[78].

nwatta Thrives in most fertile well-drained soils in a sunny position[200]. Prefers a rich loamy soil[1], growing well on calcareous soils[11]. The fully dormant tree is hardy to about -25°c[200], though the young growth in spring can be damaged by late frosts. The tree is fast growing[200] and is said to resist all insects and diseases[160]. It is also longlived[245]. A very ornamental tree[1], the flowers diffuse a powerfully rich scent[245]. It is cultivated in China for its edible leaves[109]. The plant is heat tolerant in zones 12 through 10 (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 7.2.93 Ouercus virginiana

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwishsom hpa7tmwatli hjonli

drutta Ouercus virginiana is an evergreen Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower in April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers

heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The oil contained in the seed of some varieties of this species can be rich in erucic acid which is toxic. However, modern cultivars have been selected which are almost free of erucic acid

kcakta Edible Parts: Leaves Oil OilEdible Uses: Condiment Oil OilLeaves - raw or cooked[4, 34, 37]. Added to salads or used as a potherb[183]. Immature flowering stems cooked in much the same way as broccoli[183]. An edible oil is obtained from the seed, it is used mainly for cooking purposes, but also for salads[4, 13, 34, 46, 183]. Some caution is advised, see the notes above on toxicity. The sprouted seed is often used as the mustard part of mustard and cress. Eaten in salads[4, 34, 37, 183]. The seed is used as a mustard flavouring[183].

tcanta Oil OilThe seed contains up to 45% of an edible semi-drying oil, it is used as a luminant, lubricant, in soap making etc[13, 21, 57, 142].

dwatta Diuretic EmollientThe root is emollient and diuretic[240]. The juice of the roots is used in the treatment of chronic coughs and bronchial catarrh[240, 269]. The seed, powdered, with salt is said to be a folk remedy for cancer[269]. Rape oil is used in massage and oil baths, it is believed to strengthen the skin and keep it cool and healthy. With camphor it is applied as a remedy for rheumatism and stiff joints[269].

nrakta Europe - Mediterranean, Naturalized in Britain[17], ksacta Banks of streams, ditches and arable fields in Britain[17]

propta Seed - sow spring in situ.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Succeeds in any reasonable soil[52]. Prefers a heavy soil and cool moist conditions[16, 201. Sunny days and cool nights are favourable for plant growth whilst dry weather at harvest time is essential[269]. Rape is reported to tolerate an annual precipitation of 30 to 280cm, an annual average temperature range of 5 to 27°C and a pH in the range of 4.2 to 8.2[269]. Very young plants are susceptible to cold damage, -4°C either killing or injuring seedlings, whereas -2°C has no affect when the plants are more than one month old[269]. Rape is widely cultivated for its oil-rich seeds, there are many named varieties. The oil is high in erucic acid and glucosinolates, both of which have anti-nutritional properties. Cultivars have been developed that have a low content of these items and are therefore suitable for food. Rape is 70% self-pollinating and 30% crosspollinated. Even if wind and insects are absent, seed are still produced. Yield increases with honeybees[269]. The growth of this plant is inhibited by field mustard and hedge mustard growing nearby[18, 20]. This species is closely related to B. rapa[200]

Florence Fennel

6 tlin 9 cvuc 3 kcak 3 tcan 3 dwat 1.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis 7.2.140 Bunias erucago hpa7tmwatli fvifxre7t hionli

drutta Foeniculum vulgare azoricum is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

poista Skin contact with the sap or essential oil is said to cause photo-sensitivity and/or dermatitis in some people[218, 222]. Ingestion of the oil can cause vomiting. seizures and pulmonary oedema[222].

kcakta Edible Parts: Leaves Root Seed StemEdible Uses: CondimentLeaves - raw or cooked[52]. A delicious aniseed flavour, the young leaves are best since older ones become tough. They make a very nice addition to mixed salads[K]. Leaf stalks and stem base - raw, cooked or used as

a flavouring in soups etc[50, 61, 183]. A strong, aniseed flavour[K]. They are often blanched before being eaten[183]. Very low in carbohydrates, proteins and fats[132]. Seeds raw or cooked. They have a delicious aniseed flavour and are used as a flavouring in cakes, bread etc[52, 183]. Root cooked[53]. The flavour is somewhat parsnip-like[K]. A herb tea can be made from the seeds or the leaves[16, 183].

tcanta Dye Essential Repellent StrewingThe seed yields up to 5% of an essential oil[1, 4, 46]. This is used medicinally, as a food flavouring, in toothpastes, soaps, perfumery, air fresheners etc[1, 46, 238]. The flavour of fennel oil depends upon its two main constituents. 'Fenchone' is a bitter tasting element whilst 'anethole' has a sweet anise-like flavour[238]. The proportions of these two ingredients varies according to strain and region. Plants growing in the Mediterranean and southern Europe usually have a sweet oil whilst plants growing in central and northern Europe usually produce a more bitter oil[238]. The quality of the oil also depends upon how well the seed has been dried - the oil from fully ripened and dried seeds being much sweeter and more fragrant[245]. The dried plant is an insect repellent[14, 53], the crushed leaves are effective for keeping dogs free of fleas[201]. The plant was formerly used as a strewing herb[2011 Yellow and brown dves are obtained from the flowers and leaves combined[168].

dwatta Analgesic Antiinflammatory Antispasmodic Aromatic Carminative Diuretic Emmenagogue Expectorant Galactogogue Hallucinogenic Stimulant Stomachic UrinaryFennel is a commonly used household remedy, being useful in the treatment of a variety of complaints, especially those of the digestive system. The seeds, leaves and roots can be used, but the seeds are most active medicinally and are the part normally used[4]. An essential oil is often extracted from the seed for medicinal use, though it should not be given to pregnant women[4, 238]. The plant is analgesic, anti-inflammatory, antispasmodic, aromatic, carminative, diuretic, emmenagogue, expectorant, galactogogue, hallucinogenic, laxative, stimulant and stomachic[4, 7, 9, 21, 147, 165, 176, 192, 238]. Fennel is often added to purgatives in order to all a their tendency to cause gripe, and also to improve the flavour[4]. An infusion of the root is used to treat urinary disorders[238]. An essential oil obtained from the seed is used in aromatherapy. Its keyword is 'Normalising' [210]. The essential oil is bactericidal, carminative and stimulant[218]. Some caution is advised, see notes above on toxicity[222]

nrakta A cultivar of F. vulgare, ksacta Not found in the

propta Seed - best sown in early spring in situ[1]. Division in March as the new growth appears[16, 200].

nwatta Succeeds in most soils[1] but prefers a sunny dry position[200]. A cultivated form of F. vulgare, grown for its edible swollen leaf bases, there are some named varieties[183]. This is the genuine Florence fennel[200]. Attracts bees and hoverflies[24]. Fennel is a poor companion plant in the garden, it inhibits the growth of nearby plants, especially beans, tomatoes and kohl rabif 14, 181. It is itself 7.2.139 Foeniculum vulgare azoricum inhibited by wormwood and coriander[14, 18].

Corn Rocket, Crested wartycabbage 6 tlin 9 cvuc 3 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Bunias erucago is a ANNUAL/BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers

kcakta Edible Parts: Leaves RootEdible Uses: Leaves and young stems - raw or cooked[2, 64, 61, 105, 177]. A characteristic aromatic flavour that goes well with beans[183]. The young and tender leaves make a refreshing spring soup[89, 183]. Root - raw[17, 264]. It can be sliced thinly or grated and then be added to salads[89].

heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The oil contained in the seed of some varieties of this species can be rich in erucic acid which is toxic. However, modern cultivars have been selected which are almost free of erucic acid.

kcakta Edible Parts: Leaves Oil Oil Seed StemEdible Uses: Condiment Oil OilLeaves - raw or cooked[4, 34, 37]. Added to salads or used as a potherb[183, 272]. The leaves are also fermented for later use[272]. Immature flowering stems - cooked in much the same way as broccoli[183]. An edible oil is obtained from the seed, it is used mainly for cooking purposes, but can also be used raw in salad dressings[4, 13, 34, 46, 183]. Some caution is advised, however, see the notes above on toxicity. The sprouted seed is often used as the mustard part of mustard and cress. Eaten in salads[4, 34, 37, 183]. The seed is used as a mustard flavouring[183].

tcanta Green manure Oil OilThe seed contains up to 45% of an edible semi-drying oil, it is used as a luminant, lubricant, in soap making etc[13, 21, 57, 142]. Rapeseed oil has potential market in detergent lubrication oils, emulsifying agents, polyamide fibres, and resins, and as a vegetable wax substitute. According to the Chemical Marketing Reporter (April 26, 1982) "the most common use for the oil is still in the production or erucic acid, a fatty acid used in turn in the manufacture of other chemicals[269]. The seed husks are used in plastering house walls[272]. A good green manure, the deep taproot improves drainage and loosens heavy soils[18, 20, 87].

dwatta Diuretic EmollientThe root is emollient and diuretic[240]. The juice of the roots is used in the treatment of chronic coughs and bronchial catarth[240, 269]. The seed, powdered, with salt is said to be a folk remedy for cancer[269]. Rape oil is used in massage and oil baths, it is believed to strengthen the skin and keep it cool and healthy. With camphor it is applied as a remedy for rheumatism and stiff joints[269]. It is dropped into the ear to relieve earaches[272].

nrakta Europe - Mediterranean. Naturalized in Britain[17]. ksacta Banks of streams, ditches and arable fields in Britain[17].

propta Seed - sow in situ in early spring to mid-August for a green manure crop.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Succeeds in any reasonable soil[52]. Prefers a heavy soil and cool moist conditions[16. 20]. Sunny days and cool nights are favourable for plant growth whilst dry weather at harvest time is essential[269] Colza is reported to tolerate an annual precipitation of 30 to 280cm, an annual average temperature range of 5 to 27°C and a pH in the range of 4.2 to 8.2[269]. Very young plants are susceptible to cold damage, -4°C either killing or injuring seedlings, whereas -2°C has no affect when the plants are more than one month old[269]. Brassica napus is an aggregate species, probably derived through cultivation. It is thought that crosses of Brassica oleracea subsp. oleracea with B. rapa gave rise to the subsp. B. napus pabularia, from which subsp. napus and subsp. rapifera and other cvs were derived[269]. The aggregate species includes forms with swollen edible roots (B. napus napobrassica, the garden swede), forms grown for their oil-rich seeds (B. napus napus, the oilseed rape), forms grown for their edible leaves (B. napus pabularia, the rape kales) whilst the form grown as a green manure is B. napus arvensis. All these forms are treated separately here. The oil obtained from the seed is high in erucic acid and glucosinolates, both of which have anti-nutritional properties. Cultivars have been developed that have a low content of these items and are therefore suitable for food. Colza is 70% self-pollinating and 30% crosspollinated. Even if wind and insects are absent, seed are still produced. Yield increases with honeybees[269]. The growth of this plant is inhibited by field mustard and hedge mustard growing nearby[18, 20]. This species is closely related to B. rapa[200].

#### 7.2.137 Castanea alnifolia

Bush Chinkapin

6 tlin 9 cyuc 3 kcak 2 tcan 0 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Castanea alnifolia is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in July, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[105, 177]. Of excellent quality[183]. The seed is small but it is sweet and larger than C. pumila[11, 183] though produced less abundantly[11]. Eaten raw, there is a distinct astringency, especially if the fleshy inner skin beneath the outer shell of the seed is not removed[K]. When cooked, however, and especially when baked, the seed becomes much sweeter and has a floury texture[K]. It then makes an excellent food and can be used as a staple food in much the same way as potatoes or cereals[K]. The burs have less prickles, making it easier to harvest the seed[183].

tcanta TanninThe bark, leaves, wood and seed husks all contain tannin.

nrakta South-eastern N. America - N. Carolina to Arkansas. ksacta Dry sandy soils[11, 82, 229] in open woodlands or in thickets[227], also in rich upland deciduous woodlands[229].

propta Seed - where possible sow the seed as soon as it is ripe in a cold frame or in a seed bed outdoors[78]. The seed must be protected from mice and squirrels. The seed has a short viability and must not be allowed to become dry. It can be stored in a cool place, such as the salad compartment of a fridge, for a few months if it is kept moist, but check regularly for signs of germination. The seed should germinate in late winter or early spring. If sown in an outdoor seedbed, the plants can be left in situ for 1 - 2 years before planting them out in their permanent positions. If grown in pots, the plants can be put out into their permanent positions in the summer or autumn, making sure to give them some protection from the cold in their first winter[K]. Division of suckers in winter[200]. They can be planted straight out into their permanent positions.

nwatta Prefers a good well-drained slightly acid loam but succeeds in dry soils[1, 11, 200]. Once established, it is very drought tolerant[1, 11, 200]. Very tolerant of highly acid, infertile dry sands[200]. Averse to calcareous soils but succeeds on harder limestones[11, 200]. This species only really thrives in areas with hot summers[200], it may not be hardy in Britain[11]. Another report says that it succeeds in climatic zone 7 and should therefore tolerate temperatures down to at least -10°c[200]. Usually a small shrub[11], this species occasionally reaches small-tree size (as C. alnifolia floridana, Sarg.)[82] This species is similar to and often confused with C. pumila[1, 11]. An excellent soil-enriching understorey shrub in pine forests[200]. It grows into a clump by means of suckers[183, 200]. Flowers are produced on wood of the current year's growth[229]. Plants are fairly self-sterile[200]. They hybridize freely with other members of this genus [200]. Plants in this genus are notably resistant to honey fungus[200].

## 7.2.138 Brassica napus napus

Rape

 $6\,t$ lin 9 cyuc 3 kcak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Brassica napus napus is a ANNUAL/BIENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clav) soils, prefers well-drained soil and can grow in

dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: Coffee OilSeed - raw or cooked[63, 161, 171]. Low in tannin, it has a sweet flavour[82]. The seed is usually produced in clusters of 3 - 5 and is about 25mm long and 10mm wide[82, 200]. It is about 12mm long according to another report[227]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. An edible oil obtained from the seed is used for cooking[149, 161, 177]. The roasted seed is a coffee substitute.

tcanta Oil Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is a commercial source of tannin[149, 227]. Dyes of various colours can be obtained from the bark[257]. Wood - very heavy, hard, strong, tough, close grained but difficult to work. It weighs 59lb per cubic foot. It is used for making hubs, cogs, shipbuilding etc[46, 61, 82, 149, 171, 227]. A very qood fuel[229].

dwatta Analgesic Antihaemorrhoidal Astringent DysenteryThe bark is astringent[257]. A decoction has been used in the treatment of dysentery[257]. A decoction of the wood chips or the bark has been applied externally as an astringent analgesic to treat aches and pains, sores and haemorrhoids[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Virginia to Florida and Texas. ksacta Sandy dry to wet soils, especially by the coast[43, 149]. Usually found in sandy-loam soils, but it is also found in heavy clavs[227].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Trees can stand considerable salinity, often growing close to the sea[227]. They tolerate moderate exposure, surviving well but being somewhat stunted[200]. This species seems to be susceptible to soil types, producing dwarf forms and diverse leaf forms under certain conditions[227]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[11, 200]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Abundant crops are usually produced in the wild[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus [200]. Plants in this genus are notably resistant to honey fungus[200].

# 7.2.94 Quercus hispanica

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 20 m hkuc hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli drutta Quercus hispanica is a deciduous Tree growing to 20 m (65ft) by 13 m (42ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. Up to 2.5cm long. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Cork Repellent Tannin WoodThe bark is a source of cork, it can be used for heat and sound insulation, flooring, floats etc. The bark is harvested every 6 - 12 years, being carefully removed so as not to harm the tree. A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood -

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta A hybrid species of garden origin, Q. cerris x Q. suber. ksacta Not known in the wild.

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly. This is a cultivar and it will not breed true from seed.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Grows fairly well in Britain, because of its hybrid parentage between the cork oak and the Turkey oak this tree is potentially a good source of cork for Britain. There are a number of named forms. 'Diversifolia' has a bark that is more corky than the type[11]. Hybridizes freely with other members of the genus[2001]. Plants in this genus are notably resistant to honey fungus[2001].

## 7.2.95 Tilia caroliniana

Carolina Basswood

6 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tilia caroliniana is a deciduous Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pfl: mildly acid, neutral

and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw[K]. A tea is made from the flowers. A very good chocolate substitute is made from a paste of the ground fruits and flowers[2]. Trials on marketing the product failed because the paste decomposes readily[2].

tcanta Fibre WoodA fibre is obtained from the tough inner bark It can be made into diverse items such as mats, shoes and coarse cloth[229]. Wood - soft, light, easily worked. Used for interior finishing, woodenware etc[149].

dwatta Antispasmodic Diaphoretic SedativeA tea made from the flowers is antispasmodic, diaphoretic and sedative[226].

nrakta South-eastern N. America - Virginia to Florida, west to Texas. ksacta Grows best in rich moist woods, or in dense hummocks by streams in the south of its range[229].

propta Seed - much of the seed produced in Britain is not viable, cut a few seedcases open to see if there is a seed inside[80]. If possible, obtain fresh seed that is ripe but has not as yet developed a hard seed coat and sow it immediately in a cold frame. It may germinate in the following spring though it could take 18 months[80]. Stored seed can be very slow to germinate. It has a hard seed coat, embryo dormancy and a hard coat on the pericarp. All these factors mean that the seed may take up to 8 years to germinate[80]. One way of shortening this time is to stratify the seed for 5 months at high temperatures (10°c at night, up to 30°c by day) and then 5 months cold stratification[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring just before the leaves unfurl. Takes 1 - 3 years[78]. Suckers, when formed, can be removed with as much root as possible during the dormant season and replanted immediately[200].

nwatta Prefers a good moist loamy alkaline to neutral soil but succeeds on slightly acid soils[11, 200]. Grows poorly on any very dry or very wet soil[200. Dislikes exposed positions[200]. Succeeds in sun or semi-shade[188]. One report suggests that this tree is probably tender in Britain[11] whilst another says that it succeeds in zone 7, which means that it should be hardy in most of Britain[200]. A fast-growing tree in its native habitats[227], but it prefers a continental climate, growing more slowly and not producing fertile seed in areas with cool summers[200]. Lime trees tend to hybridise freely if other members of the genus are growing nearby[238]. If growing plants from seed it is important to ensure the seed came from a wild source or from an isolated clump of the single species[K]. Grows best in a woodland situation, young plants tolerate a reasonable level of side shade[200]. A good bee plant[149]. Trees are usually attacked by aphids which cover the ground and the leaves with a sticky honeydew[188]. Quite tolerant of root disturbance, semi-mature trees up to 5 metres tall have been transplanted successfully. Plants in this genus are notably resistant to honey fungus[200].

## 7.2.96 Juniperus drupacea

Syrian Juniper

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 15 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus drupacea is an evergreen Tree growing to 15 m (49ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Large and sweet[2, 61, 105]. The cones are about 20 - 25mm in diameter and take 2 years to mature[200].

nrakta S. Europe, W. Asia, N. Africa. ksacta Rocky slopes in forest or scrub, 1000 - 1500 metres in Turkey[93].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78. 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel. September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in dry soils, tolerating drought once it is established[185]. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[11]. Prefers a limestone soil, growing well on chalk, but it also succeeds in very acid soils[200]. Grows well on dry banks[200]. A very ornamental plant[1] that is fairly fast growing for a juniper[81, 185]. A tree at Westonbirt Arbore-tum was 7 metres tall after 23 years[81, 185]. This species is resistant to honey fungus[88]. Cones are rarely if ever produced in Britain, could this be due to a lack of female trees?[1] Only male trees have been seen in cultivation in Britain[185]. Seed takes 2 years to mature[200]. Dioecious. Male and female plants must be grown if seed is required.

# 7.2.97 Torreya californica

California Nutmeg

6 tlin 9 cyuc 3 koak 0 tcan 1 dwat 15 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Torreya californica is an evergreen Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in May, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH. mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[183]. The seeds are roasted and eaten[257]. They are rich in oil[105, 161]. The ovoid seed is up to 2cm long[K]. An edible oil is obtained from the seed[177, 183].

tcanta Basketry Oil WoodThe roots have been used as splints in basketry[257]. Wood - straight-grained, strong, light, soft, easily worked. Of no commercial value[229], though it is occasionally used for fence posts[82, 229].

dwatta Analgesic Diaphoretic Febrifuge Stomachic TBThe nuts have been chewed as a treatment for indigestion[257]. A decoction of the nuts has been used in the treatment of tuberculosis[257]. The crushed seeds have been rubbed on the temples in the treatment of headaches[257]. They have also been rubbed on the body to cause sweating in the treatment of chills and fevers[257].

nrakta South-western N. America - California. ksacta Rare and local along mountain streams, protected slopes, creek bottoms, and moist canyons of the Coastal Range and Sierra Nevada from sea level to 2000 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame. Some of the seed should germinate in the following spring though much of it might take another 12 months. Stored seed requires a period of cold stratification and can take 18 months or more to germinate. Prick out the seedlings into individual pots as soon as growth is observed and grow them on in light shade in the greenhouse for at least the next couple of winters, making sure to pot them on into larger pots as and when required. Plant them out into their permanent

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between -2 to  $0^{\circ}$ c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. Hardy to about -20°(2100]. A very ornamental plant[1], it is closely related to R. niveum[11, 200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees. Plants in this qenus are notably susceptible to honey funqus[200].

# 7.2.134 Rheum nobile

Sikkim Rhubarh

6 tlin 9 cvuc 3 kcak 1 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum nobile is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: StemEdible Uses: Leaf stem - raw or cooked[51, 105, 183, 272]. Pleasantly acid, this is a commonly used vegetable where it grows wild[2, 183].

tcanta An ornamental plant[1] hardy to about -15°c.

dwatta Antiemetic Astringent Carminative Depurative Diuretic LaxativeThe root is astringent, carminative, depurative, diuretic, purgative and tonic[51, 91, 240]. Small doses act as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232]. The flowering stem is used in Tibetan medicine, it is said to have a sour taste and a heating potency[241]. It is antiemetic, diuretic and laxative[241]. It is used in the treatment of swellings and fullness of the abdomen as well as to rid the body of retained fluids[241].

nrakta E. Asia - Himalayas from Nepal to S.E. Tibet. ksacta Rock ledges around 4000 metres[187]. Open slopes to 4500 metres[51].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semi-shade. Grows well in heavy clay soils. A very ornamen-

tal plant[1], it is hardy to about -15°c[200]. Plants have proved very difficult to grow in cultivation in Britain[187]. Plants in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

# 7.2.135 Brassica napus pabularia

Rape Kal

6 tlin 9 cvuc 3 kcak 0 tcan 2 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Brassica napus pabularia is a AN-NUAL/BIENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The oil contained in the seed of some varieties of this species can be rich in erucic acid which is toxic. However, modern cultivars have been selected which are almost free of erucic acid.

kcakta Edible Parts: Leaves Oil OilEdible Uses: Oil OilLeaves - raw or cooked[4, 34, 37]. Added to salads or used as a potherb[183]. Immature flowering stems - cooked in much the same way as broccoli[183]. An edible oil is obtained from the seed, it is used mainly for cooking purposes, but also for salads[4, 13, 34, 46, 183]. Some caution is advised, see the notes above on toxicity. The sprouted seed is often used as the mustard part of mustard and cress. Eaten in salads[4, 34, 37, 183]. The seed is used as a mustard flavouring[183].

tcanta Oil OilThe seed contains up to 45% of an edible semi-drying oil, it is used as a luminant, lubricant, in soap making etc[13, 21, 57, 142].

dwatta Diuretic EmollientThe root is emollient and diuretic[240]. The juice of the roots is used in the treatment of chronic coughs and bronchial catarrh[240, 269]. The seed, powdered, with salt is said to be a folk remedy for cancer[269]. Rape oil is used in massage and oil baths, it is believed to strengthen the skin and keep it cool and healthy. With camphor it is applied as a remedy for rheumatism and stiff joints[269].

nrakta Europe - Mediterranean. Naturalized in Britain[17]. ksacta Banks of streams, ditches and arable fields in Britain[17].

propta Seed - sow spring in situ.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Succeeds in any reasonable soil[52]. Prefers a heavy soil and cool moist conditions[16, 20]. Tolerates a pH in the range 4.2 to 8.3. Very young plants are susceptible to cold damage, -4°C either killing or injuring seedlings, whereas -2°C has no affect when the plants are more than one month old[269]. The rape kales have nontuberous roots. They are cultivated for their edible leaves. Plants are intolerant of root disturbance and so should not be transplanted[200]. Rape kale is 70% self-pollinating and 30% cross-pollinated. Even if wind and insects are absent, seed are still produced. Yield increases with honeybees[269]. The growth of this plant is inhibited by field mustard and hedge mustard growing nearby[18, 20]. This species is closely related to B. rapa[200].

# 7.2.136 Brassica napus

Colza, Rape

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Brassica napus is a ANNUAL/BIENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and

growth. Division is very easy and can be carried out at almost any time in the year, though winter divisions are best potted up in the greenhouse and planted out in late spring[K].

nwatta Landscape Uses: Alpine garden, Border, Massing, Rock garden, Specimen. Succeeds in ordinary garden soil in sun or partial shade[162, 187]. This species is only hardy in the southern part of Britain, tolerating temperatures down to about -15°c when dormant[187], though the young growth in spring can be damaged by late frosts. The var. I. cylindrica major. (Nees.)C.E.Hubb. is used medicinally in China[176] and as a wild food in Australia[193]. This species is quite closely related to sugar cane, it has been interbred experimentally with that species in India[193]. Plants grow away vigorously after a fire, often spreading freely to infest the burnt areas[144, 193]. Special Features: Attractive foliage, There are no flowers or blooms.

# 7.2.131 Alliaria petiolata

Garlic Mustard

6 tlin 8 cyuc 3 kcak 1 tcan 2 dwat 1 m hkuc pcimhmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Alliaria petiolata is a BIENNIAL growing to 1 m (3ft 3in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to June, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil

kcakta Edible Parts: Flowers Leaves SeedpodEdible Uses: Young leaves - raw or cooked as a potherb or as a flavouring in cooked foods[4, 5, 9, 12, 62, 115, 244]. A mild garlic and mustard flavour, the leaves are also believed to strengthen the digestive system[244]. They can be finely chopped and added to salads[7, 183]. The leaves are available very early in the year and provide a very acceptable flavouring for salads in the winter[K]. Flowers and young seed pods - raw[62]. A mild, garlic-like flavour[K].

tcanta DyeA yellow dye is obtained from the whole plant[7].

dwatta Antiasthmatic Antiscorbutic Antiseptic Deobstruent Diaphoretic Eczema Sternutatory Vermifuge VulneraryGarlic mustard has been little used in herbal medicine[268]. The leaves and stems are antiasthmatic, antiscorbutic, antiseptic, deobstruent, diaphoretic, vermifuge and vulnerary[4, 7]. The leaves have been taken internally to promote sweating and to treat bronchitis, asthma and eczema[4]. Externally, they have been used as an antiseptic poultice on ulcers etc[4], and are effective in relieving the itching caused by bites and stings[244]. The leaves and stems are harvested before the plant comes into flower and they can be dried for later use[238]. The roots are chopped up small and then heated in oil to make an ointment to rub on the chest in order to bring relief from bronchitis[245]. The juice of the plant has an inhibitory effect on Bacillus pyocyaneum and on gram-negative bacteria of the typhoidparatyphoid-enteritis group[240]. The seeds have been used as a snuff to excite sneezing[4].

nrakta Most of Europe, including Britain, south to N. Africa and east to W. Asia and the Himalayas. ksacta Damp hedgerows, edges of woods and other shady places, preferring basic soils[7, 13, 17, 244].

propta Seed - sow outdoors in situ either in spring or autumn

nwatta Prefers a damp rich alluvial soil[7, 53]. Succeeds in damp shady places where few other herbs will grow[238]. A good woodland edge plant, it also grows well in the bottom of hedgerows[24] and will self-sow freely in suitable conditions[238]. On a calm day the plant emits a strong smell of garlic. This is especially pronounced if the leaves are bruised[245]. This species is an important food source for the orange-tip butterfly[238]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for

their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

# 7.2.132 Lilium bulbiferum

Fire Lily, Orange lily

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 1.2 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lilium bulbiferum is a BULB growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked. Sweet and mealy[177], they make very fair eating and can be used as a potato substitute[2].

nrakta Eastern Central Europe. ksacta Scrub, amongst bracken and on rocky slopes[90].

propta Seed - delayed hypogeal germination[130]. Best sown as soon as ripe in a cold frame, it should germinate in spring[143]. Stored seed will require a warm/cold/warm cycle of stratification, each period being about 2 months long[163]. Grow on in cool shady conditions. Great care should be taken in pricking out the young seedlings, many people leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant. putting 2 - 3 in each pot, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulbils - gather in late summer when they start to fall off the stems and pot up immediately. Grow on in a greenhouse until large enough to go outside[163]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough to plant out[200].

nwatta Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Succeeds in ordinary garden soil[1, 143] and in calcareous soils[90, 200]. Prefers summer shade[200]. Stem rooting, the bulbs should be planted 15cm deep[43, 143, 200]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. This is one of the easiest lilies to grow[47], it is cultivated for its edible bulb in Japan[2]. The plant should be protected against slugs in early spring. If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. The typical form of this species forms bulbils on its stems[200]. The sub-species L. bulbiferum croceum does not normally produce bulbils[188].

#### 7.2.133 Ribes curvatum

Granite gooseberry

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes curvatum is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. A gooseberry with an acid flavour, it is about 7.5mm in diameter[200].

nrakta South-eastern N. America. ksacta Not known

positions in early summer when the plants are at least 20cm tall. Cuttings of half-ripe shoots in late summer[1]. Cuttings do not grow well[11]. Layering.

nwatta Succeeds in ordinary garden soil, tolerating some lime[1]. Undemanding as to the soil pH[200]. Dislikes wind exposure[200]. Requires a sheltered position and either high humidity or a moist riverside soil[200]. Tolerates woodland shade very well[200]. One report says that trees are only hardy in the milder parts of Britain[1], whilst another says that trees are hardy in Britain at least as far north as Edinburgh[200]. This species is the only member of the genus that is fully adapted to cool maritime sites. It can actually grow faster in such a position than it does in the wild[200]. Trees in general grow better in the wetter western part of Britain[81]. Usually slow growing, though trees occasionally increase by 60cm in a year[185]. The bruised leaves release a powerful resinous smell[245]. The fruits are also aromatic[245]. The seed takes two summers to mature[229]. Trees often crop well at Kew, but there were no seeds formed in 1994[K]. A tree in fairly deep shade at Kew was carrying a good crop of seeds in the summer of 1996[K]. Plants are usually dioecious, but isolated female plants have been known to bear fruit in the absence of a pollinating male[11]. Plants are sometimes monoecious with dioecious branches. Male and female plants must usually be grown if seed is required.

# 7.2.98 Sorbus devoniensis

Devon Whitebeam

6 tlin 9 cyuc 3 kcak 2 tcan 0 dwat 13 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sorbus devoniensis is a deciduous Tree growing to 13 m (42ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is usually bletted if it is going to be eaten raw[3, 5, 11]. This involves storing the fruit in a cool dry place until it is almost but not quite going rotten. At this stage the fruit has a delicious taste, somewhat like a luscious tropical fruit[K]. The fruit is up to 15mm across[200] and is produced in bunches which makes harvesting easier[K].

tcanta Attracts wildlife.

nrakta Southwestern Britain. ksacta Old woods in southwestern England[5]. Probably a hybrid species with S. torminalis in its blood[11].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. At one time the fruits of this species were collected and sold in local markets in S.W. England[11, 183]. Plants are susceptible to fireblight[188]. It is part of the aggregate species S. latifolia, it breeds true

because its seed is produced apomictically [17]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

## 7.2.99 Aesculus californica

Californian Buckeve, California Horsechestnut 6 tlin 10 cvuc 3 kcak 0 tcan 1 dwat 12 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aesculus californica is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The seed is rich in saponins. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are guite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching the seed or flour in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The flowers of this plant are toxic to bees[94].

kcakta Edible Parts: SeedEdible Uses: Seed cooked[22, 46, 63, 92, 94, 95]. It can be dried, ground into a powder and used as a gruel[2]. The seed contains about 23% protein and has an agreeable taste[213]. The seed is large, and can be up to 5cm in diameter[82]. It is often produced abundantly in the warmer areas of Britain and is easily harvested[K]. This was the most commonly used Aesculus species in N. America[213]. It does, however, contain poisonous saponins (see the notes above on toxicity) and so needs careful preparation before being eaten. The seed needs to be leached of these toxins before it becomes safe to eat - the Indians would do this by slow-roasting the nuts (which would have rendered the saponins harmless) and then cutting them into thin slices, putting them into a cloth bag and rinsing them in a stream for 2 - 5 days[213]. Most of the minerals etc would also have been leached out by this treatment[K]

tcanta Friction sticks Soap WoodThe seed is rich in saponins, these are used as a soap substitute[169]. The saponins can be easily obtained by chopping the seed into small pieces and infusing them in hot water. This water can then be used for washing the body, clothes etc. Its main drawback is a lingering odour of horse chestnuts[K]. Wood - soft, light, very close grained[82]. Of no value as a lumber[229]. The wood was used as friction sticks for making fire by the North American Indians[257].

dwatta Expectorant Odontalgic SalveThe seed contains saponins and can be used as an expectorant[94]. The crushed fruit is applied as a salve on haemorrhoids[257]. A decoction of the bark is used in the treatment of toothache and loose teeth[257].

nrakta South-western N. America - California. ksacta Moist stream borders, scrub and the edges of oak and pine woods in canyons and dry slopes below 1200 metres[71, 184,

propta Seed - best sown outdoors or in a cold frame as soon as it is ripe[11, 80]. The seed germinates almost immediately and must be given protection from severe weather[130]. The seed has a very limited viability and must not be allowed to dry out. Stored seed should be soaked for 24 hours prior to sowing and even after this may still not be viable [80, 113]. It is best to sow the seed with its 'scar' downwards[130]. If sowing the seed in a cold frame, pot up

the seedlings in early spring and plant them out into their permanent positions in the summer.

nwatta Landscape Uses:Erosion control, Specimen. Prefers a deep loamy well-drained soil but is not too fussy[11]. Requires a position in full sun[200]. Prefers dry sunny locations[126]. Although fairly hardy throughout Britain, it grows best in areas where winter temperatures do not fall below -10°c[200]. A moderately fast-growing and long-lived tree in the wild[229], in Britain it grows best in eastern and south-eastern England. Plants thrives at Kew[11]. Most members of this genus transplant easily, even when fairly large[11]. Special Features:North American native, Flowers have an unpleasant odor, Blooms are very show.

#### 7.2.100 Ouercus emoryi

Black Oak, Emory oak

6 tlin 9 cyuc 3 koak 0 tcan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus emoryi is an evergreen Tree growing to  $12\ m$  ( $39ft\ 4in$ ) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower in May, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[257]. A sweet taste[63, 85, 161], it is an important item of food for the Indians in S. Arizona and northern Mexico and is sold in the local markets there[46, 82, 85]. The seed is up to 2cm long and 1cm thick[82, 200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. If the seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute

tcanta Fodder Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - heavy, hard, strong, brittle, close grained[82]. Of little value commercially, though it is an important fuel in its native range[229].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-western N. America - W. Texas, New Mexico, Arizona and northern Mexico. ksacta Canyons, dry foothills and mountain slopes, 1350 - 2350 metres[229], growing best in sheltered valleys[82].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Fodder: Mast Management: Standard Staple Crop: Balanced carb Wild Staple CropPrefers a good deep

fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A slow-growing tree in its native range[229]. Seed production is cyclical, with a year of high production followed by a few years of low production. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 7.2.101 Vitis berlandieri

Spanish Grape

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis berlandieri is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for winter use[161, 177]. A rich pleasant flavour[2, 183]. The fruit is rather small, but it is borne in very large clusters[2]. It has a slightly bitter flavour, but is pleasant when fully ripe[200]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour Young tendrils - raw or cooked.

tcanta Dye RootstockUsed as a rootstock[183]. A yellow dye is obtained from the fresh or dried leaves[168].

nrakta Southern N. America - Texas, New Mexico, Arkansas. ksacta Woodlands[161]. Stream bottom woods[274].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth. December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This species is used in breeding programmes for improved grape cultivars[183]. It produces very large clusters of remarkably small fruits[2]. Plants in this genus are notably susceptible to honey fungus[200].

#### 7.2.102 Vitis cinerea

Spanish Grape

of thin 9 cyuc 3 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli though the taste is pleasant[K]. Flowers - raw. Added to salads[61]. The following uses are recorded for Althaea officinalis, they are said to also apply to this species[61]: Root - raw or cooked[61]. When boiled and then fried with onions it is said to make a palatable dish that is often used in times of shortage[4]. The root is used as a vegetable[62, 141, 183], it is also dried then ground into a powder, made into a paste and roasted to make the sweet 'marshmallow'[4, 5, 7, 17, 61]. The water left over from cooking any part of the plant can be used as an egg-white substitute in making meringues etc[62]. The water from the root is the most effective[183], it is concentrated by boiling until it has a similar consistency to egg white. A tea is made from the flowers[183]. A tea can also be made from the root[183].

tcanta Adhesive Fibre OilA strong fibre is obtained from the stems. It is used for making string, nets ect[74]. The following uses are recorded for Althaea officinalis, they are said to also apply to this species[61]:- A glue can be made from the root[74]. An oil from the seed is used in making paints and varnishes[74].

nrakta Europe - Italy to the Caspian sea. ksacta Seaside bogs of the Caspian littoral, along the west and south coasts[74].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Prefers a deep rich moist sandy soil in a warm sunny position[1, 200]. Plants are hardy to at least - 15°c[200].

# 7.2.129 Brassica napus arvensis

Coleseed

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Brassica napus arvensis is a ANNUAL/BIENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The oil contained in the seed of some varieties of this species can be rich in erucic acid which is toxic. However, modern cultivars have been selected which are almost free of erucic acid.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Condiment OilLeaves - raw or cooked[4, 34, 37]. Added to salads or used as a potherb[183]. Immature flowering stems - cooked in much the same way as broccoll[183]. An edible oil is obtained from the seed, it is used mainly for cooking purposes, but also for salads[4, 13, 34, 46, 183]. Some caution is advised, see the notes above on toxicity. The sprouted seed is often used as the mustard part of mustard and cress. Eaten in salads[4, 34, 37, 183]. The seed is used as a mustard flavouring[183].

tcanta Fodder Green manure OilThe seed contains up to 45% of an edible semi-drying oil, it is used as a luminant, lubricant, in soap making etc[13, 21, 57, 142]. A good green manure, the deep taproot improves drainage and loosens heavy soils[18, 20, 87].

dwatta Diuretic EmollientThe root is emollient and diuretic[240]. The juice of the roots is used in the treatment of chronic coughs and bronchial catarrh[240, 269]. The seed, powdered, with salt is said to be a folk remedy for cancer[269]. Rape oil is used in massage and oil baths, it is believed to strengthen the skin and keep it cool and healthy. With camphor it is applied as a remedy for rheumatism and stiff joints[269].

nrakta Europe - Mediterranean. Naturalized in Britain[17]. ksacta Banks of streams, ditches and arable fields in Britain[17].

propta Seed - sow in situ in early spring to mid-August for a green manure crop.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Succeeds in any reasonable soil[52]. Prefers a heavy soil and cool moist conditions[16, 201. Sunny days and cool nights are favourable for plant growth whilst dry weather at harvest time is essential[269]. Coleseed is reported to tolerate an annual precipitation of 30 to 280cm, an annual average temperature range of 5 to 27°C and a pH in the range of 4.2 to 8.2[269]. Very young plants are susceptible to cold damage, -4°C either killing or injuring seedlings, whereas -2°C has no affect when the plants are more than one month old[269]. Coleseed is the form of this species most often found either escaped or naturalized in Britain. It has a non-tuberous root and has been cultivated as a fodder crop, oil-seed crop and green manure[17]. Coleseed is 70% self-pollinating and 30% crosspollinated. Even if wind and insects are absent, seed are still produced. Yield increases with honeybees[269]. The growth of this plant is inhibited by field mustard and hedge mustard growing nearby[18, 20]. This species is closely related to B. rapa[200].

# 7.2.130 Imperata cylindrica

Cogongrass, Japanese Blood Grass 6 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Imperata cylindrica is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: SaltYoung inflorescence and young shoots - cooked[177, 179]. Root - fibrous but pleasant to chew, containing starch and sugar[144, 177, 179]. Fairly sweet, the taste is sweetest in the wet season in Australia and worst from plants growing in sand[193]. The ash of the plant is used as a salt substitute[177].

tcanta Paper Soil stabilization Stuffing Thatching WeavingThe leaves are woven to make mats, bags and raincats[46, 61, 193]. The inflorescences are valued for stuffing pillows and cushions[272]. The stems are used in thatching roofs[46, 61, 178, 272]. A fibre obtained from the leaves is used in making paper[46, 61, 154]. Can be planted on sandy soils to prevent erosion[154, 272]. The plants form impenetrably dense clumps and when planted close together in drifts make an excellent ground cover[200].

dwatta Anthelmintic Antibacterial Antivinous Astringent Cancer Diuretic Dysentery Emollient Febrifuge Restorative Sialagogue Styptic Tonic UrinaryThe flowers and the roots are antibacterial, diuretic, febrifuge, sialagogue, styptic and tonic[147, 176, 178]. The flowers are used in the treatment of haemorrhages, wounds etc[218]. They are decocted and used to treat urinary tract infections, fevers, thirst etc[147, 218]. The root is astringent, antifebrile, antivinous, diuretic, emollient, haemostatic, restorative and tonic[218, 240]. It is used in the treatment of nose bleeds, haematuria, haematemesis, oedema and jaundice[176]. The root has antibacterial action against Staphylococcus aureus, Bacillus dysenteriae etc[176]. A decoction of the root is used as an anthelmintic and also to treat digestive disorders such as indigestion, diarrhoea and dysentery[272]. The root bark is febrifuge, restorative and tonic[218]. Extracts of the plant have shown viricidal and anticancer activity[218].

nrakta E. Asia - China, Japan, Korea. ksacta Open sandy habitats, usually by a river or the sea shore in Europe[50]. Commonly found on impoverished soils in Australia[193].

propta Seed - surface sow in spring in a greenhouse. The seed germinates quickly, prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in spring as the plant comes into

flour is considered antiseptic[269].

nrakta C. Europe. Occasionally naturalized in S.W. Britain[17]. ksacta Cliffs near the sea in S. W. England[17].

propta Seed - sow in situ from early spring until late summer in order to obtain a succession of crops. The main crop for seed is sown in April

nwatta An easily grown plant, black mustard is suited to many types of soils except very heavy clays, it grows best on light sandy loams, or deep rich fertile soils[269]. Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Prefers a heavy soil in an open position[16]. Another report says that it prefers a light well-drained soil and some shade in the summer[52]. The plant tolerates an annual precipitation of 30 to 170cm, an annual average temperature range of 6 to 27°C and a pH in the range of 4.9 to 8.2[269]. Black mustard is adapted to a wide variety of climatic conditions, it is often grown in the temperate zone though it is mainly suited to tropical areas, and grown chiefly as a rainfed crop in areas of low or moderate rainfall[269]. Black mustard is often cultivated for its edible seed, though it is going out of favour because it rapidly sheds its seeds once they are ripe and this makes it harder to harvest mechanically than the less pungent brown mustard (Brassica juncea).. This is used especially as a food flavouring, though it is also sown with the seeds of garden cress (Lepidium sativum) to provide mustard and cress, a salading eaten when the seedlings are about one week old. Black mustard is also grown as a medicinal plant. It germinates freely and guickly grows rapidly and makes a very useful green manure. The plants are not very winter hardy so the seed is best sown in the spring when grown for its seed whilst it can be sown as late as late summer as a green manure crop. The flowers have a pleasing perfume, though this is only noticed if several flowers are inhaled at the same time[245].

#### 7.2.126 Mahonia confusa

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 1.5 m hkuc pcimhmim cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Mahonia confusa is an evergreen Shrub growing to 1.5 m (5ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from October to December, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. An acid but nice flavour and fairly juicy, it makes a pleasant nibble and is nice in other dishes, especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit ripens in early to mid spring, a time when little other fresh fruit is available in the garden[K].

dwatta Cancer Dysentery Febrifuge OdontalgicThe leaf is used in the treatment of cancer[218]. A decoction of the root is febrifuge and odontalgic[218]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213]

nrakta E. Asia - Western China in Guizhou, Hubei and Sichuan provinces. ksacta Wet shady ravines and woods[260].

propta Seed - best sown as soon as it is ripe in a greenhouse[78]. It usually germinates in the spring[K], 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick

out the seedlings when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider giving them some protection from the cold for their next winter. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown shrub, it thrives in any good garden soil[11] including heavy clays. Prefers a semishaded woodland position in a damp, slightly acid to neutral humus-rich soil[200]. Plants can tolerate temperatures down to about -10°c[260]. Only introduced to Britain in 1980, the plant is growing so well here that within six years it was being distributed commercially from home-produced seedlings[11]. The young growth in spring can be damaged by late frosts. Plants are very tolerant of pruning and can be cut right back into old wood if they have outgrown their welcome[182]. Closely related to M. fortunei[11]. It hybridizes freely with other members of this genus. The flowers are very sweetly scented[184].

#### 7.2.127 Aster scaber

6 tlin 9 cyuc 3 kcak 2 tcan 0 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aster scaber is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young plant[105, 177]. Frequently used in Korean cuisine and called chamchwi or chwinamul. The leaves are stir-fried or blanched. Used in namul - A Korean herbal side dish. Used as a flavoring herb in kimchi or rice.

tcanta Attracts wildlife. A good food forest plant for moist soil and sunny conditions.

nrakta E. Asia - China, Japan ksacta Woods and thickets in hills and low mountains all over Japan[58]. Clearings in forest in warm temperate areas[275].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whist smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

#### 7.2.128 Kosteletzkya pentacarpos

6 tlin 9 cvuc 3 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Kosteletzkya pentacarpos is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Oil RootEdible Uses: Egg Oil TeaLeaves - raw or cooked[2, 4, 100]. They are used as a potherb or to thicken soups[62, 183]. The leaves can be eaten raw but are rather fibrous and somewhat hairy,

drutta Vitis cinerea is a deciduous Climber growing to of many hawthorns are well-known in herbal folk medicine 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit Leaves SapEdible Uses: Fruit - raw or dried for winter use[161, 177]. A rich pleasant flavour[2, 183]. The fruit is rather small, but it is borne in very large clusters[2]. It has a slightly bitter flavour, but is pleasant when fully ripe[200]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta DveUsed as a rootstock[183]. A vellow dve is obtained from the fresh or dried leaves[168].

nrakta Southern N. America - Texas, New Mexico, Arkansas. ksacta Woodlands[161]. Stream bottom woods[274].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Lavering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. This species is used in breeding programmes for improved grape cultivars[183]. It produces very large clusters of remarkably small fruits[2]. Plants in this genus are notably susceptible to honey funaus[200].

# 7.2.103 Crataegus pubescens

Manzanilla

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crataegus pubescens is a deciduous Tree growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177, 200]. A mealy texture, it is often used in preserves[183]. For stewing, they are first boiled with wood ashes to remove the skin, then boiled in hot syrup with red colouring for a short time and hung on nails stuck into poles, much like candied apples[183]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]

nrakta Southern N. America - Mexico. ksacta Not known propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year. planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit. they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open. the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11].

# 7.2.104 Actinidia callosa

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia callosa is a deciduous Climber growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[272]. A very delicate flavour[2, 51, 105, 146, 177]. An acid flavour[183]. The fruit can be dried[183]. The fruits are grayish-green when fully ripe and 18 - 50mm long[266]. They contain a number of small seeds, but these are easily eaten with the fruit[K]

tcanta WoodThe wood is porous[146].

nrakta E. Asia - Himalayas to W. China. ksacta Forests and shrubberies to 3000 metres in the Himalayas[51, 198]. Forests, thickets, forest margins, valleys, slopes, streamsides and moist places at elevations of 400 - 2600 metres in China[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood, October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200], Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. Plants are not fully hardy in much of Britain[219]. Young spring growth is susceptible to frost damage[160]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. This is a climbing plant, supporting itself by twining around branches etc[200]. A very ornamental plant[146], there are some named varieties developed for their edible fruit[183]. A polymorphic species, there are a number of sub-species[198]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required

# 7.2.105 Crataegus aestivalis

Eastern Mayhaw, May hawthorn, Mayhaw, Apple Hawthorn 6 tlin 11 cyuc 3 kcak 5 tcan 2 dwat 9 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Crataegus aestivalis is a deciduous Shrub growing to 9 m (29ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[160]. Juicy and acid with a pleasant flavour[2]. It is up to 2cm in diameter[227]. The fruit is frequently used and much prized in parts of southern N. America where it is often gathered in quantity from the wild. Its acid flavour makes it a favourite for preserves and jellies[82, 183, 227]. The fruit can also be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Shelterbelt Soil stabilization WoodBecause it tolerates a wide variety of sites, this species can be used to stabilize banks, for shelterbelts, and to give protection from wind and water erosion[277]. Wood - heavy, hard and strong, but not large enough for commercial use[227]. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or a tincture[222]

nrakta South-eastern N. America - North Carolina to Mississippi. ksacta Found on the outer coastal plain in seasonally flooded depressions, in floodplains or in uplands. It is commonly found in river swamps, pond areas, and along stream banks[277].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta Landscape Uses:Border, Espalier, Pollard, Specimen, Street tree. A very easily grown plant, it prefers a well-drained moisture retentive loamy soil but is not at all fussy[11, 200, 277]. Once established, it succeeds in excessively moist soils and also tolerates drought[200, 277]. It grows well on a chalk soil and also in heavy clay soils[200]. It thrives in acid soils[160]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. It succeeds well in exposed positions and tolerates atmospheric pollution[200, 277]. A very hardy species, tolerating temperatures down to about -30°c[160]. This species is closely related to C. opaca and is included in that species by some botanists. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. Occasionally cultivated for its fruit in America, there are some named varieties[183]. Special Features:North American native, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

# 7.2.106 Ouercus phillyreoides

Black ridge oak,

6 tlin 9 cvuc 3 kcak 2 tcan 2 dwat 9 m hkuc

hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus phillyreoides is an evergreen Shrub growing to 9 m (29ft 6in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[105]. Up to 2cm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method

seldom seen in cultivation, having been replaced with its hybrid progeny[182]. There are some named forms, selected for their ornamental value[11]. Plants can be pruned back quite severely, they resprout well from the base[200]. This species is notably resistant to honey fungus[200]. Heat Zone

# 7.2.124 Asparagus cochinchinensis

Chinese Asparagus 6 tlin 9 cyuc 3 kcak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Asparagus cochinchinensis is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June, and the seeds ripen in September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit RootEdible Uses: Tubers cooked[1, 61, 177]. The tubers are up to 5cm long and 2m wide[266]. They are washed to remove the bitterness, the fibrous core is removed and the root is then boiled[46, 179]. It tastes like asparagus[22]. Another report says that the tubers are eaten after preserving in sugar[183]. The fruit is said to be edible[183]. The fruit is about 6 - 8mm in diameter[200]. Another report says that the berries are harmful if eaten[238].

tcanta InsecticideKills the larvae of flies and mosquitoes[176]. No more details.

dwatta Antibacterial Antiinflammatory Antipyretic Antiseptic Antitussive Cancer Diuretic Expectorant Infertility Nervine Sialagogue Stomachic TonicThis species has been used in traditional Chinese medicine for over 2,000 years[238]. The roots contain asparagine, mucilage, starch and sugars[283]. The dried root is antibacterial, antiinflammatory, antipyretic, antiseptic, antitussive, diuretic, expectorant, nervine, sialagogue, stomachic, nervous stimulant and tonic[176, 178, 218, 238, 279]. It is taken internally in the treatment of fevers, debility, sore throats, coughs etc[238]. It is often decocted with other herbs and used in the treatment of a wide range of ailments including diabetes mellitus[218]. It is commonly used in restorative recipes together with Rehmannia glutinosa and Codonopsis javanica[283]. Prolonged usage is recommended for the treatment of impotence[218]. The root is harvested when the plant is dormant and is dried for later use[238]. The plant has a folk history for the treatment of cancer, modern research has detected antitumour activity and it is now being studied for the treatment of lung cancer[218].

nrakta E. Asia - China, Japan, Korea. ksacta Near seashores all over Japan[58]. Thinly forested slopes, roadsides and waste fields from near sea level to 1700 metres in China[266]

propta Seed - pre-soak for 12 hours in warm water and then sow in spring or as soon as the seed is ripe in early autumn in a greenhouse. It usually germinates in 3 - 6 weeks at 25°c[134]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a sunny position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Division in early spring as the plant comes into

nwatta Easily grown in any good garden soil[200]. Prefers a rich light well-drained sandy loam in a sunny position[238]. Plants are almost hardy in Britain according to one report[1], whilst others say that the plants tolerate temperatures down to between -10 and -15°c[200, 238]. Dioecious. Male and female plants must be grown if seed is required.

# 7.2.125 Brassica nigra

Black Mustard

6 tlin 9 cyuc 3 kcak 2 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Brassica nigra is a ANNUAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid. neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

pcista When eaten in large quantities, the seed and pods have sometimes proved toxic to grazing animals[85]. Mustard allergy possibly especially in children and adolescents. Retention of seeds possibly in intestines if taken internally

kcakta Edible Parts: Leaves Oil Oil Seed StemEdible Uses: Oil OilLeaves - raw or cooked[2, 85, 100]. A hot flavour, they can be finely chopped and added to salads or cooked as a potherb[183]. The seedlings can also be used as a salading when about one week old, adding a hot pungency to a salad[2, 27, 183, K]. Immature flowering stems cooked and eaten like broccoli[183]. Mustard seed is commonly ground into a powder and used as a food flavouring and relish[4, 5, 17, 27, 34]. This is the black mustard of commerce, it is widely used as a food relish and as an ingredient of curry[183]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238]. The seed can also be used whole to season pickles, curries, sauerkraut etc[183, 238]. Black mustard has a stronger more pungent flavour than white mustard (Sinapis alba) and brown mustard (B. juncea)[238]. An edible oil is obtained from the seed[2, 21, 171].

tcanta Green manure Oil Oil RepellentA semi-drying oil is obtained from the seed, as well as being edible it is also used as a lubricant, illuminant and in making soap[17, 21, 46, 1001. The plant is often grown as a green manure, it is very fast, producing a bulk suitable for digging into the soil in about 8 weeks[100]. Not very winter hardy, it is generally used in spring and summer. It does harbour the pests and diseases of the cabbage family so is probably best avoided where these plants are grown in a short rotation and especially if club root is a problem. Mustard oil (allyl isothiocyanate) is used in commercial cat and dog repellent mixtures[269].

dwatta Antirheumatic Appetizer Digestive Digretic Emetic Epilepsy Rubefacient StimulantMustard seed is often used in herbal medicine, especially as a rubefacient poultice[4]. The seed is ground and made into a paste then applied to the skin[4, 21, 46, 213] in the treatment of rheumatism, as a means of reducing congestion in internal organs[4, 222]. Applied externally, mustard relieves congestion by drawing the blood to the surface as in head afflictions, neuralgia and spasms. Hot water poured on bruised seeds makes a stimulant foot bath, good for colds and headaches. Old herbals suggested mustard for treating alopecia, epilepsy, snakebite, and toothache[269]. Care must be taken not to overdo it, since poultices can sometimes cause quite severe irritation to the skin[K]. The seed is also used internally, when it is appetizer, digestive, diuretic, emetic and tonic[4, 21, 46]. Swallowed whole when mixed with molasses, it acts as a laxative[213]. A decoction of the seeds is used in the treatment of indurations of the liver and spleen. It is also used to treat carcinoma, throat tumours, and imposthumes[269]. A liquid prepared from the seed, when gargled, is said to help tumours of the "sinax," [269]. The seed is eaten as a tonic and appetite stimulant[4, 21, 46, 222]. Hot water poured onto bruised mustard seeds makes a stimulating foot bath and can also be used as an inhaler where it acts to throw off a cold or dispel a headache[4]. Mustard Oil is said to stimulate hair growth. Mustard is also recommended as an aperient ingredient of tea, useful in hiccup. Mustard

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[K]. We have seen no reports of edibility, but the bulb is certainly not poisonous and has a pleasant mild onion flavour[K]. The fairly large bulbs are 4 - 6cm in diameter[200]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta E. Asia - Afghanistan to Pakistan and north into Russia, ksacta Not known

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Landscape Uses: Container, Foundation, Massing, Rock garden, Specimen. Prefers a hot, sunny position in a light well-drained soil[1], it grows well in the light shade of thinly-clad shrubs that also like hot dry conditions[200]. The bulbs tend to rot when grown in cool wet climates, even if they are given sharp drainage[203]. One report says that this species is only hardy to zone 8, which only covers the mildest areas of Britain[200], whilst another says that it is much hardier and will succeed in zone 4[203]. It is being grown successfully about 60 kilometres west of London, and so should be hardy at least in the south of Britain[242]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for cut flowers. Suitable for dried flowers.

# 7.2.122 Crambe orientalis

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Crambe orientalis is a PERENNIAL growing to 1.2 m (4ft) by 1.2 m (4ft in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Root StemEdible Uses: CondimentLeaves - cooked. Immature flowering stems - raw or cooked and used like broccoli[2, 74, 105, 183]. Root - cooked. It is very thick and can be used as a horseradish substitute[2, 105, 183].

nrakta Europe - E. Mediterranean to W. Asia - Iran. ksacta Fields, hills, dry slopes, rocky places and clay soils[74]. propta Seed - sow March/April in a seedbed outdoors and either thin the plants out or move them to their permanent positions when about 10cm tall[11]. The young plants are very attractive to slugs so some protection will often be

needed. Germination can be slow so it is best to sow the seed in pots in a cold frame[164]. Germination usually take place in  $3 \cdot 26$  weeks at  $15^{\circ} (164)$ . Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions when they are at least  $10 {\rm cm}$  tall. Division in spring or autumn[1, 111]. Dig up the root clump and cut off as many sections as you require, making sure they all have at least one growing point. The larger of these divisions can be planted out straight into their permanent positions, though small ones are best potted up and grown on in a cold frame until they are established. Root cuttings,  $3 \cdot 10$  cm long, in spring[104]. These can be planted straight into the open ground or you can pot them up in the greenhouse and plant them out once they are growing strongly.

nwatta An easily grown species, succeeding in a good loam and an open sunny position[1]. Prefers a slightly alkaline soil in a position sheltered from strong winds[200]. Tolerates poor soil and some shade[200]. Dislikes acid soils[1]. Prefers a rather dry soil[187]. Plants are hardy to about - 20°c[187]. A deep-rooted plant[233], it dislikes root disturbance[164].

# 7.2.123 Berberis wilsoniae

Wilson barberry

6 tlin 9 cyuc 3 ǩcak 1 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis wilsoniae is an evergreen Shrub growing to 1 m (3ft 3in) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit raw or cooked. Very acid with a lemon-like flavour, it goes very well in a muesli[K]. Children and some adults like it raw, at least in small quantities, though most adults prefer to cook it and use it in pies, preserves etc[K]. The fruits are about 6mm lengt[200]

tcanta DyePlants can be grown as a tall ground cover when planted about 60cm apart each way[208]. A yellow dye is obtained from the root. A shrub for thorny barriers to deter unwanted visitors. Berries loved by birds.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - W. China. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Deciduous to semi-evergreen. Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[11, 200]. Hybridizes freely with other members of this genus, especially the closely related B. aggregata[11, 200]. The true species is

was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent TanninA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan. ksacta Thickets and open woods near seashores in C. and S. Japan[58].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure[166], surviving well but being somewhat stunted[200]. Rarely fruits well in Britain[11]. Trees at Kew in the hot summer of 1989 carried large crops of seed[K]. The seed takes 2 years to ripen[200]. A very ornamental plant[1]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 7.2.107 Crataegus pubescens stipulacea

Manzanilla

falianna 6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 9 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikkwisslip hpa7tmwatli xre7t hjonli

drutta Crataegus pubescens stipulacea is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 46, 177, 181]. The yellow fruit can be up to 20mm in diameter, it is mealy and juicy with a slightly apple-like flavour[3, K]. It is used in jellies, jams and preserves etc and can be dried for later use. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta Wood - heavy, hard, tough, close-grained. Useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it

to be efficacious[222]. It is normally used either as a tea or a tincture[222].

nrakta South-western N. America - Mexico. ksacta Clearings of pine - oak woodlands in Mexico[181].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate [78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more than two years.

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. Plants grow best in areas with dry climates[3]. They grow well on a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and quality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year [K]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open. the flowers have more pleasant scent with balsamic undertones[245]. Seedlings should not be left in a seedbed for more than 2 years without being transplanted[11]. At one time this species was much cultivated for its edible fruit in Mexico but it has now fallen into virtual disuse[3]. Plants often retain their leaves until the New Year[11].

# 7.2.108 Quercus oblongifolia

Mexican Blue Oak

6 tlin 9 cyuc 3 kcak 2 tcan 2 dwat 8 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Quercus oblongifolia is an evergreen Shrub growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May, and the seeds ripen all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[161, 181]. A staple food for some native North American Indian tribes[257]. Very sweet[177, 200], it is up to 2cm long and 8mm wide[82, 200]. The seed can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. If any seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of

preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - very heavy, hard, strong, brittle[82]. It is sometimes used as a fuel[82].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-western N. America - Texas. New Mexico. Arizona, Mexico. ksacta A common tree of open oak woodlands in foothills, mountain slopes and in canyons, 1500 -2000 metres[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 7.2.109 Phyllostachys praecox

6 tlin 10 cvuc 3 kcak 3 tcan 0 dwat 6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phyllostachys praecox is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked. A delicious flavour[266]. This is one of the first species to be ready to eat in the spring, the young shoots are usually boiled in at least one change of water. The shoots, which are 4 - 6cm in diameter[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta A recommended species for producing canes. Agroforestry Uses: This is a good companion species to grow in a woodland because the plants have shallow root systems that do not compete with deep tree roots[195].

nrakta E. Asia - China in Jiangsu and Zhejiang, ksacta

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open

ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Cultivated in the warm temperate and subtropical regions of southern China. In cultivation outside of China it has withstood temperatures down as low as -15°c for short periods. Succeeds in full sun and in partial shade. Species in this genus generally tolerate a wide range of soils and sites. though they prefer a damp humus-rich soil in sun or semishade[1

11

. 200

]. They grow best in a position sheltered from cold winds[11

]. Plants are generally not very tolerant of dry conditions[1

]. Bamboos have an interesting method of growth. Each plant produces a number of new stems annually - these stems grow to their maximum height in their first year of growth. subsequent growth in the stem being limited to the production of new side branches and leaves. In the case of some mature tropical species the new stem could be as much as 30 metres tall, with daily increases in height of 30cm or more during their peak growth time. This makes them some of the fastest-growing species in the world[K

]. Bamboos in general are usually monocarpic, living for many years before flowering, then flowering and seeding profusely for a period of 1 - 3 years before usually dying. This pattern can vary - sometimes flowering is sporadic, with plants flowering annually and not dying; at other times it is gregarious with all the plants in a specific species coming into flower at the same time. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

#### 7.2.110 Arundo donax

Giant Reed, Giant Reed Grass 6 tlin 10 cyuc 3 kcak 4 tcan 2 dwat 6 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Arundo donax is a PERENNIAL growing to 6 m (19ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Leaves RootEdible Uses: Rhizome - raw or cooked[84]. The rhizome can be dried and ground into a powder to make bread, usually in conjunction with cereal flours[7, K]. It can also be roasted or boiled[84]. Leaves - cooked as a potherb[84]. They are very bitter[177]. The young shoots are used[177].

tcanta Basketry Biomass Broom Dye Fodder Hedge Hedge Musical Paper Pipes Plant support Shelterbelt Soil stabilization Thatching WeavingBrooms are made from the terminal panicles[7]. Plants are grown alongside irrigation canals to check soil erosion[169]. The plant can be grown as a windbreak screen[1, 169]. If cut down, the culms branch and in this form the plants can be used as a hedge[236]. The leaves can be woven into mats etc, whilst the split and flattened stems are used to make screens, walls of houses etc[46, 61. 841. A vellow dve is obtained from the pollen[257]. The stems of the plant have a multitude of applications. They are used as plant supports for vines and other climbing plants[7, 169, 269] and to make clarinets, bag-pipes etc[46,

propta Seed - sow early spring or autumn in situ. Ger- 7.2.120 Viburnum grandiflorum mination usually takes place within 2 - 8 weeks at 20°c.

nwatta An easily grown plant, succeeding in any ordinary garden soil in a sunny position[200]. A monocarpic species, it grows for a number of years without flowering but then dies after flowering[60].

# 7.2.119 Mahonia trifoliolata

Mexican Barberry, Algerita 6 tlin 9 cyuc 3 kcak 4 tcan 2 dwat 2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia trifoliolata is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw or cooked[2, 3, 85]. An acid flavour but nice, especially when added to porridges or muesli[K]. A subtle tart flavour, it is pleasant to eat raw[183]. Unfortunately there is relatively little flesh and a lot of seeds[K]. The fruit is also used to make preserves[149, 183]. The roasted seed is a coffee substitute[149].

tcanta Dye Hedge Hedge Ink TanninA yellow dye is obtained from the inner bark of the stem and roots[46, 61, 149, 181]. It is green according to another report[168]. An ink is made from the wood[46, 61]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dve is obtained from the leaves[168]. Makes a good hedge[149]. The wood is a source of tannin[46].

dwatta Antibacterial Antitumor Dysentery TonicBerberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[181, 213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine 218. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta South-western N. America - Texas, Arizona, Mexico. ksacta Dry calcareous soils[67]. Slopes and flats in grassland, shrubland, and sometimes open woodland at elevations of 0 - 2000 metres[270].

propta Seed - best sown as soon as it is ripe in a greenhouse[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider giving them some protection from the cold for their next winter. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Unlike most members of the genus, this species requires a dry, perfectly drained position in full sun, a gritty slightly acid soil is best[200]. It does well in a hot, dry position[167]. Succeeds in a good garden soil[11]. The form in general cultivation in Britain (M. trifoliolata glauca. I.M.Johnst.) comes from the southern part of its range[67], it is only hardy on a sunny wall in this country or as a freestanding shrub in the very mildest areas[3, 11]. The young growth in spring can be damaged by late frosts. A good bee plant[149]. Resistant to honey fungus[88].

Cranberry bush.

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum grandiflorum is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from January to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[11, 51, 105, 272]. A sweet flavour[K]. The ovoid fruit is about 20mm long and contains a single large seed[200].

nrakta E. Asia - China, Himalayas. ksacta Open forests and shrubberies, often forming dense scrub, 2700 - 3600 metres in the Himalayas[51, 184].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood. 5 - 8 cm long with a heel if possible, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semishade[11, 200]. Best if given shade from the early morning sun in spring[200]. Requires shelter from north and east winds[200]. A very ornamental plant[1], the deliciously scented flowers are produced in the winter and the flowers are said to withstand temperatures down to -12°c without damage[11, 200]. However fruit is not often produced in this country[K]. This may be due to the plant being selfincompatible and so growing 2 or more different cultivars together may improve fruit set[11, 200]. Hand pollination may also be beneficial as well as siting the plants so that they get the maximum of protection from severe winter weather[K]. A position against an east-facing wall or on the edge of a woodland, would be ideal for this[K]. Closely allied to V. farreri. The very closely related species V. foetens, which is often included as part of this genus, has a more westerly range. shorter stems and white flowers

# 7.2.121 Allium giganteum

Giant Onion, Ornamental Onion

6 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 2 m hkuc

htut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium giganteum is a BULB growing to 2 m (6ft) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

to die[122]. Closely related to P. gramineus[1]. This species is cultivated for its edible shoots in China[195]. The rootstock is running and invasive[25]. New shoots are produced from April[25].

# 7.2.116 Ipomoea pandurata

Wild Potato Vine, Man of the earth 6 tlin 9 cyuc 3 kcak 2 tcan 2 dwat 3.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ipomoea pandurata is a PERENNIAL CLIMBER growing to 3.5 m (11ft 6in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There is a report that the root could be poisonous [274].

kcakta Edible Parts: RootEdible Uses: Root -cooked[85]. The young ones are best[62], they become very acrid as they get old[4]. The roots can be up to  $75 \mathrm{cm}$  long and  $12 \mathrm{cm}$  in diameter[4, 207] and can weigh  $7 \mathrm{kilos}[207]$ . Roots weighing  $10 \mathrm{kilos}$  or more are not unknown[274]. They are best if given a long roasting[95]. Roasted roots taste like sweet potato but with some bitterness[207].

tcanta RepellentAn infusion of the plant has been used for soaking sweet potatoes in order to keep away bugs and moles[257].

dwatta Cathartic Diuretic Expectorant4 poultice of the root is applied to aching joints in the treatment of rheumatism[222, 257]. A tea made from the dried root is diuretic, expectorant and laxative[4, 222, 257]. It has been used in the treatment of strangury and calculus diseases, abdominal pains set[257]. It also slightly influences the lungs, liver and kidneys without excessive diuresis or catharsis[4, 257]. Caution should be employed because the plant can be strongly laxative[21].

nrakta Eastern N. America - Connecticut to Florida, west to Texas, Kansas and Michigan. ksacta Fields, hedgerows and roadsides in dry open or partially shaded areas[43, 62].

propta Pre-soak the seed for 12 hours in warm water, or scarify the seed, and sow in individual pots in a greenhouse in early spring. The seed usually germinates in 1 - 3 weeks at 22°c. Plants are extremely resentful of root disturbance, even when they are quite small, and should be potted up almost as soon as they germinate[219]. Grow them on in the greenhouse for at least their first winter then plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of side shoots in a peaty soil. Lavering.

nwatta Requires a rich well-drained loam in a warm sunny position[200]. The hardiest member of the genus, it tolerates frozen soil and should survive winter temperatures down to at least -10°c[260]. A climbing plant, supporting itself by twining around the branches of other plants[219]. A very ornamental plant[1]. This species has become a trouble-some weed in many warm countries and is difficult to eradicate because of its deep root[219]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is a tap root similar to a carrot going directly down [1-2]. The root pattern is tuberous with swollen potato-like roots [1-2].

# 7.2.117 Calvcanthus occidentalis

Californian Allspice, Western sweetshrub 6 tlin 9 cyuc 3 kcak 2 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Calycanthus occidentalis is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to September, and the seeds ripen from October to November.

The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Calycanthus contains calycanthine, an alkaloid similar to strychnine, and it is toxic to humans and live-stock[270].

kcakta Edible Parts: Edible Uses: CondimentThe aromatic bark is dried and used as a substitute for cinnamon and all spice[11, 105]. Some caution is advised, see reports above on toxicity[270].

tcanta Basketry DyeA light brown dye is obtained from the flowers[168]. The wood and the bark from fresh shoots has been used in basket making[257].

dwatta Expectorant StomachicThe bark is expectorant[257]. A decoction of the fresh or dried bark has been used in the treatment of sore throats, severe colds and stomach disorders[257].

nrakta South-western N. America - California. ksacta Banks of streams, ponds and other wet places below 1200 metres[11, 184].

propta Seed - best sown in a cold frame as soon as it is ripe. If the seed is harvested 'green' (as soon as it has fully developed but before it has dried on the plant) and sown immediately it can germinate in 3 weeks[113]. Dried seed germinates in 1 - 6 months at 15°c[138]. Stored seed requires between 3 weeks and 3 months cold stratification before sowing in the spring. When large enough to handle, prick out the seedlings into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. They can be difficult[113]. Layering in spring. Sever the new plants in a wet spell of weather about 15 months later and then lift them in the autumn[78]. High percentage [78]. Division of suckers in early spring [11]. Very easy, they can be planted straight out into their permanent positions if required.

nwatta Prefers a light loamy soil that is deep and moist but succeeds in most fertile soils if they are not shallow[11, 182]. Requires a well-drained soil[188]. Prefers a sunny position but it tolerates shade when grown in warm temperate zones[11, 200]. Requires a sheltered position, protected from cold winds[245]. Plants are hardy to about -15°c[184]. The leaves and the flowers are very aromatic according to one report[188], whilst another says that the leaves and wood are pleasantly aromatic, whilst the flowers have no scent[245]. Plants in this genus are notably resistant to honey fungus[200].

#### 7.2.118 Cirsium edule

Edible Thistle

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cirsium edule is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies), beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Oil Root StemEdible Uses: OilRoot -cooked[95, 105, 161, 257]. The root is likely to be rich in inulin, a starch that cannot be digested by humans. This starch thus passes straight through the digestive system and, in some people, ferments to produce flatulence[K]. Young stems -peeled and eaten raw[46, 61, 95, 105]. Soft and sweet[161], they are considered to be a luxury food[257]. Young shoots raw or cooked as greens[257]. Harvested in spring[257].

tcanta OilThe seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K].

nrakta Western N. America - southwards from Canada. ksacta Wet meadows and open woods in mountains[60].

61, 103]. They are also used as pipe stems[84], for roofing[46], to make screens, walking sticks and in basketry[100, 195]. They are used to make the reeds of clarinets and organ pipes[236]. The stems can be harvested as desired at any time of the year[269]. The fibre from the stems can be used to make a good quality paper[269]. This plant is currently (1995) under investigation at Rosewarne in Cornwall as a potential commercial paper crop for small-scale industries in SW. England[K]. Because of rather high yields from natural stands, the plant has been suggested as a source of biomass for energy production[7, 269]. Dry cane yields of ca 10, 15, and 20 tonnes per hectare were reported respectively from infertile, partly fertile and fertile soils[269]. According to the phytomass files annual productivity ranges from 10 to 59 tonnes per hectare, the latter figure from Westlake's (1963) estimate of 57 - 59 tonnes[269]. In addendum, Westlake cites evidence that Arundo donax can produce 40-75 MT/ha/yr. in warm temperate and tropical regions. Early vegetative growth has ME (metabolizable energy) of 2.22 megacalories/kg DM, while hay has an ME of only 1.37 (Gohl, 1981). Such annual productivity, if sustainable, makes this a notable energy candidate, especially when one considers the energy as a by-product, with leaf protein and potential pharmaceutical as primary products[269]. A particular type of cellulose is obtained from the plant[7]. In Italy, the plant is used in the manufacture of rayon[269]. Bio-fuel crop.

dwatta Diaphoretic Diuretic Emollient Galactofuge HypotensiveThe root is diaphoretic, diuretic, emollient and galactofuge[7]. An infusion is said to stimulate menstrual discharge and diminish milk flow[240, 272]. A paste of the root is applied to the forehead to treat headaches[272]. Isolated alkaloids have been experimentally shown to raise the blood pressure and contract the intestine and uterus[240]. The rhizome or rootstock is used in the treatment of dropsy. Boiled in wine with honey, the root or rhizome has been used for treating cancer[269]. The plant contains the alkaloid gramine. This is said to be a vasopressor, raising the blood pressure in dogs after small doses, causing a fall in larger doses[269]. The stems have been used as splints for broken limbs[2571].

nrakta S. Europe ksacta Ditches, riversides and marshland[7, 200].

propta Seed - surface sow in a greenhouse in February to April. Stand the pots in about 3cm of water to keep the soil moist until the seed germinates. It usually germinates in 1 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Once they are 20cm or more tall, plant them out into their permanent positions in late spring or early summer. Division in springf 1]. Whilst large divisions can be planted out direct into their permanent positions, we have found that it is best to pot the divisions up and keep them in light shade in a greenhouse until they are rooting away well. Stem cuttings, placed in water, root easily[1].

Hay Minor Global CropLandscape Uses:Container, Screen, Specimen, Winter interest. Prefers a moist fertile soil in a sunny sheltered position, preferably by water[1, 134, 200]. Tolerates a pH in the range 5.5 to 8.3. Plants can be grown as a specimen in lawns etc, succeeding in quite coarse grass[233]. Plants are succeeding in a site that is very exposed to maritime winds at Rosewarne in Cornwall[K]. Adapted to tropical, subtropical and warm temperate climates of the World. Giant reed is often found on sand dunes near seashores. It tolerates some salt. It grows best along river banks and in other wet places, and is best developed in poor sandy soil and in sunny situations. Said to tolerate all types of soils, from heavy clays to loose sands and gravelly soils. Ranging from Cool Temperate Wet through Tropical Dry to Wet Forest Life Zones, giant reed is reported to tolerate annual precipitation of 30 to 400cm, an average annual temperature range of 9 to 28.5°C and a pH in the range of 5.0 to 8.7[269]. One report says that this plant is only hardy in the milder areas of Britain[1] whilst another report says that it is hardy to between -5 and -10°c[200]. This contradicts with the hardiness zone rating of 6 which would make the plant hardy in most areas of Britain[200]. Plants thrive outdoors at Oxford Botanical Gardens[233] as well as at Hilliers Arboretum in Hampshire and the RHS Gardens in Surrey[K]. Extensively cultivated in S. Europe for basket making etc[50]. Plants rarely if ever flower in British gar-

dens233]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attracts birds, Attractive foliage, Not North American native, Naturalizing, Wetlands plant, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms.

# 7.2.111 Prunus lusitanica

Portugal Laurel

6 tlin 9 cyuc 3 kcak 5 tcan 1 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Prunus lusitanica is an evergreen Shrub growing to 6 m (19ft) by 6 m (19ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: Fruit SeedEdible Uses: The fruit is probably edible when fully ripe but should not be eaten if it is bitter because this bitterness is caused by the presence of toxic compounds, see the notes above on toxicity[K]. The fruit is about 8mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bittersee the notes above on toxicity.

tcanta Dye Hedge HedgeA very good plant for a low windbreak[184]. It is also used as a medium to tall hedge and for topiary[29, 182, 200]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

t easily[1].

nrakta W. Europe - S.W. France, Spain and Portugal. Ocnwatta Fodder: Bank Industrial Crop: Biomass Managemensionally naturalized in Britain[17]. ksacta Forests in the Minor Global Cropl and Scape Uses: Container Screen mountains of the Iberian peninsula.

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Cuttings of mature wood, October in a sheltered north facing border outdoors[113]. Layering in spring.

nwatta Succeeds on all soil types[28], though it prefers a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Thrives on chalk according to other reports[98, 182, 200]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. Hardy to about -20°c[184]. A very ornamental plant[1], there are some named varieties selected for their ornamental value[182]. Grows well in a woodland[28]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants are susceptible to silver leaf disease[11]. Plants in this genus are notably susceptible to honey fungus[200]. The flowers are pleasantly

scented[182]. Any trimming is best done with secateurs in August[182]. Plants are very tolerant of pruning. used to make a refreshing drink[61, 183]. The freshly picked fruit yields little juice but if stored for 2 weeks it will yield

# 7.2.112 Broussonetia kazinoki

Voze

6 tlin 9 cyuc 3 kcak 0 tcan 1 dwat 4.5 m hkuc

httt cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyat hjonli

drutta Broussonetia kazinoki is a deciduous Tree growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in August, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. It can tolerate atmospheric pollution

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Fruit - raw[105, 177]. A sweet taste[4]. The fruit comprises a ball about 1cm in diameter with small edible fruits protruding - there is not much edible flesh but it has a lovely flavour[K]. Prolonged ingestion of the fruit is said to weaken the bones[179]. Leaves - cooked and used as a vegetable[105, 177, 183]. Flowers[105, 177, 183]. No more details

tcanta FibreA fibre from the bark is used in making paper, cloth, rope etc[46, 61]. It is inferior to B. papyrifera[4]. dwatta TonicThe fruit is used as a tonic to increase vision and sexual potency[218].

nrakta E. Asia - C. and S. Japan, Korea. ksacta Forest margins, low mountains and near houses[266].

propta Seed - no pre-treatment is required. Sown in the autumn or spring in a greenhouse, germination usually takes place within 1 - 3 months at 15°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8 - 12cm long with a heal July/August in a frame. High percentage[11, 78]. Cuttings of mature wood of the current season's growth, November in a frame[200]. Root cuttings in winter[200]. Layering in spring[200].

watta Easily cultivated in a warm sunny position in any soil of reasonable quality[1, 11], thriving on poor sandor gravelly soils[200]. Tolerates atmospheric pollution[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Often cultivated in Japan for the fibre in its bark, the tree is coppiced annually for this purpose[4, 58]. Some plants are monoecious whilst others are dioecious. Male and female plants must usually be grown if seed is required[200].

# 7.2.113 Poncirus trifoliata

Bitter Orange, Hardy orange, Trifoliat Orange, Japanese Hardy Orange

6 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Poncirus trifoliata is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: CondimentFruit - cooked. A bitter and acrid flavour, but it can be used to make a marmalade[3, 11, 105]. The fruit is also

used to make a refreshing drink[61, 183]. The freshly picked fruit yields little juice but if stored for 2 weeks it will yield about 20% juice[183], which is rich in vitamin C. Yields of up to 14 kilos of fruit per plant have been achieved in America[160]. The fruit is 2 - 3cm wide[188], though most of this is the skin[K]. The fruit peel can be used as a flavouring[183]. Young leaves - cooked[183].

tcanta Hedge Hedge RootstockUsed as a rootstock for Citrus species (oranges, lemons etc)[105, 160]. It confers an extra 3° or esistance to the cold[160]. The plant is very thorny and makes an excellent impenetrable barrier or hedge[3, 11, 29], though this barrier is not very dense[K]. The plants are very tolerant of pruning[182], they are best clipped in early summer shortly after flowering[200, 245].

dwatta Antiemetic Antispasmodic Carminative Deobstruent Digestive Diuretic Expectorant Laxative Odontalgic Stimulant Stomachic Vasoconstrictor Vitamin CThe thorns are used in the treatment of toothache[218]. The stem bark is used in the treatment of colds[218]. The fruits contain a number of medically active constituents including flavonoids, coumarins, monoterpenes and alkaloids[279]. The fruit, with the endocarp and seeds removed, is carminative, deobstruent and expectorant[176]. It is used in the treatment of dyspepsia, constipation and abdominal distension, stuffy sensation in the chest, prolapse of the uterus, rectum and stomach[176]. It is milder in effect than the immature fruit and is better used for removing stagnancy of food and vital energy in the spleen and stomach[176]. The unripe fruit is antidiarrheic, antiemetic, antispasmodic, deobstruent, digestive, diuretic, laxative, stimulant, stomachic and vasoconstrictor[147, 176, 178, 218]. It is used in the treatment of dyspepsia, constipation and abdominal distension, stuffy sensation in the chest, prolapse of the uterus, rectum and stomach, shock[176].

nrakta E. Asia - C. and S. China, Korea. ksacta Hedgerows[109]. Woods in mountains and hills in Koreal[279]

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Cold stratify stored seed for 4 weeks and sow early spring in a greenhouse[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in early summer. Cuttings of half-ripe wood, June/July in a frame[1].

nwatta Landscape Uses:Border, Espalier, Foundation, Hedge, Screen, Standard, Winter interest. An easily grown plant, it succeeds in an ordinary garden soil[1], preferably well-drained[182], but prefers a fertile light sandy soil in a sunny position[11, 200]. A plant is growing and fruiting well in light woodland shade at Cambridge Botanical Gardens[K]. Plants dislike soil cultivation close to their roots and so should either be well mulched to prevent weed growth, or hand weeded[202]. Succeeds in poor acid soils[229]. Plants also succeed in chalk-laden soils[245]. Hardy to about -15°c[184]. Plants have survived -30°c of frost without injury according to one report[11]. The bitter orange hybridizes with Citrus species and could possibly be used in breeding programmes to produce hardier forms of oranges, lemons etc[61, 160]. It could also be of value in conferring disease resistance, tolerance of poorer soils and dwarfing characteristics. The flowers are produced on the previous years wood[200]. The whole plant, but especially the flowers[202], is strongly aromatic[182]. A very ornamental plant[1, 11]. the fruits are freely formed in south-western Britain[11, 59]. A hedge at Wisley in a semi-shaded position fruits heavily in most years[K]. Another report says that warm autumns are required if the plant is to fruit freely. Fertile seed is produced after warm summers[182]. Plants are relatively short-lived, deteriorating after about 25 years[202]. Special Features: Not North American native, Naturalizing, Fragrant flowers, Attractive flowers or blooms.

### 7.2.114 Rheum palmatum

Turkey Rhubarb, Chinese Rhubarb - Da Huang, Chinese

6 tlin 9 cyuc 3 kcak 2 tcan 5 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum palmatum is a PERENNIAL growing to 3 m (9ft) by 2 m (6ft). See above for USDA hardiness. It

is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves are poisonous[21]. This report probably refers to high levels of oxalic acid found in the leaves. Perfectly safe in moderate quantities, oxalic acid can lock up certain minerals (especially calcium) in the body, leading to nutritional deficiency. Cooking the plant will reduce its content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can agravate their condition[238]. Laxative action side-effect with long term use may lead to electrolyte imbalances. Increase in aldosterone secretion, passage of albumin and blood in urine and intestinal movement loss [301].

kcakta Edible Parts: StemEdible Uses: Leaf stem - raw or cooked[2, 7, 105, 183]. The stem is superior in flavour to the common rhubarb and quite tender[2]. An acid flavour, it is sometimes used as a cooked fruit substitute[K].

tcanta Fungicide InsecticideAn insect spray is made from the leaves[20]. This spray is also said to help prevent clubroot of brassicas[20]. The cultivar 'Atrosanguineum' can be used as a ground cover plant in a sunny position[188]. Other forms can also be used, they are best planted about 1.8 metres apart each way[208].

dwatta Anticholesterolemic Antiseptic Antispasmodic Antitumor Aperient Astringent Cholagogue Demulcent Diuretic Homeopathy Laxative Purgative Stomachic TonicChinese rhubarb, called Da Huang in China, has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[238]. It has a safe and gentle action, safe even for children to use[254]. The plant is also part of a North American formula called essiac which is a popular treatment for cancer. Its effectiveness has never been reliably proven or disproven since controlled studies have not been carried out. The other herbs included in the formula are Arctium lappa. Ulmus rubra and Rumex acetosella[254]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 7, 9, 21, 91, 171, 176, 238]. The roots contain anthraquinones, which have a purgative effect, and also tannins and bitters, which have an opposite astringent effect[244]. When taken in small doses, it acts as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232, 244]. The root is taken internally in the treatment of chronic constipation, diarrhoea. liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Rheum palmatum for constipation (see [302] for critics of commission E).

nrakta E. Ásia - N.W. China in Yunnan, W. Sichuan, E. Xizang and Gansu. ksacta Scrub and rocky places and by streams, 2500 - 4000 metres. Slopes and valleys at elevations of 1500 - 4400 metres in western and northern China[266].

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late

spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semishade[200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Hardy to at least -15°c[200]. A very ornamental plant[1], there is at least one named variety[183]. Hybridizes freely with other members of this genus[200]. The sub-species R. palmatum tanguticum is cultivated as a medicinal plant in China[61, 244], it was at one time a popular purgative in Europe[50]. Plants in this genus seem to be immune to the predations of rabbits[233]. Turkish rhubarb is a good companion plant for columbine (Aguilegia spp)[20]. The plant is heat tolerant in zones 9 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread

# 7.2.115 Pleioblastus hindsii

Hinde' cano hamboo

6 tlin 9 cvuc 3 kcak 0 tcan 0 dwat 3.5 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pleioblastus hindsii is an evergreen Bamboo growing to 3.5 m (11ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots - cooked[105, 177]. A good flavour. The stems are about 1cm in diameter[266].

tcanta Hedge Hedge Musical Plant supportCanes can be used as plant supports[25] and also make good flutes. The plant can be used as a screen or a hedge[25, 195].

nrakta E. Asia - China. ksacta Mountains or on hills near sea shores[266].

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°c. Stored seed should be sown as soon as it is received. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 -6 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse or cold frame until they are large enough to plant out, which could be a number of years. The plants only flower at intervals of several years and so seed is rarely available. Division as the plant comes into growth in spring. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200].

nwatta Succeeds in most soils[25] but prefers a good loamy soil in a sheltered position in semi-shade[1]. Requires deep shade[25] and a position sheltered from north and east winds[11]. Dislikes drought[1]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[2, 51, 158, 272]. It is said to be very sweet when bletted[105, 183] (eaten when overripe but before it starts to rot). The bottle-shaped fruit is about  $4 \mathrm{cm}$  long, though it can be up to  $7 \mathrm{cm}$  long[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Hedge HedgePlants can be grown as a hedge[158, 272].

dwatta Cancer OphthalmicA paste of the fruit is ingested in the belief it is beneficial for the eyesight[272]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Himalayas from India to Kashmir, Sikkim and China. ksacta Humus-rich soils in forests and shrubberies to 3800 metres[51, 145]. On slopes or in scrub at elevations of 3000 - 3700 metres in S Xizang and NE Yunnan Provinces, China[266].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate [80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Prefers light shade according to another report[11]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. A very ornamental plant[1]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

# 7.2.263 Fibigia clypeata

6tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fibigia clypeata is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and

prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw[177]. Used as a cress in salads[2, 183].

nrakta S. Europe. ksacta Rocks, dry hills and slopes and dry rocky places up to 1000 metres[74].

propta Seed - sow early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring. If you have sufficient seed then it is worth making an outdoor sowing in situ in the middle of spring.

nwatta Prefers a hot dry well-drained soil in a sunny position[1, 200].

# 7.2.264 Yucca gloriosa

Spanish Dagger, moundlily yucca, Palm Lily, Roman Candle, Mound Lily Yucca, Spanish Dagger

6 tlin 11 cyuc 2 kcak 0 tcan 1 dwat 1.8 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Yucca gloriosa is an evergreen Shrub growing to 1.8 m (6ft) by 1.2 m (4ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime expossure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit Root StemEdible Uses: Fruit - raw or cooked. The fruit is up to 10cm long and 26mm wide[229]. The fruit is very rarely produced in the wild[82]. Flowers - raw or cooked. They are delicious raw, and can also be dried, crushed and used as a flavouring[164]. Flowering stem - cooked and used like asparagus[164]. Root - cooked. It can be dried, ground into a powder and made into a bread[105].

tcanta Fibre SoapA fibre obtained from the leaves is used for making cloth, ropes, baskets and mats[46, 61, 82, 169]. The roots are rich in saponins and can be used as a soap substitute[82].

dwatta Detergent PurgativeThe fruit is purgative[240]. The root is detergent[240].

nrakta South-eastern N. America - North Carolina to Florida. Naturalized in S. Europe[50]. ksacta Sand dunes and the borders of beaches of the seacoast[82].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept at a temperature of 20°c. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established[78]. Cuttings can be made of the tops of old plants. These normally root quite easily in the growing season[11].

nwatta Agroforestry Services: Living fence Industrial Crop: Fiber Management: Standard Regional CropLandscape Uses:Massing, Specimen. Thrives in any soil but prefers a sandy loam and full exposure to the south[11].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[161, 177, 257]. Used mainly as a condiment[177], the bulb is also eaten as a vegetable[183]. The bulb is rather small, up to 25mm tall and 15mm in diameter[235]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta N. America - Texas to New Mexico, north to Nebraska. ksacta Sandy or gravelly, often limestone soils on dry prairies and hills[43, 274].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained soil[1]. Succeeds in the rock garden, though in cold wet areas it is best grown in a bulb frame or cold greenhouse[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. The plants are much liked by grazing animals and have become rare or absent on pasture land[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 7.2.164 Capsella bursa

Shepherd's Purse

6 tlin 10 cyuc 3 kcak 3 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwishsom hpa7tmwatli fyifxre7t hjonli

drutta Capsella bursa-pastoris is a ANNUAL growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower all year, and the seeds ripen all year. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

pcista Signs of toxicity are sedation, pupil enlargement and breathing difficulty. Avoid if on treatments for high blood pressure. Avoid with thyroid gland disorders or heart disease. Possible addictive sedative effects with other depressants (e.g. Alcohol). Avoid during pregnancy (3011.

kcakta Edible Parts: Leaves Oil SeedEdible Uses: Condiment OilLeaves - raw or cooked[2, 4, 5, 52, 94]. The young leaves, used before the plant comes into flower, make a fine addition to salads[9]. The leaves are a cress and cabbage substitute[12], becoming peppery with age[172]. Leaves are usually available all year round, though they can also be dried for later use[12]. The leaves contain about 2.9% protein, 0.2% fat. 3.4% carbohydrate. 1% ash. They are rich in iron. calcium and vitamin C[179]. A zero moisture basis analysis is available[218]. The young flowering shoots can be eaten raw or cooked[264]. They are rather thin and fiddly but the taste is quite acceptable. They can be available at most times of the year. Seed - raw or cooked[94, 172]. It can be ground into a meal and used in soups etc[102, 183]. It is very fiddly to harvest and utilize, the seed is very small[85]. The seed contains 35% of a fatty oil[179]. This oil can be extracted and is edible[74]. The seedpods can be used as a peppery seasoning for soups and stews[183]. The fresh or dried root is a ginger substitute[85, 172, 183].

tcanta Insecticide Oil Soil reclamationThe seed, when placed in water, attracts mosquitoes. It has a gummy substance that binds the insects mouth to the seed[201]. The seed also releases a substance toxic to the larvae. ½ kilo of seed is said to be able to kill 10 million larvae[172]. Plants can be grown on salty or marshy land in order to reclaim it by absorbing the salt and 'sweetening' the soil[201]. Birds are very fond of the seeds of shepherd's purse[201]. Dynamic accumulator

dwatta Antiscorbutic Astringent Cancer Diuretic Emmenagogue Haemostatic Homeopathy Hypotensive Oxytoxic Stimulant Urinary Vasoconstrictor Vasodilator Vitamin C VulneraryShepherd's purse is little used in herbalism, though it is a commonly used domestic remedy, being especially efficacious in the treatment of both internal and external bleeding, diarrhoea etc[4, 222]. A tea made from the whole plant is antiscorbutic, astringent, diuretic, emmenagogue, haemostatic, hypotensive, oxytocic, stimulant, vasoconstrictor, vasodilator and vulnerary[4, 7, 9, 13, 21, 46, 147, 165, 172, 176, 222]. A tea made from the dried herb is considered to be a sovereign remedy against haemorrhages of all kinds the stomach, the lungs, the uterus and more especially the kidneys[4, 222]. The plant can be used fresh or dried, for drying it is harvested in the summer[9]. The dried herb quickly loses its effectiveness and should not be stored for more than a year[9]. Clinical trials on the effectiveness of this plant as a wound herb have been inconclusive[244]. It appears that either it varies considerably in its effectiveness from batch to batch, or perhaps a white fungus that is often found on the plant contains the medically active properties[244]. The plant has been ranked 7th amongst 250 potential anti-fertility plants in China[218]. It has proven uterinecontracting properties and is traditionally used during childbirth[222]. The plant is a folk remedy for cancer - it contains fumaric acid which has markedly reduced growth and viability of Ehrlich tumour in mice[218]. A homeopathic remedv is made from the fresh plant[4]. It is used in the treatment of nose bleeds and urinary calculus[7]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Capsella bursa-pastoris Shepherd's Purse for nose bleeds, premenstrual syndrome, wounds and burns (see [302] for critics of commission E).

nrakta A virtually cosmopolitan plant, found in most regions of the world including Britain. ksacta Arable land, gardens, waste places etc, it is a common weed of cultivated soil[9, 17].

propta Seed - sow in situ February to May. Seed can also be sown as late as mid autumn[206]. A common weed of disturbed ground, the plant does not normally need any help to maintain itself[K].

nwatta Plants flourish in most soils[17]. They will grow even in the poorest of soils, though in such a situation the plants might only reach a few centimetres tall before they flower and set seed[4]. In rich soils plants will take longer to go to seed and will grow up to 60cm tall[4]. Shepherd's purse is a very common garden weed that can spread freely in cultivated ground. It is usually in flower and producing seed in all months of the year. This species is a prime example of how a plant can be viewed as an annoying weed in some areas of the world whilst in others it is actually cultivated for its wide range of uses[4, 183]. The plant is extensively cultivated in some areas of the world as a cabbage-flavoured spring greens[268], in Japan it is one of the essential ingredients of a ceremonial rice and barley gruel that is eaten on January 7th[183]. The leaves grow rather larger under cultivation, they can be harvested about a month after sowing and can be treated as a cut and come again crop[206]. They do run to seed fairly rapidly, however, especially in hot dry weather or when in poor soils[206, K]. A member of the cabbage family, it is a host plant for many diseases of Brassi-

# 7.2.165 Allium carinatum

Keeled Garlic

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium carinatum is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[22]. The bulb is very small, about 15mm tall and 10mm in diameter[203, 235]. Leaves - raw or cooked. Flowers - raw. Bulbils - raw or cooked. Rather small and fiddly to use, but they have a fairly pleasant onion/garlic flavour[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Europe. Naturalized in Britain[17]. ksacta Dry grassy places and open woods[100].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the growing season and the divisions can be planted straight out into their permanent positions if required. Bulbils are harvested in late summer and can be planted out immediately in situ or stored and planted out in spring.

Invatta Prefers a sunny position in a light well-drained soil[1]. Succeeds in clay soils[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. A good plant for the wild garden[42]. This species can become very invasive by means of its bulbils[203]. The sub-species A. carinatum pulchellum Bonnier. and Layens. is much better behaved and makes a good garden plant[203]. Closely allied to A. oleraceum[1]. Produces new growth in early autumn[K]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 7.2.166 Origanum majorana

Sweet Marioran

6 tlin 9 cyuc 3 kcak 3 tcan 3 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Origanum majorana is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Üses: Condiment TeaLeaves - raw or cooked[2, 52]. Sweet marjoram is widely used as a flavouring for salad dressings, vegetables, legumes and oils[7, 14, 27, 61, 171, 238]. It has a more delicate flavour than the closely related oregano (Origanum vulgare),

drutta Allium carinatum is a BULB growing to 0.6 m. See above for USDA hardiness. It is hardy to UK zone d is not frost tender. It is in flower from June to August. species is hermaphrodite (has both male and female ors) and is pollinated by Bees, insects. Suitable for: light thyme, rosemary and sage[183].

tcanta Disinfectant Dye EssentialThe leaves and flowers yield  $0.3 \cdot 0.4\%$  essential oil by steam distillation[240]. Called 'Oil of Sweet Marjoram', it is used as a food flavouring and in perfumery, soaps, hair products etc[57, 61, 171, 238]. The plant is often used to disinfect bee hives[7].

dwatta Antidepressant Antiseptic Antispasmodic Aromatherapy Carminative Cholagogue Diaphoretic Disinfectant Emmenagogue Expectorant Stimulant Stomachic TonicSweet marjoram is mainly used as a culinary herb, but is also medicinally valuable due to its stimulant and antispasmodic properties[254]. It is a good general tonic, treating various disorders of the digestive and respiratory systems. It has a stronger affect on the nervous system than the related oregano (O. vulgare) and is also thought to lower the sex drive[254]. Because it can promote menstruation, it should not be used medicinally by pregnant women though small quantities used for culinary purposes are safe[254]. The herb is antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, diuretic, emmenagoque, expectorant, stimulant, stomachic and mildly tonic[4, 7, 21, 240]. It is taken internally in the treatment of bronchial complaints, tension headaches, insomnia, anxiety, minor digestive upsets and painful menstruation[238]. It should not be prescribed for pregnant women[238]. Externally, it is used to treat muscular pain, bronchial complaints, arthritis, sprains and stiff joints[238]. The plant is harvested as flowering begins and can be used fresh or dried. Marjoram is often used medicinally in the form of the essential oil, about 400 grams being obtained from 70 kilos of the fresh herb[4]. The oil is used as an external application for sprains, bruises etc[4, 240]. The essential oil is used in aromatherapy. Its keyword is 'Muscle relaxant'[210].

nrakta N. Africa to Turkey. ksacta Dry slopes and rocky places, occasionally in partial shade, to  $1500\ metres$  in Turkey[93].

propta Seed - sow early spring at 10 - 13°c and only just cover the seed. Germination usually takes place within 2 -4 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. The seed can also be sown in situ in April or early May and, although it can be slow to germinate, usually does well[4]. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings of young barren shoots in June. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a rather dry, warm, well-drained soil, but is not fussy as to soil type[18], thriving on chalk[1, 37]. Prefers slightly alkaline conditions[200]. Sweet marjoram is often cultivated as a culinary herb, there are some named varieties[46, 183]. Plants do not normally survive the winter outdoors in Britain so they are usually grown as an annual[1, 4, 14, 37]. Another report says that it is possible to overwinter plants in areas with cold winters so long as you apply a thick mulch to the roots[200]. Container growing is preferred in areas with cold, wet winters or humid, wet summers. Plants do not often set seed in Britain[K]. A good companion plant, improving the flavour of nearby plants[14, 18, 20]. The flowers are very attractive to bees[108]. The bruised leaves emit a fragrance somewhat resembling thyme. but somewhat sweeter with balsamic undertones[245]. This is a sacred plant in India[171]. Members of this genus are rarely if ever troubled by browsing deer[233]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

pcista The seeds are slightly poisonous to some mammals, but no cases involving people are known[13, 76]. Skin contact with the plant can cause dermatitis in some people[76].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 105, 115]. Used in salads[4] and as a spinach[2]. The tender shoots are cooked as a vegetable[272]. It is best not to eat these leaves[55, 238], see the notes above on toxicity.

tcanta SoapThe squeezed plant is used in Nepal for washing and bathing[272]. Anagallis arvensis is insecticidal or at least is repellent to some insects. Dynamic accumulator.

dwatta Antidepressant Antipruritic Antitussive Antiviral Cholagogue Diaphoretic Diuretic Epilepsy Expectorant Homeopathy Nervine Purgative Stimulant VulneraryThe scarlet pimpernel was at one time highly regarded as a medicinal herb, especially in the treatment of epilepsy and mental problems[254], but there is little evidence to support its efficacy and it is no longer recommended for internal use because it contains toxic saponins and cytotoxic cucurbitacins[238, 254]. The whole herb is antitussive, cholagoque, diaphoretic, diuretic, expectorant, nervine, purgative, stimulant and vulnerary[4, 7, 9, 21, 46]. It can be taken internally or applied externally as a poultice[7]. An infusion is used in the treatment of dropsy, skin infections and disorders of the liver and gall bladder[9, 272]. The plant is best harvested in June and can be dried for later use[4]. Use with caution[21], large doses can cause polyuria and tremor[7]. A homeopathic remedy is made from the plant[9]. It is used internally to treat itchy skins and externally to remove warts[9].

nrakta Throughout most of the world, including Britain, but absent from the Tropics. ksacta Roadsides and cultivated land[9], preferring rather sandy soils[7].

propta Seed - sow spring in situ.

nwatta Prefers a sunny position and a good soil[1]. Succeeds in dry or sandy soils[238]. The flowers open at about 8 am and close at 3pm each day, though they close earlier if it rains. The flowers are also said to foretell wet weather if they close early[207].

# 7.2.260 Pleioblastus gramineus

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pleioblastus gramineus is an evergreen Bamboo growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots - cooked[105, 177].

tcanta Plant supportCanes are thin-walled but strong and can be used as plant supports[25, 195].

nrakta E. Asia - E. China, Japan. ksacta Not known

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°c. Stored seed should be sown as soon as it is received. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 -6 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse or cold frame until they are large enough to plant out, which could be a number of years. The plants only flower at intervals of several years and so seed is rarely available. Division as the plant comes into growth in spring. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200].

nwatta Succeeds in most soils but prefers a good loamy soil[1] in a sheltered position in semi-shade[25]. Dislikes drought[1]. Requires shelter from N. and N.E. winds[11].

Closely related to P. hindsii[1]. The rootstock is running and invasive[25]. New shoots are produced from late May[25]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of several years, they often produce fertile seed[122]. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They occasionally die after flowering, but if left alone they will normally recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122].

# 7.2.261 Solidago missouriensis

Prairie Goldenrod, Missouri goldenrod, Tolmie's goldenrod 6 tlin 9 cyuc 2 kcak 1 tcan 1 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flat-

priklwis hpa7tmwatli xre7t hjonli drutta Solidago missouriensis is a PERENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - raw or cooked[94, 155, 161]. They can be added to salads or used as a potherb[183]. A very good tea is made from the dried leaves and dried fully expanded flowers[183].

tcanta DyeMustard, orange and brown dyes can be obtained from the whole plant [168].

dwatta AntisepticAntiseptic. An infusion of the dried powdered herb can be used[168].

nrakta Western N. America. ksacta Dry prairies, gravels and rocky slopes[43].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 7.2.262 Rosa macrophylla

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rosa macrophylla is a deciduous Shrub growing to 4 m (13ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

propta Seed - surface sow, preferably as soon as it is making wattles[51, 146, 158, 272]. The leaves are used to ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. When well-suited, the plants can multiply rapidly [230]. Grows well in a sunny dry border or on a scree[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or funcicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. This species can often appear in disturbed habitats well away from its normal preferred sites on chalk and limestone hills[230]. The flowers resemble a female insect and also emit a scent similar to female pheremones. This species is unique in the genus, however, in that it is not pollinated by insects but is self-pollinated[230]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

#### 7.2.258 Vitex negundo

Huang Ping, Chinese chastetree, Cut Leaf Vitex, Cut-leaf Chastetree

6 tlin 9 cvuc 2 kcak 0 tcan 3 dwat 3 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitex negundo is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: Condiment TeaSeed - occasionally used as a condiment[177, 183], it is a pepper substitute. When washed to remove the bitterness it can be ground into a powder and used as a flour[179], though it is very much a famine food used only when all else fails[177]. A tea is made from the roots and leaves[177, 183].

tcanta Basketry Hedge Hedge Insecticide Repellent Soil stabilizationYoung stems are used in basket making and for

repel insects in grain stores[51, 146]. Extracts of the leaves have insecticidal activity[218]. The fresh leaves are burnt with grass as a fumigant against mosquitoes[238]. The plant is grown on slopes to counter land slides[272].

dwatta Antibacterial Antitumor Astringent Dysentery Expectorant Febrifuge Malaria Sedative Tonic Vermifuge This species is widely used in Chinese herbal medicine, it is the second most important treatment for chronic bronchitis[218]. (The sub-species V. negundo cannabifolia (Sieb. and Zucc.) Hand-Mazz. is used.) The leaves are astringent, febrifuge, sedative, tonic and vermifuge[146, 147, 178, 218, 240]. They are useful in dispersing swellings of the joints from acute rheumatism, and of the testes from suppressed gonorrhoea[240]. The juice of the leaves is used for removing foetid discharges and worms from ulcers, whilst an oil prepared with the leaf juice is applied to sinuses and scrofulous sores[240]. They are harvested in early summer and used fresh or dried[238]. A decoction of the stems is used in the treatment of burns and scalds[218]. The dried fruit is vermifuge[240]. The fruit is also used in the treatment of angina, colds, coughs, rheumatic difficulties etc[218]. The fresh berries are pounded to a pulp and used in the form of a tincture for the relief of paralysis, pains in the limbs, weakness etc[4]. The root is expectorant, febrifuge and tonic[240]. It is used in the treatment of colds and rheumatic ailments[218]. It is harvested in late summer and autumn, and dried for later use[238]. The plant is said to be a malarial preventative and is also used in the treatment of bacterial dysentery - extracts of the leaves have shown bactericidal and antitumor activ-

nrakta E. Asia - Southwest China to the Himalayas, ksacta Wasteland up to 2000 metres in the Himalayas[51]. Mixed thickets on mountain slopes at elevations of 200 - 1400 metres in China[266]

propta Seed - sow March in a greenhouse. It does not need any pre-treatment[113]. Germination is usually free and guick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in early summer of the following year. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current seasons growth, November in a cold frame[113].

nwatta Landscape Uses:Border, Container, Pollard, Standard, Specimen. An easily grown plant, it prefers a light well-drained loamy soil in a warm sunny position sheltered from cold drying winds[1, 200]. Succeeds in poor dry soils[238]. Plants tolerate temperatures down to about -10°c[200]. They are not very hardy in Britain, they succeed outdoors at Kew[K], but in general are best given the protection of a sunny wall outside the milder areas of the country[11]. Plants only flower freely after a warm summer, so they are best grown against a sunny wall even in areas where they are hardy[219]. The flowers are produced so late in the season that they are unlikely to produce viable seed in this country even if they flower properly[K]. The plants require abundant summer sunshine in order to ripen their wood fully, the well-ripened wood is more frost resistant[11, 166]. There are some named forms, selected for their ornamental value[219]. The leaves and stems are strongly aromatic[182]. The flowers have a most pronounced musk-like perfume[245]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

#### 7.2.259 Anagallis arvensis

Scarlet Pimpernel

6 tlin 9 cyuc 2 kcak 3 tcan 2 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anagallis arvensis is a ANNUAL growing to 0.1 m (0ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

#### 7.2.167 Mahonia x media

6 tlin 9 cvuc 3 kcak 0 tcan 2 dwat m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia x media is an evergreen Shrub growing to 2 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year. in flower from February to April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. An acid flavour but the fruit is rather nice raw, especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit ripens in early spring and good crops have often been seen on plants growing in sheltered positions[K]. The fruit is produced in large clusters and so is easy to harvest[K].

dwatta Antibacterial Antitumor Dysentery TonicBerberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta A hybrid species of garden origin, M. lomariifolia x M. japonica. ksacta Not found in the wild.

propta Seed - this is a hybrid species and seed will not come true, though some interesting plants might be produced. The seed is best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn. Stems will often root if they are stuck in the ground with most of their leaves removed[182].

nwatta An easily grown shrub, it thrives in any good garden soil including heavy clays. Prefers a semi-shaded woodland position in a damp, slightly acid to neutral humus-rich soil. Survives under very heavy tree shade. The fully dormant plant is hardy to about -15°c[184], though the young growth in spring can be damaged by late frosts. Commonly grown as an ornamental plant, there are several named varieties[182]. This plant often produces a good crop of fruit in April and May. It seems that a sheltered position helps to ensure a good crop, as does growing more than one cultivar together and perhaps also one or both of the parents (M. bealei and M. japonica)[K]. The cultivars 'Charity' and 'Lionel Fortescue' have both been seen on a number of occasions with heavy crops[K]. The flowers are very sweetly scented[182].

# 7.2.168 Allium kunthii

Kunth's onion

6 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 0.4 m hkuc htut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium kunthii is a BULB growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable

pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. Used as a flavouring[177]. The small bulbs are usually less than 2cm in diameter[270]. Leaves raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Southwestern N. America - Texas, New Mexico, Mexico. ksacta Dry, rocky hills and mountains, usually in limestone soils at elevations of 700 - 3000 metres[270].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained soil[1]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 7.2.169 Oxalis oregana

6 tlin 9 cvuc 3 kcak 3 tcan 1 dwat 0.2 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Oxalis oregana is an evergreen Perennial growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[118, 183, 257]. A acid, flavour, it is especially adored by children and makes an excellent addition to mixed salads[K]. The leaves can be harvested all year round[K]. A mass of the leaves and stems can be allowed to ferment slightly when they make a tasty dessert[183]. A sort of rhubarb pie can be made from the leaf stalks[183]. The leaf stalks are very thin - you would need an awful lot for a pie[K]. Use in moderation, see notes above on toxicity. Flowers - raw[K]. A pleasant acid flavour[K].

tcanta A good ground cover plant for a woodland garden[197, 208], though it can be invasive[60]. It needs weeding for the first year or so[197].

dwatta Antirheumatic Ophthalmic PoulticeA decoction of the whole plant has been used as a wash in the treatment of rheumatism[257]. The fresh juice of the plant has been used as eye drops to ease sore eyes[257]. A poultice of the wilted leaves has been used as a dressing on boils, sores and on swollen areas of the skin[257].

nrakta Western N. America - Washington to California. ksacta Redwood forests[187]. Moist woods[60].

propta Seed - best sown as soon as ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a moisture-retentive humus-rich soil in shade or dappled sunlight[200]. Succeeds in dense shade[187]. Grows well in a wild or woodland garden[200]. Plants can be very invasive when in suitable conditions[60]. Plant is growing very vigorously in quite dense shade under an Elaeagnus shrub in Cornwall - it stays green all year round and is fairly productive[K]. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 7.2.170 Rubus tricolor

Creeping Bramble

6 tlin 9 cyuc 3 kcak 3 tcan 0 dwat 0.3 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rubus tricolor is an evergreen Shrub growing to 0.3 m (1ft) by 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 11, 105]. The best forms can fruit quite well and have a good size and flavour[182, K]. Another report says that they are bland[202]. The bright red fruits are up to 17mm in diameter[266].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]. A good vigorous ground cover plant for sun or shade[11, 200, 208]. It grows strongly but requires weeding for the first year or so[197]. New roots are formed at intervals along the stem[202]. It should only be grown with trees and other tall plants otherwise it will swamp them[K].

nrakta E. Asia - W. China. ksacta Steep banks and in scrub on mountains to 3000 metres[184]. Slopes, forests and thickets at elevations of 1800 - 3600 metres in Sichuan and Yunnan[266]

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month at  $3^{\circ}$ c if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold

frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Plants grow best in part or full shade[182] and also succeed in dry shade[190]. Established plants are fairly drought tolerant[190]. Hardy to about -15°c[184]. Plants are evergreen but may be deciduous in severe winters[202]. A fast growing plant, the stems can grow by up to 2 metres per year[184, 190]. Plants in this genus are notably susceptible to honey fungus[200]. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A clumping mat former. Forming a dense prostrate carpet spreading indefinitely [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

# 7.2.171 Brassica rapa perviridis

Mustard Spinach

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica rapa perviridis is a BIENNIAL growing to  $0.5~\mathrm{m}$  (1ft 8in) by  $0.5~\mathrm{m}$  (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[206]. The flavour is a happy compromise between the blandness of cabbages and the sharpness of the oriental mustards[206]. The plant can be eaten at any stage from seedling to mature plant[206]. Flowering stems - raw or cooked[206]. Sweet and succulent, but becoming hotter as the plant matures[206].

nrakta A cultivar of garden origin. ksacta Not known in the wild, it probably arose from B. rapa chinensis, Pak choi[206].

propta Seed - sow in situ April to September[206]. Some varieties can also be sown in a cold greenhouse in late autumn, winter or early spring to provide leaves overwinter and in late spring.

nwatta Succeeds in full sun in a moisture-retentive well-drained fertile preferably alkaline soil[200, 206]. Prefers a cool moist reasonably fertile soil[52]. The plant is somewhat deeper rooted than many of the oriental brassicas and is more tolerant of drought, though it grows best if it is not short of water[206]. Mustard spinach is widely cultivated in the Orient for its edible leaves, there are many named varieties[206]. It takes 55 - 80 days for plants to reach maturity from sowing[206]. This is a very hardy plant, although knocked back, it has withstood temperatures down to about-14°c and can be cropped for most of the year[206]. It is much less likely to bolt from a spring sowing and is fairly resistant to summer heat[206].

# 7.2.172 Agastache mexicana

Mexican Giant Hyssop 6 tlin 10 cyuc 3 kcak 2 tcan 0 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

# 7.2.255 Podocarpus lawrencei

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Podocarpus lawrencei is an evergreen Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Superficially similar to Taxus species, but this plant is definitely not poisonous[200].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. It is rather small but has a pleasant slightly sweet flavour with a mucilaginous texture[K]. The fruit is about 6 x 5 mm[200].

mrakta New Zealand - South Island. ksacta Not known propta The seed can be sown at any time of the year in a sandy soil in a warm greenhouse, though it is probably best sown as soon as it is ripe[1]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe terminal shoots, 5 - 10cm long, July/August in a frame[78].

nwatta Prefers a rich moist non-alkaline soil[167]. Grows best in sheltered areas with a humid climate[200]. Plants in this genus are notably resistant to honey fungus[200]. There is some confusion over this species, the Flora of Australia says that it is endemic to Australia[286], whilst our other records say that it is a New Zealand plant[200]. Dioecious. Male and female plants must be grown if seed is required.

# 7.2.256 Ophrys bertolonii

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ophrys Dertolonii is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta S. and C. Europe. ksacta Not known

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able

to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

# 7.2.257 Ophrys apifera

Bee Orch

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Ophrys apifera is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Central and southern Europe, including Britain, to N. Africa. ksacta Pastures, field borders, banks and copses on chalk or limestone, especially on recently disturbed soils; also on base-rich clays and calcareous dunes[17].

wasps. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Ēdible Parts: Leaves RootEdible Uses: Root - raw or cooked[105, 177]. The plant produces thick tubers[275]. Young plant - raw or cooked[105, 177]. A nutritional analysis is available[218].

dwatta Aphrodisiac Depurative Emmenagogue Galactogogue TonicAphrodisiac, tonic[46, 61]. The root is anticancer, depurative, emmenagogue and galactogogue[147, 218]. A decoction is used in the treatment of lung absesses, milk-flow obstruction, amenorrhoea, acute and inflamed boils and abscesses and lymphadenopathy[147].

nrakta E. Asia - China, Japan. ksacta Moist places in woods in low mountains and hills[58, 147]. Edges of moist forests at elevations of 200 - 1600 metres all over Japan[275].

propta Seed - surface sow in spring to early summer in an ericaceous compost in a greenhouse. Do not allow the compost to dry out. The seed usually germinates in 1 - 6 weeks at 20°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in a greenhouse for their first winter. Plant out in late spring or early summer and protect them from slugs until the plants are well established[K]. Division in spring, with care, since the plant resents root disturbance[200]. We have found it best to take small divisions that are teased out from the sides of the main clump so as to cause the least possible disturbance to the plants and to avoid having to dig up the clump. These small divisions need to be potted up and placed in light shade in a greenhouse until they are rooting well. They can be planted out into their permanent positions in the summer if they are large enough, otherwise in the following spring[K].

nwatta Prefers a well-drained fertile light soil in full sun or semi shade[1, 200]. Plants only succeed in full sun if the soil remains moist during the growing season[200]. Prefers a slightly acid soil[164]. Dormant plants are hardy to about -20°c[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A lot of confusion exists over the correct authorship of this specific name. Apart from the one mentioned above there are also :-(Sieb. and Zucc.)Trautv.; Benth.; and Benth. and Hook. A climbing plant, supporting itself by twining and scrambling over other plants[219]. The plant resents root disturbance and should be planted out into its permanent position as soon as possible [164]. Plants are very susceptible to the ravages of slugs. The young shoots in spring are particularly at risk, though older growth is also eaten[K]. It is best grown on a high bank in order to give a good view of the flowers[1].

#### 7.2.253 Bumelia lycioides

Shittamwood

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Bumelia İycioides is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[177]. No further details. The fruit has a thick flesh and is about 10mm in diameter[82, 200].

tcanta WoodWood - heavy, hard, not strong, close grained[82, 229]. It weighs about 46lb per cubic foot[235]. Of no commercial value, it is used for tool handles, cabinet making etc[82, 229].

nrakta South-eastern N. America - Virginia to Florida, west to Indiana and Texas. ksacta Low moist soils by swamps and streams, also found on rocky bluffs[82].

propta Seed - we have no details on this species but would suggest that if ripe seed can be obtained it should be sown straight away in a cold greenhouse. Stored seed can be sown in late winter or early spring in a greenhouse. When

large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in a warm sunny site in any freely draining moderately fertile soil[200]. Plants are cut back by temperatures below about -15°c but they regenerate freely from the base 200]. Succeeds outdoors at Kew[11], though it is not very vigorous[K]. This species rarely, if ever, fruits in Britain[11]. The tree at Kew flowered freely in the long hot summer of 1989 but did not produce fruit[K].

#### 7.2.254 Ouercus infectoria

Aleppo Oak, Oak 6 tlin 8 cyuc 2 koak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Quercus infectoria is an evergreen Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Ink TanninAn ink is made from the tannin-rich galls are caused by the activity of the Cynipid fly Cynips tinctoria[223]. The galls contain 36 - 58% tannin[223]. An extract of the galls is mixed with ferrous sulphate together with a gum and colouring in order to make the ink[171]. We are not sure if the galls are meant to be used before or after the insect has left them[K].

dwatta Astringent Dysentery EczemaThe bark and acorns are astringent[240]. They are used in the treatment of intertrigo, impetigo and eczema[240]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta S. Europe - E. Mediterranean. ksacta Not known propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Specimen. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, Inconspicuous flowers or blooms.

drutta Agastache mexicana is a PERENNIAL growing to 0.8~m (2ft 7in) by 0.3~m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaThe highly aromatic young leaves are used as a flavouring in salads and cooked foods[183]. The young leaves are used to make a herbal tea[183].

tcanta Attracts wildlife. The flowers are very attractive to bees

nrakta Southern N. America - Mexico. ksacta Not known propta Seed - sow spring in a greenhouse and only just cover the seed. The seed usually germinates in 1 - 3 months at 13°c[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant out in late spring or early summer[K]. Division in spring. Fairly simple, if large divisions are used it is possible to plant them straight out into their permanent positions. Basal cuttings of young shoots in spring[111]. Harvest the young shoots when they are about 10 - 15cm tall and pot them up in a lightly shaded position in a greenhouse. They should root within 3 weeks and can be planted out in the summer or following spring.

nwatta A perennial plant. It can be grown as an annual. Prefers a warm sunny sheltered position and a well-drained soil. Succeeds in most soils. Although given a hardiness rating of 9 in [200] (which means that a plant is not very frost-tolerant), this species is thriving in a sunny bed at Kew Botanical Gardens and so should be hardy to at least zone 7[K]. Another report says that it withstands temperatures down to about -40°c when dormant. Yet another report says that it should succeed outdoors in the milder and drier counties, but that it is not very long-lived[233]. The flowers are very attractive to bees. The flowers are pink or red.

# 7.2.173 Silybum marianum

Milk Thistle, Blessed milkthistle 6 tlin 9 cyuc 3 kcak 2 tcan 5 dwat m hkuc htut cyutli kyuuctup hwicii hrasjlutnyik hpa7tli flatpriklwisslin hpa7tmwatli xre7t hionli

drutta Silybum marianum is a BIENNIAL growing to 1.2 (4ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista When grown on nitrogen rich soils, especially those that have been fed with chemical fertilizers, this plant can concentrate nitrates in the leaves. Nitrates are implicated in stomach cancers. Diabetics should monitor blood glucose when using. Avoid if decompensated liver cirrhosis. Possible headaches, nausea, irritability and minor gastrointestinal upset [301].

kcakła Edible Parts: Flowers Leaves Oil Oil Root StemEdible Uses: Coffee Oil OilRoot - raw or cooked[1, 2, 4, 52, 183]. A mild flavour and somewhat mucilaginous texture[K]. When boiled, the roots resemble salsify (Tragopogon hispanicus)[1, 4, 115]. Leaves - raw or cooked[1, 4, 5, 52, 89, 115]. The very sharp leaf-spines must be removed first[46, 183], which is quite a fiddly operation[K]. The leaves are quite thick and have a mild flavour when young, at this time they are quite an acceptable ingredient of mixed salads, though they can become bitter in hot dry weather[K]. When cooked they make an acceptable spinach substitute[238]. It is possible to have leaves available all year round from successional sowings[K]. Flower buds - cooked[1, 238]. A globe artichoke substitute[12, 183], they are used before the flowers open. The flavour is mild and acceptable, but the buds

are quite small and even more fiddly to use than globe artichokes[K]. Stems - raw or cooked[4, 100]. They are best peeled and can be soaked to reduce the bitterness[5, 183]. Palatable and nutritious[4, 115], they can be used like asparagus or rhubarb[12] or added to salads. They are best used in spring when they are young[105]. A good quality oil is obtained from the seeds[4]. The roasted seed is a coffee substitute[21, 46, 61, 183].

tcanta Green manure Oil OilA good green manure plant, producing a lot of bulk for incorporation into the soil[K].

dwatta Astringent Bitter Cholagogue Diaphoretic Diuretic Emetic Emmenagogue Hepatic Homeopathy Stimulant Stomachic TonicMilk Thistle has a long history of use in the West as a remedy for depression and liver problems[254]. Recent research has confirmed that it has a remarkable ability to protect the liver from damage resulting from alcoholic and other types of poisoning[254]. The whole plant is astringent, bitter, cholagogue, diaphoretic, diuretic, emetic, emmenagogue, hepatic, stimulant, stomachic and tonic[4. 21. 160, 165, 238]. It is used internally in the treatment of liver and gall bladder diseases, jaundice, cirrhosis, hepatitis and poisoning[238]. The plant is harvested when in flower and dried for later use[238]. Silymarin, an extract from the seed, acts on the membranes of the liver cells preventing the entry of virus toxins and other toxic compounds and thus preventing damage to the cells[244]. It also dramatically improves liver regeneration in hepatitis, cirrhosis, mushroom poisoning and other diseases of the liver[222, 238, 254]. German research suggests that silvbin (a flavonoid component of the seed) is clinically useful in the treatment of severe poisoning by Amanita mushrooms[222]. Seed extracts are produced commercially in Europe[222]. Regeneration of the liver is particularly important in the treatment of cancer since this disease is always characterized by a severely compromised and often partially destroyed liver[K]. A homeopathic remedy is obtained from equal parts of the root and the seed with its hulls still attached[4]. It is used in the treatment of liver and abdominal disorders[9]. The German Commission E Monographs, a therapeutic quide to herbal medicine, approve Silybum marianum Milk Thistle for dyspeptic complaints, liver and gallbladder complaints (see [302] for critics of commission E)

nrakta S. Europe, N. Africa and W. Asia. Naturalized in Britain. ksacta Waste places[17], usually close to the sea[5], especially if the ground is dry and rocky[165].

propta Seed - if sown in situ during March or April, the plant will usually flower in the summer and complete its life cycle in one growing season[K]. The seed can also be sown from May to August when the plant will normally wait until the following year to flower and thus behave as a bienial[K]. The best edible roots should be produced from a May/June sowing, whilst sowing the seed in the spring as well as the summer should ensure a supply of edible leaves all year round[K].

nwatta Succeeds in any well-drained fertile garden soil[1, 200]. Prefers a calcareous soil[12] and a sunny position[200]. Hardy to about -15°c[200]. The blessed thistle is a very ornamental plant that was formerly cultivated as a vegetable crop[1, 61, 238]. Young plants are prone to damage from snails and slugs[200]. Plants will often self sow freely[K].

# 7.2.174 Diplotaxis muralis

Wall Rocket, Annual wallrocket 6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Diplotaxis muralis is a ANNUAL/PERENNIAL growing to 0.6 m (2ft). It is not frost tender. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - raw[52]. They can be finely chopped and added sparingly to salads or used as a flavouring for cooked

dishes[183]. A piquant flavour, somewhat resembling rocket, Eruca sativa, but with a sharp aftertaste[132, 183].

nrakta Europe - Mediterranean. Naturalized in S. Britain[17]. ksacta Limestone rocks, walls and as a weed of arable ground in England[17].

propta Seed - best sown in situ as soon as it is ripe, though it can also be sown in situ in the spring. The seed usually germinates in the autumn.

watta Prefers dry soils and dislikes shade[175]. Very resistant to heat, this plant could be used as a perennial substitute for Eruca vesicaria sativa, the annual rocket, in hot summer areas[183]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2].

#### 7.2.175 Camassia scilloides

Atlantic Camas

6 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Camassia scilloides is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - raw or cooked[257]. The bulb was an important food for several native North American Indian tribes who used it in a variety of ways[257]. It can be baked or dried and made into a powder which can be used as a thickener in stews or as an additive to cereal flours when making bread, cakes etc[62, K]. The bulb is about 4cm long and 15mm wide[235].

nrakta Eastern N. America. - Ontario to Wisconsin and southwards. ksacta Low fields, meadows and open woods[43]. Prairies at elevations of 100 - 1000 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[134]. The seed can also be sown in a cold frame is spring[134]. It usually germinates in 1- 6 months at  $15^\circ c$ , but it can be erratic[138]. Sow the seed thinly so that it does not need to be thinned and allow the seedlings to grow on undisturbed for their first year. Give an occasional liquid feed to ensure that the plants do not become nutrient deficient. When the plants are dormant in late summer, pot up the small bulbs putting 2- 3 bulbs in each pot. Grow them on for another one or two years in a cold frame before planting them out when dormant in late summer. Offsets in late sumer. The bulb has to be scored in order to produce offsets.

nwatta Succeeds in almost any soil[42]. Grows well in heavy clay soils. Prefers a rather heavy loam[1] that has plenty of moisture in spring but does not remain wet over the winter[138, 200]. Dislikes dry soils[200]. Tolerates partial shade[138, 200]. Plant bulbs 7 - 10cm deep in early autumn and then leave them undisturbed.

## 7.2.176 Physalis alkekengi

Winter Cherry, Strawberry groundcherry, Ground Cherry, Chinese Lantern

6 tlin 9 cvuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Physalis alkekengi is a PERENNIAL growing to 0.3 m (1ft) by 0.6 m (2ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant, except the ripe fruit, are poisonous[19, 65, 238].

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit revorceoked[1, 2, 105]. Rich in vitamins[100], with twice the vitamin C of lemons[179], but not much taste[178]. Another report says that they are juicy but with a bitter acrid flavour[4], whilst another says that they add a delicious flavour to salads[7]. We have found them to be bitter and rather unpleasant[K]. The fruit is a berry about 17mm in diameter[200]. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten[34, 65]. Young leaves - cooked[105, 170, 179]. Caution is advised, the leaves are almost certainly poisonous, at least when raw.

dwatta Antiphlogistic Antirheumatic Antitussive Aperient Diuretic Expectorant Febrifuge Homeopathy Lithontripic Malaria Urinary Vitamin CThe plant has a long history of herbal use, and an interesting chemistry, but it is seldom used in modern practice[238]. The whole plant is antiphlogistic, antipyretic, antityssive and expectorant[9, 61, 147, 178, 2181. It has been used in the treatment of urinary and skin diseases[240]. Some caution is recommended since an overdose of the plant is said to easily precipitate an abortion[218]. The fruit is aperient, strongly diuretic and lithontripic[4, 7, 9, 218]. It is used internally in the treatment of gravel, suppression of urine etc and is highly recommended in fevers and in gout[4, 238]. The fruit is harvested when fully ripe and can be used fresh, juiced or dried[238]. The calyx should be removed[238]. The leaves and stems are febrifuge and slightly tonic[4]. They are used in the treatment of the malaise that follows malaria, and for weak or anaemic people[4]. The fresh leaves have been used externally to make soothing poultices in the treatment of skin inflammations[238, 244]. The seed is used to promote early labour[218]. A homeopathic remedy is made from the fruit. It is used in the treatment of kidney and bladder disorders[9].

nrakta Asia - Caucasus to China. Occasionally naturalized in Britain. ksacta Cultivated ground and vineyards[147]. Hedgerows and by damp paths, from the plains to the lower slopes of mountains[7].

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place guickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out in early summer. Diurnal temperature fluctuations assist germination[170]. Division in spring[111]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in early summer[111]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container. Succeeds in any well-drained soil in full sun or light shade[111, 200]. The fully dormant plant is hardy in most of Britain, though the young growth in spring can be damaged by late frosts. A very ornamental plant[1] though it can be invasive[200]. The subspecies P. alkekengi francheti. Mak. (sometimes treated as a separate species) is a more vigorous form of the species with larger fruits[200]. Slugs are very fond of the new growth in spring and can destroy even quite large clumps[K]. Special Features: Naturalizing, Suitable for dried flowers.

# 7.2.177 Rosmarinus officinalis

Rosemary

6 tlin 11 cyuc 2 kcak 4 tcan 3 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Rosmarinus officinalis is an evergreen Shrub growing to  $1.5 \, \mathrm{m}$  (5ft) by  $1.5 \, \mathrm{m}$  (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UX zone 6 and is not frost tender. It is in leaf all year, in flower from March to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils

tablished plants are very drought tolerant, they can show distress in very severe droughts but usually recover[190]. Plants succeed in maritime gardens[233]. Hardy to about  $-20^\circ$ c[187]. An excellent plant to grow in a large pot, the long stems will tend to arch down and continue to flower for a long time[244]. The leaves have a pungent aroma, especially when the plant is grown in a hot sunny position[245]. The plant is intermediate between A. millefolium and A. ptarmica in its characteristics[233]. There is at least one named variety, selected for its ornamental value[233]. Hybridizes freely with other members of the genus[200].

# 7.2.250 Nyssa aquatica

Water Tupelo

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 30 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hionli

drutta Nyssa aquatica is a deciduous Tree growing to 30 m (98ft 5in) at a medium rate. It is in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: FruitEdible Uses: Fruit - occasionally eaten raw but more often used in preserves[177, 183]. The fruit is up to 4cm long, it has a thick, tough skin with a thin acid flesh surrounding a large seed[82, 229].

tcanta Cork Dye WoodThe wood of the roots is sometimes used for making floats instead of cork[82]. A red dye can be obtained from the burnt bark mixed with water and the ash of red oak (Quercus rubra)[257]. Wood - light, close-grained, soft, difficult to split[82, 229, 235]. Tough according to one report[235], weak according to another[229]. It has an intricately contorted and twisted grain[82]. It weighs 29lb per cubic foot[235], and is used for various things such as panelling, broom handles, woodenware and crates[82, 229]. It is sometimes exploited commercially[229].

nrakta South-eastern N. America - Virginia to Florida, west to Illinois and Texas. ksacta Swamps, bottomlands, or sites periodically under water, in soils ranging from clay to rich silts[229].

propta The seed can be sown in late winter in a cold frame[78] but would probably benefit from an earlier sowing if the seed can be obtained any sooner. Three months stratification at 5°c improves germination[200]. Germination rates are variable[78]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Lavering.

nwatta Landscape Uses:Specimen, Woodland garden. Although this is a plant of swamps and other wet soils in the wild, once established it can succeed in Britain when growing in an ordinary good loamy soil in sun or semi-shade[1]. This plant probably requires a very wet soil, it is very difficult to establish in Britain, though it should be hardy at least in the milder parts of the country. It prefers a neutral to alkaline soil[200]. Plants are fast-growing in well-drained bottomlands in the wild, but slower in swampy sites[229]. They are long-lived trees, commencing to bear seeds when about 30 years old and usually producing heavy crops each year[229]. The seed is mainly distributed by water[229]. Resents root disturbance[1]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms.

# 7.2.251 Saxifraga stolonifera

Strawberry Saxifrage, Creeping Saxifrage, Strawberry Geranium, Strawberry Begonia

6 tlin 10 cyuc 2 kcak 2 tcan 2 dwat 0.2 m hkuc

hmim cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Saxifraga stolonifera is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a medium rate.

See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves StemEdible Uses: Leaves - raw or cooked[105, 177]. Relished in Japan when parboiled or fried and used in salads[183]. Flowering stem - said to be tasty when salted[183].

tcanta Can be grown as a ground cover plant in a shady position[188]. Plants should be spaced about 45cm apart each way[208].

dwatta Antibacterial Antiphlogistic Depurative FebrifugeAntibacterial, antiphlogistic[174]. There are growth-promoting substances in the leaves[174]. The whole plant is depurative, febrifuge and suppurative[147, 218]. Its use promotes the drainage of pus[147]. A decoction is used in the treatment of boils and abscesses, poisonous snakebites, otitis media, acute attacks of convulsions and haematemesis[147]. The leaf juice is applied to aching ears, abscesses and inflammations[218].

nrakta E. Asia - W. China, Japan. Naturalized in C. and S. Europe[50]. ksacta Shady cliffs and mossy rocks at low altitudes[187]. Occasionally naturalized on walls in C. and S. Europe[50].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame in the spring. Surface sow, or only just cover the seed, and make sure that the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Alpine garden, Container, Ground cover, Massing, Rock garden, Woodland garden. Prefers a cool position in a moist humus-rich soil[1]. Prefers an acid soil[200]. Thrives on heavy soils in the milder areas of the country[208]. Usually thrives in a poor soil with a northerly aspect[1]. Grows well in light woodland[200] or in a shady position in a rock garden. The plant is hardy to about -10°c[187]. The leaves and the flowers, however, are liable to be damaged by autumn frosts[200]. A very ornamental plant[1], it is sometimes grown as a house plant[200]. A polymorphic species[1], it is closely related to S. cortusifolia, differing in having runners[200]. Special Features: Attractive foliage, Not North American native, Naturalizing, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet spreading in-

# 7.2.252 Codonopsis lanceolata

odok

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Codonopsis lanceolata is a PERENNIAL CLIMBER growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees,

raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food, it is only used when all else fails. Seed - raw. Too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tins[172]

tcanta Charcoal Gum Resin Roofing WoodThe bark is very water resistant and is used for roofing and making water troughs[146, 158]. Small quantities of resin are obtained from between the bark and the wood[146]. Wood - soft to moderately hard. Used in construction, shingles, crates, household purposes etc[146, 272]. It is also valued for its use in the pulp industry to make paper[171]. An indifferent fuel but it yields a fairly good charcoal[158].

nrakta E. Asia - Himalayas, ksacta Usually found on N. and W. slopes inhabiting the drier upper areas often in association with silver fir or deodar, 2100 - 3600 metres from Afghanistan to Nepal[146].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame[78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery hed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame, Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Succeeds in most sites, including limestone[81]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. Most trees are only hardy to zone 8 (tolerating temperatures down to about -5 to -10°c) but selected clones can succeed in zone 7 with temperatures down to -15°c[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Difficult to establish because it is sensitive to frost until it is 1.5 metres or more tall, young plants should be given a position sheltered from the early morning sun[11]. Established trees can grow quite vigorously making new growth of 60cm per year for a number of years[185]. Plants in general are slow-growing[1888]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

#### 7.2.248 Amaranthus powellii

Powell's Amaranth

6 tlin 11 cvuc 2 kcak 1 tcan 0 dwat 1.8 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvif hionli

drutta Amaranthus powellii is a ANNUAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7 and is frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista No members of this genus are known to be poi-

known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves cooked as a spinach[257]. Seed - cooked[257]. Used as a flour[161, 177]. Very small but easy to harvest and very nutritious. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K].

tcanta DveYellow and green dves can be obtained from the whole plant[168]

nrakta Eastern N. America ksacta Waste places[43].

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root eas-

nwatta We have very little information on this species and do not know how well it will grow in Britain, though it should succeed as a spring-sown annual. The following notes are based on the general needs of the genus. Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196].

# 7.2.249 Achillea ageratum

Mace, Sweet-nancy

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Achillea ageratum is a PERENNIAL growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime expo-

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - raw or cooked. The initial flavour is mild and pleasant, though it becomes stronger and aromatic when the leaves are chewed, and leaves a tingly sensation in the mouth[K]. They make an acceptable addition to mixed salads. the plant is very productive, though the leaves are rather small and fiddly to pick in quantity[K]. They are also used in soups, stews etc., and as a flavouring in potato salad etc[183]. The aromatic leaves are used as a tea substitute[183]

nrakta Europe - Greece, ksacta The origin of this plant is uncertain, it is possibly a hybrid, A. ptarmica x A. macrocephala[187].

propta Seed - sow spring or early autumn in a cold frame[133]. The seed usually germinates in 1 - 3 months[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If this species is a hybrid it might not breed true from seed. Division in spring or autumn. Very easy, the divisions can be planted direct into their permanent positions. Basal cuttings of new shoots in spring. Very easy, collect the shoots when they are about 10cm tall, potting them up individually in pots and keeping them in a warm but lightly shaded position. They should root within 3 weeks and will be ready to plant out in the summer.

nwatta Succeeds in most soils but prefers a well-drained soil in a sunny position[1, 200]. It also succeeds in parsonous, but when grown on nitrogen-rich soils they are tial shade[187]. Plants live longer in a poor soil[200]. Esand prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate

pcista Products containing rosemary oil may cause erythema (redness) of the skin. Caution needed if allergies. Reportedly used as an abortifacient in large quantities but can lead to deep coma, spasm and vomiting and even death [301].

kcakta Edible Parts: Flowers Leaves ShootsEdible Uses: Condiment TeaYoung shoots, leaves and flowers - raw or cooked. The leaves have a very strong flavour that is bitter and somewhat resinous[238], the flowers are somewhat milder. They are used in small quantities as a flavouring in soups and stews, with vegetables such as peas and spinach. and with sweet dishes such as biscuits cakes, jams and jellies[1, 2, 9, 15, 27, 52, 244]. They can be used fresh or dried[21]. The leaves have a tough texture and so should either be used very finely chopped, or in sprigs that can be removed after cooking[238]. A fragrant tea is made from the fresh or dried leaves[21, 183]. It is said to be especially nice when mixed with tansy[183].

tcanta Dye Essential Hair Hedge Hedge Incense RepellentThe growing plant is said to repel insects from neighbouring plants[14, 18, 89, 201]. Branches or sachets of the leaves are often placed in clothes cupboards to keep moths away[148]. An infusion of the dried plant (both leaves and flowers) is used in shampoos[4, 14, 201]. When combined with borax and used cold, it is one of the best hair washes known and is effective against dandruff[4]. An essential oil is obtained from the leaves and flowering stems[11, 57, 89, 1711. One kilo of oil is obtained from 200 kilos of flowering stems[4]. The oil is used in perfumery, soaps, medicinally etc[11, 57, 89, 171]. It is often added to hair lotions and is said to prevent premature baldness[4]. The leaves are burnt as an incense, fumigant and disinfectant[61, 244]. The cultivar 'Prostratus' can be used as a ground cover in a sunny position[188]. This cultivar is the least hardy form of the species[188]. The plant can be grown as a hedge, it is fairly resistant to maritime exposure[49, 75], though when this is coupled with very cold weather the plants can suffer severely[11]. Any trimming is best carried out after the plant has flowered[188]. The cultivar 'Miss Jessopp's Upright' is particularly suitable for hedging[188]. 'Fastigiatus' is also very suitable[K]. A yellow-green dye is obtained from the leaves and flowers[168]. Rosmarinus officinalis 'Prostratus' Creeping rosemary is a perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, theses are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level groundcovers provide little fuel

dwatta Antiseptic Antispasmodic Appetizer Aromatherapy Aromatic Astringent Cardiac Carminative Cholagogue Diaphoretic Emmenagogue Nervine Ophthalmic Stimulant Stomachic TonicRosemary is commonly grown in the herb garden as a domestic remedy, used especially as a tonic and pick-me-up when feeling depressed, mentally tired, nervous etc[238]. Research has shown that the plant is rich in volatile oils, flavanoids and phenolic acids, which are strongly antiseptic and anti-inflammatory[238]. Rosmarinic acid has potential in the treatment of toxic shock syndrome, whilst the flavonoid diosmin is reputedly more effective than rutin in reducing capillary fragility[238]. Rosmarol, an extract from the leaves, has shown remarkably high antioxidant activity[218]. The whole plant is antiseptic, antispasmodic, aromatic, astringent, cardiac, carminative, cholagogue, diaphoretic, emmenagogue, nervine, stimulant, stomachic and tonic[4, 21, 89, 165, 218]. An infusion of the flowering stems made in a closed container to prevent the steam from escaping is effective in treating headaches, colic, colds and nervous diseases[4]. A distilled water from the flowers is used as an evewash[7]. The leaves can be harvested in the spring or summer and used fresh, they can also be dried for later use[7]. This remedy should not be prescribed for pregnant women since in excess it can cause an abortion[238]. An essential oil distilled from the stems and leaves is often used medicinally, that distilled from the flowering tops is superior but not often available[4]. The oil is applied externally as a rubefacient, added to liniments, rubbed into the temples to treat headaches and used internally as a stomachic and nervine[4]. The essential oil is used in aromatherapy. Its keyword is

'Stimulant'[210]. The German Commission E Monographs. a therapeutic guide to herbal medicine, approve Rosmarinus officinalis Rosemary for rheumatism, dyspeptic complaints, loss of appetite, blood pressure problems (see [302] for crit-

nrakta S. Europe to W. Asia. ksacta Dry scrub and rocky places, especially near the sea[50, 132].

propta Seed - sow spring in a cold frame or greenhouse. Germination can be slow. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a greenhouse or cold frame for their first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, 10 - 18 cm with a heel, July/August in a frame or shady border[4]. Very easy, they usually root within 3 weeks[K]. It is best to give the plants some protection for their first winter and then plant them out into their permanent positions in late spring or early summer. Cuttings of young shoots in spring in a frame[15]. They usually root well within 3 weeks, prick them out into individual pots and plant them out during the summer. Layering in summer[1].

nwatta Landscape Uses:Border, Container, Ground cover, Seashore. Prefers a hot sunny position and a slightly alkaline light dry soil[11, 14, 27, 37]. Dislikes very heavy soils[11]. Intolerant of excessive winter wet[200]. Likes a stony calcareous soil[200]. Plants are smaller when grown on chalky soils, but are more fragrant[4]. Fairly tolerant of maritime exposure[49, 75] and very tolerant of salt spray[244]. Succeeds in a hot dry position[200]. Hardy to between -10 and -15°c[184], but plants can be damaged or killed in severe winters, old plants are the most susceptible[11]. Rosemary is a polymorphic species that is commonly grown in the ornamental and herb gardens, there are many named varieties[183, 238]. Traditionally, the plant is a symbol of friendship and fidelity and a wreath of it would be worn by a bride to denote love and loyalty[244]. It was also carried at religious ceremonies and funerals in the belief that its pungent scent would ward of disease and evil spirits[244]. The whole plant is highly aromatic[245]. The cultivar 'Corsican Blue' is more aromatic than the type[245]. Very tolerant of pruning, plants can regenerate from old wood[202]. A good bee plant, producing pollen early in the year[7, 24, 89]. A good companion for most plants, including cabbages, beans, carrots and sage[14, 18, 54, 201]. Grows badly with potatoes[201]. Special Features: Edible, Fragrant foliage, Not North American native, Attracts butterflies, Suitable for dried flowers. Fragrant flowers. The plant is heat tolerant in zones 12 through 8. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. An evergreen. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1]. Heat Zone 12-8

# 7.2.178 Ehretia acuminata

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 9 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ehretia acuminata is a deciduous Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid

neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 144, 146, 158, 177]. About the size of a pea, it is insipidly sweet when fully ripe[2, 183]. The fruit is about 4mm in diameter[200]. The unripe fruit is sometimes used as a pickle[2, 183].

tcanta WoodWood - light, tough, soft and easily worked. Used for carrying poles[46, 61, 158].

dwatta FebrifugeThe juice of the bark is used in the treatment of fevers[272].

nrakta E. Asia - China to the Himalayas. ksacta Woodlands in valleys to 1500 metres in W. China[109, 146].

propta Seed - we have no information on this species but suggest sowing it as soon as it is ripe in a greenhouse. Sow stored seed in late winter or early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame.

nwatta Prefers a moderately fertile well-drained sandy loam in a sunny position[200]. Tolerates calcareous soils[200]. Requires a sheltered position[200]. Plants are shade tolerant in continental climates but they require more sun in maritime areas in order to ripen the wood[200]. Rich fertile soils encourage soft sappy growth which is then more susceptible to winter damage[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A tree at Kew was 6 metres tall in 1989[K]. This species is much confused with E. ovalifolia[1].

#### 7.2.179 Acer circinatum

Vine Maple

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyikfrip hpa7tli flatprikl-

wis hpa7tmwatli hjonli

drutta Acer circinatum is a deciduous Tree growing to 12 m (39ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower in April, and the seeds ripen from October to November. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy (clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[183]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (A. saccharum). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from coldwinter areas with continental climates.

tcanta Basketry Fuel Paint Preservative WoodThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20]. The young shoots are quite pliable and are used in basket making[118]. Straight shoots can be used to make open-work baskets[257]. A charcoal made from the wood can be mixed with oil and used as a black paint[257]. Wood - hard, heavy, durable, close-grained, strong according to some reports, but not strong according to others. Too small to be commercially important, the wood is used for cart shafts, tool handles, small boxes etc[46, 61, 82, 118, 226, 229, 257]. One report says that the wood is quite pliable and was used for making bows, snowshoe frames etc, whilst young saplings could be used as swings for baby cradles[257]. The wood is almost impossible to burn when green and has served as a cauldron hook over the fire[226].

dwatta Astringent DysenteryThe wood was burnt to charcoal and mixed with water and brown sugar then used in the treatment of dysentery and polio[257].

nrakta Western N. America - British Columbia to California. ksacta Forests, along banks of streams and in rich alluvial soils of bottomlands up to 1200 metres[82].

propta Seed is usually of good quality when produced in gardens. It is best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored

seed for 24 hours and then stratify for 2 - 4 months at 1 -8°c. It can be slow or very poor to germinate, especially if it has been dried. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. This tree often self-layers and can be propagated by this means. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Cultivars of this species can be grafted onto A. palmatum, which makes a better rootstock than this species.

nwatta Landscape Uses: Specimen. Of easy cultivation. it succeeds in most good soils[11], preferring a good moist well-drained soil on the acid side[182]. Prefers a sunny position but tolerates some shade[11, 200]. Grows well in heavy clay soils. Plants are hardy to about -20°c[184]. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. A very ornamental tree[1], a number of varieties are in cultivation[11, 200]. The branches tend to coil around other trees in much the same way as vines[226]. (A strange report because vines do not coil but climb by means of tendrils formed in the leaf axils[K].) The tree sends out long slender arching branches in the wild. These form roots when they touch the ground and the plant thereby forms large impenetrable thickets often several hectares in extent[82]. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features: North American native, Inconspicuous flowers

# 7.2.180 Crambe kotschvana

6tlin 9 cyuc 2 kcak 0 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Crambe kotschyana is a PERENNIAL growing to 2.5 m (8ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - cooked[51]. Used as a vegetable[266]. Root - cooked[51, 145]. Used as a vegetable[266]. Nutritious[74].

dwatta AntipruriticAntipruritic[145].

nrakta E. Asia - Himalayas. ksacta Rocky slopes to 4300 metres[51]. On humus rich soils, usually below rocky cliffs, 2000 - 2500 metres in Kashmir[145].

propta Seed - sow March/April in a seedbed outdoors and either thin the plants out or move them to their permanent positions when about 10cm tall[111]. The young plants are very attractive to slugs so some protection will often be needed. Germination can be slow so it is best to sow the seed in pots in a cold frame[164]. Germination usually takes place in 3 - 26 weeks at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions when they are at least 10cm tall. Division in spring or autumn[1, 111]. Dig up the root clump and cut off as many sections as you require, making sure they all have at least one growing point. The larger of these divisions can be planted out straight into their permanent positions, though small ones are best potted up and grown on in a cold frame until they are established. Root cuttings, 3 - 10 cm long, in spring[104]. These can be planted straight into the open ground or you can pot them up in the greenhouse and plant them out once they are growing

well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The cones are about 8 - 10mm in diameter[200].

tcanta A good low ground cover[11], though plants take about 2 years to form effective cover[197]. Plants should be spaced about 90cm apart each way[208].

nrakta E. Asia - Japan. ksacta Sandy seashores all over Japan[58].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Cascades, Container, Erosion control, Ground cover, Massing, Seashore. Succeeds in hot, dry sandy soils and in maritime exposure[11, 166, 200]. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11]. Succeeds in poor soils and tolerates light shade[197]. Plants are not reliably hardy in the coldest areas of the country[208]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Fragrant foliage, Not North American native, There are no flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

#### 7.2.245 Commelina dianthifolia

Birdbill Dayflower

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.1 m hkuc

hmimhtut cyutli kyutcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Commelina dianthifolia is a PERENNIAL growing to 0.1 m (0ft 4im). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: The following use is for the closely related C. tuberosa, but is also probably appropriate for this species[K]. Tubers - cooked. Rich in starch[105, 177], but with a fairly bland flavour.

dwatta Aphrodisiac TBAn infusion of the plant is used as an aphrodisiac[207] and as a strengthener for weakened patients with tuberculosis[257].

nrakta South-western N. America. ksacta Rocky soils in Arizona, Colorado, New Mexico, Texas and Mexico[270].

propta Seed - sow March in a greenhouse. The seed usually germinates in 4 - 5 weeks at 20°c[164]. When they are large enough to handle, prick the seedlings out into individual pots plant them out in late spring or early summer, after the last expected frosts. Division in early spring. Make sure that each portion has at least one growing bud[111, K]. Cuttings during the growing season. Very easy 2001.

nwatta Prefers a light well-drained loam with added leafmold[42]. Succeeds in an ordinary, reasonably moist soil in a sunny position with some shelter[164]. Plants are hardy to about -10°c if the roots are protected from freezing[187]. It is probably best to dig up the roots in autumn and store them like dahlias in a cool frost free place[200]. When grown in a light well-drained soil and mulched well, the roots usually survive the winter outdoors[1]. This species is closely related to C. tuberosa[200]. The flowers are very ephemeral, individual flowers only living for a few hours[266].

# 7.2.246 Vaccinium myrsinites

Florida Evergreen Blueberry, Shiny blueberry 6 tlin 9 cvuc 2 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium myrsinites is an evergreen Shrub growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked in pies etc[46, 61, 105, 177, 183]. The fruit is about 6mm in diameter[200].

dwatta Analgesic Febrifuge OphthalmicThe leaves are analgesic, febrifuge and ophthalmic[257]. An infusion has been used in the treatment of colds, sun sickness, eye diseases, headaches, high fever and diarrhoea[257].

nrakta South-eastern N. America. ksacta Pinelands scrub prairies and open woods in acid soils[72].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Plants are not very hardy in many parts of Britain but they grow well south and west of London[11]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

# 7.2.247 Picea smithiana

Morinda Spruce

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 30 m hkuc

htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Picea smithiana is an evergreen Tree growing to 30 m (98ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark Seed SeedpodEdible Uses: Condiment Gum TeaYoung male catkins -

#### 7.2.241 Micromeria chamissonis

Yerha Buena

6 tlin 9 cvuc 2 kcak 2 tcan 2 dwat 0.1 m hkuc

hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Micromeria chamissonis is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: TeaThe dried leaves, steeped in boiling water, make a palatable mint-flavoured tea[183, 207, 256, 257]. The dried leafy spines are used according to other reports[161, 177].

tcanta EssentialThe leaves have been placed in clothing as a perfume[257]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Anthelmintic Aphrodisiac Blood purifier Digestive Febrifuge Kidney Sedative TonicThe whole plant is aphrodisiac, blood purifier, mildly digestive, febrifuge, sedative and tonic[207, 256, 257]. An infusion can be used in the treatment of insomnia, colic, upset stomachs, kidney problems, colds and fevers[257]. A decoction of the plant has been used to get rid of pinworms[257]. The decoction has also been used as an aphrodisiac[257]. A poultice of the warm leaves have been applied to the jaw, or the plant held in the mouth, as a treatment for toothache[257].

nrakta Western N. America - southern British Columbia to southern California. ksacta Coniferous woods[60].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in early summer. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Division of the rooted prostrate stems in the spring.

nwatta Prefers an open position in a well-drained soil[1]. Succeeds in poor soils [200]. Plants grow best and live longer when grown in an open sunny position and a dry sandy soil[245]. A prostate plant, the stems forming roots at the leaf axils wherever they come into contact with the soil[245]. The bruised leaves release a most refreshing lemony scent resembling verbena[245]. Micromeria chamissonis (Benth.) Greene is a synonym of Micromeria douglasii Benth. Satureja douglasii (Benth.) Briq. is a synonym of Micromeria douglasii Benth. For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 7.2.242 Adenophora denticulata

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Adenophora denticulata is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable off. light (sandy) and medium (loamy) soils. Suitable off. mildly

acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Root<br/>Edible Uses: Root - cooked. A sweet flavour<br/>[74].  $\,$ 

nrakta E. Europe - Dahuria ksacta Found in broad-leaved forests, especially oak, and in thickets and meadows[74].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. The seed can also be sown in spring. Surface sow 2 - 3 seeds per pot in the spring in order to avoid transplanting[133]. We have found that if transplanted when very small seedlings grow away without difficulty[K]. Germinates in 1 - 3 months at  $10^{\circ}$ c[133]. Plant out into their permanent positions whilst young. Basal cuttings in spring[K]. Division in spring - very difficult because the plant dislikes root disturbance[1].

nwatta Prefers a light rich slightly alkaline soil that is not too dry, and a warm sunny position[1, 200]. Intolerant of root disturbance[1]. The young growth is extremely attractive to slugs, they have been known to destroy even mature plants[K].

# 7.2.243 Podocarpus nubigenus

Chilean Podocarn

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 20 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik

drutta Podocarpus nubigenus is an evergreen Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Superficially similar to Taxus species, but this plant is definitely not poisonous[200].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. About 8mm long[200]. We have seen no reports for this species but it is most likely that the fruit is edible.

tcanta WoodWood - straight grained, reddish, very durable lasting a long time in water, but it can be brittle. Used for construction work and cabinet making[1, 11, 46, 61, 128].

nrakta S. America - S. Chile, S.W. Argentina. ksacta Grows in moist forests, where annual rainfall can be up to 5,000 millimetres, in association with Fitzroya cupressoides and Nothofagus dombevil 111.

propta The seed can be sown at any time of the year in a sandy soil in a warm greenhouse, though it is probably best sown as soon as it is ripe[1]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe terminal shoots, 5 - 10cm long, July/August in a frame[78].

nwatta Prefers a rich moist non-alkaline soil[167]. Shade tolerant, at least when young[200]. This species is hardy to about -25°c, but the plants grow best in humid areas with high rainfall, mild winters and cool summers[200]. They are not really happy in the drier eastern half of the county[11]. Closely related to P totara[200]. A good plant for the rock garden[200]. Very tolerant of pruning[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 7.2.244 Juniperus conferta

Shore Juniper

1152

6 tlin 10 cyuc 2 kcak 3 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus conferta is an evergreen Shrub growing to 0.2 m (0ft 8in) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is diocious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers

nwatta An easily grown plant, succeeding in a good loam an open sunny position[1]. Prefers a slightly alkaline soil in a position sheltered from strong winds[200]. Tolerates poor soil and some shade[200]. Dislikes acid soils[1]. Prefers a rather dry soil[187]. Plants are hardy to about -20°c[187]. A deep-rooted plant[233], it dislikes root disturbance[164]. Plants can be grown in the summer meadow if the grass is not cut too low (since this would damage the growing point)[200]. A good bee plant[74]. Very closely related to C. cordifolia[200] and considered by some botanists to be no more than a variety of that species, differing mainly in its larger flowers[1].

# 7.2.181 Citroncirus webberi

Citrange

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Citroncirus webberi is an evergreen Tree. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The acid fruit can be used for drinks and marmalade[183, 200]. The fruit is 5 - 7cm in diameter[200].

tcanta RootstockThis species can be used as a rootstock for the sweet orange, conferring a greater tolerance to cold weather[183].

nrakta A bi-generic hybrid, Citrus sinensis x Poncirus trifoliata[200]. ksacta Not known in the wild.

propta The following notes are based on Citrus species. They are probably applicable here as well, even though this is a bi-generic hybrid, since any seed might be produced polyembrionically. The seed is best sown in a greenhouse as soon as it ripe after thoroughly rinsing it[164, 200]. Sow stored seed in March in a greenhouse[3]. Germination usually takes place within 2 - 3 weeks at 13°c. Seedlings are liable to damp off so they must be watered with care and kept well ventilated. The seed is usually polyembrionic, two or more seedlings arise from each seed and they are genetically identical to the parent but they do not usually carry any virus that might be present in the parent plant[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least three growing seasons before trying them outdoors. Plant them out in the summer and give them some protection from the cold for their first few winters outdoors. Cuttings of half-ripe wood, July/August in a frame. Layering in October.

nwatta Prefers a moderately heavy loam with a generous amount of compost and sand added and a very sunny position[1, 200]. When growing plants in pots, a compost comprising equal quantities of loam and leafmould plus a little charcoal should produce good results[260]. Do not use manure since Citrus species dislike it[260]. When watering pot plants it is important to neither overwater or underwater since the plant will soon complain by turning yellow and dying. Water only when the compost is almost dry, but do not allow it to become completely dry[260]. Reasonably cold resistant, dormant plants can tolerate temperatures down to about -10°c, especially if they are grafted onto a Poncirus trifoliata rootstock[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A group of hybrids of garden origin, Poncirus trifoliata x Citrus sinensis[183]. Generally, these hybrids combine the qualities of cold hardiness and bitterness from Poncirus trifoliata with the larger more orange-like fruits of Citrus sinensis[183]. They are occasionally cultivated for their edible fruit, but more usually for their use as a rootstock, there are some named varieties[183, 200]. 'Morton' has very juicy fruits and is cold resistant[200]. 'Rusk' is very juicy and much less bitter than most forms[200].

# 7.2.182 Scirpus validus creber

Soft-Stem Bulrush

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scirpus validus creber is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Leaves Pollen Root SeedEdible Uses: Root - raw or cooked[159, 161, 172, 183]. Rich in starch. The bruised young roots, when boiled in water, furnish a sweet syrup[183]. The rhizomes are 3 - 10mm in diameter[270]. Young shoots - cooked[55, 62, 85, 183]. The tender base of the stem is eaten raw in salads[183]. The pollen is used in soups or mixed with flour and used in making bread[177, 183]. It is rich in protein. Seed[62, 85, 159, 183]. No further details are given but it is probably ground into a powder and used in making bread etc. Small and rather fiddly to harvest and utilize.

tcanta Basketry WeavingThe stems are used in weaving and basket making[189, 257]. They are used to make good quality mats for use on the floor, for sleeping on and for making temporary partitions[257]. The stems are pulled off the plant rather than cut to ensure the maximum length of stem[257].

dwatta Astringent DiureticThe root is astringent and diuretic[152].

nrakta N. America - all areas except the extreme north. ksacta Fresh to brackish marshes, fens, bogs, lakes, stream banks and bars, pioneering in disturbed places, often emergent in water up to 1 metre deep, from sea level to elevations of 2400 metres[270].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta We have very little information on this species and do not know if it will be hardy in Britain. However, judging by its native range, it is likely to succeed outdoors at least in the milder areas of the country. The following notes are based on the general needs of the genus. This species may be no more than a synonym for Schoenoplectus tabernaemontani[270]. Succeeds in any wet to moisture retentive ground, pond margins and shallow water in full sun or shade[200].

# 7.2.183 Podocarpus alpinus

Tasmanian Podocarp

1129

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Podocarpus alpinus is an evergreen Shrub growing to 2 m (6ft) by 2.5 m (8ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen in October. The species is diocious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Superficially similar to Taxus species, but this plant is definitely not poisonous[200].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is about 6mm x 5mm in size with a single seed[11, 200]. Although we have seen no specific reports of

edibility for this fruit, it is closely related to other species with edible fruits and is very unlikely to be poisonous - we have indeed eaten it on a number of occasions and it has a mucilaginous texture with a slightly sweet flavour[K].

tcanta WoodWood

nrakta Australia - New South Wales, Tasmania, Victoria, ksacta Screes and ridges in alpine and subalpine areas[286].

propta The seed can be sown at any time of the year in a sandy soil in a warm greenhouse, though it is probably best sown as soon as it is ripe[1]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe terminal shoots, 5 - 10cm long, July/August in a frame[78].

nwatta Prefers a rich moist non-alkaline soil[167] Plants are shade tolerant, at least when young[200]. Hardy to about -25°c, but plants grow best in humid areas with high rainfall and mild winters[200]. Plants often fruit freely in Britain[200]. There is some doubt over the correct name for this species - the Flora of Australia says that it is a synonym of P. lawrencei[286], a species which, according to our records, only occurs in New Zealand[200]. A very slow growing plant, reaching 1.5 metres tall in 50 years at Kew Gardens[11]. It is a good plant for the rock garden[200]. Plants are very tolerant of pruning[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Occasional plants are monoecious[286]

#### 7.2.184 Carex arenaria

Sand Sedge

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasilut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Carex arenaria is a PERENNIAL growing to 0.5 m (1ft 8in) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Root SeedEdible Uses: Root cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta Soil stabilizationThe long creeping rootstock is valuable for binding sandy soils[1, 4, 115].

dwatta Antiflatulent Antirheumatic Diaphoretic Diuretic Eczema Hypoglycaemic TBThe root is diaphoretic and diuretic[4, 7, 9, 21, 61]. An infusion has been used in the treatment of bronchitis and catarrhs, abdominal and stomach disorders, liver complaints, arthritis and rheumatism and skin conditions such as eczema and pruritus[9]. It has been used as a substitute for the tropical plant sarsaparilla[4]. The root is harvested in the spring and dried for later use[9].

nrakta Coastal areas of Europe, including Britain, the Black Sea, Siberia and N. America, ksacta Sandy sea shores. especially on fixed dunes and wind-blown sand[1, 9, 17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Best grown in a sandy soil in a sunny position[200]. Tolerates maritime exposure[17]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 7.2.185 Ouercus marilandica

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hyisjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Quercus marilandica is a deciduous Tree growing to 10 m (32ft) by 7 m (23ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[63, 105]. Used in times of scarcity[257]. The seed is about 2cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Charcoal Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - heavy, hard, strong, close grained[82]. It weighs 46lb per cubic foot[227], but is too small to be of commercial value and is only used for fence posts, charcoal and fuel[82, 149, 229].

dwatta Astringent Birthing aid DysenteryAn infusion of the tree bark coal has been taken to ease childbirth, remove the afterbirth and ease cramps[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Central and South-eastern N. America - New York to Florida, west to Iowa and Texas. ksacta Dry siliceous or argillaceous barrens and sterile woods[43].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Specimen. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Trees are tolerant of dry sandy sterile soils[229]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A slow-growing and short-lived tree[200, 229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Inconspicuous flowers or blooms.

very acid soils[17]. Plants are fairly wind tolerant[1, 11]. trunk is tapped in the early spring, the sap flowing better on An upright growing tree that does not produce suckers[183]. This species is closely related to C. ferox[11, 200]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

# 7.2.238 Torreva fargesii

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 20 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nvanhjen hjonli

drutta Torreya fargesii is an evergreen Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Oil Oil SeedEdible Uses: Oil OilSeed[81]. No further details are given, but it is likely to be oily and to be eaten raw or cooked. An oil is obtained from the seed[105, 177].

tcanta Oil Oil WoodAn oil is extracted from the seed[266]. The high quality timber is used in constructing houses, bridges, and furniture, and making implements and utensils[266]

nrakta E. Asia - E. China. ksacta Woodlands, 1000 - 1600 metres[109]. Coniferous, mixed, and broad-leaved forests at an elevation of 1000 - 3400 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Some of the seed should germinate in the following spring though much of it might take another 12 months. Stored seed requires a period of cold stratification and can take 18 months or more to germinate. Prick out the seedlings into individual pots as soon as growth is observed and grow them on in light shade in the greenhouse for at least the next couple of winters, making sure to pot them on into larger pots as and when required. Plant them out into their permanent positions in early summer when the plants are at least 20cm tall. Cuttings of half-ripe shoots in late summer[1]. Cuttings do not grow well[11]. Layering.

nwatta Succeeds in ordinary garden soil, tolerating some lime[1]. Requires a sheltered position and either high humidity or a moist riverside soil[200]. Dislikes wind exposure[200]. Tolerates woodland shade very well[200]. Requires hot, very humid summers for best growth[200]. This species is considered to be suitable for afforestation and reforestation in China[266].. Trees are hardy only in the milder areas of Britain[81]. The seed takes two summers to mature[229]. Plants are dioecious, but sometimes monoecious plants are seen bearing dioecious branches. Male and female plants must be grown if seed and fruit is required.

#### 7.2.239 Acer distylum

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Acer distylum is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SapEdible Uses: SweetenerThe sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177, 183]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (A. saccharum). The tree

warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates.

tcanta PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - Japan ksacta Mountains in C. and S. Japan[58]. In temperate deciduous forests a elevations of 700 - 1600 metres[275].

propta Seed of plants grown in gardens can be relied upon to breed true. It is best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. This species is quite difficult to grow away well from cuttings.

nwatta Of easy cultivation, it prefers a good moist welldrained soil[11], preferring a sunny position but tolerating some shade[11, 200]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Plants are usuallu monoecious, but hermaphrodite forms oc-

# 7.2.240 Brassica rapa trilocularis

Indian Colza

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica rapa trilocularis is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves Oil OilEdible Uses: Oil Oil-Leaves - raw or cooked. Used as a vegetable or fermented and stored for winter use[272]. A bit on the coarse side, though the young leaves can be added in moderation to salads whilst older leaves make an acceptable vegetable [K]. An edible oil is obtained from the seeds. It is used for cooking[272].

tcanta Lighting Oil OilThe oil from the seed is used for lighting[272]. The seed husks are used in plastering house walls[272].

nrakta A cultivated form of B, rapa, ksacta Not known in the wild

propta Seed - sow in situ April to September[206]. Some varieties can also be sown in a cold greenhouse in late autumn, winter or early spring to provide leaves overwinter and in late spring

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Prefers a light sandy soil and dislikes a heavy soil[37]. Prefers cool moist growing conditions[16]. Succeeds in any reasonable soil. Tolerates a pH in the range 4.3 to 8.3. Indian colza is cultivated mainly in India and Nepal for its oil-rich seeds.

a warm position against a sunny wall[219]. Plants are selfincompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. A foetid smelling plant[58], but the flowers are very fragrant with a jonquil-like scent[219, 245]. This species is closely related to V. odoratissimum[1].

# 7.2.235 Thymus caespititius

Cretan Thyme

6 tlin 9 cvuc 2 kcak 0 tcan 2 dwat 0.1 m hkuc

htut cyutli kyuctcup hwicli hrasilut hpa7tli priklwis hna7tmwatli xre7t hionli

drutta Thymus caespititius is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe plant is sometimes used as a condiment in cooked foods. The fresh leaves have a tangerine-like scent and can be used with or instead of lemon-scented thyme, Thymus citriodorus[183, 238]. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200].

tcanta Deodorant Disinfectant EssentialThe essential oil obtained from the leaves is also used in perfumery, as a mouth wash, medicinally etc[200].

dwatta Antiseptic Deodorant DisinfectantThe leaves, and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta S.W. Europe - Portugal, N.W. Spain. ksacta Dry stony slopes and gullies[238].

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual nots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Prefers a light, well-drained calcareous soil and a sunny position[200]. Plants tolerate occasional walking on and can be grown in cracks in paths, they also succeed on walls[200]. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to at least -15°c[238]. There is at least one named variety. 'Celery' is a low compact grower that forms small mounds of growth. The leaves have a celery-like flavour[183]. The flowers are rich in nectar and are very attractive to honey bees[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200].

#### 7.2.236 Cornus sessilis

Blackfruit dogwood

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cornus sessilis is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in April, and the seeds ripen in September. The species is hermaphrodite (has both male

1150

and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The following note is for the closely related C. officinalis. It can probably also be applied to this species[K]. The fruit of this species is about 1 - 1.5cm long[200]:- Fruit - raw or cooked[105, 177]. The fully ripe fruit is quite pleasant but slightly astringent[K]. It is about 1.5cm long[200]. The fruit contains about 8.6% sugars, 2.9% malic acid, 0.74% ash[179].

nrakta Western N. America - N. California, ksacta Stream banks to 1500 metres[71].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80. 1131. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164], Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage [78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. This species is very closely related to C. mas and C. officinalis[200]. Plants in this genus are notably resistant to honey fungus[200].

# 7.2.237 Corvlus tibetica

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fvif hionli

drutta Corylus tibetica is a deciduous Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[63, 105, 146, 177]. Rich in oil. The seed, in its shell, is about 10 - 15mm in diameter[266]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled. the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

nrakta E. Asia - Tibet, Himalayas. ksacta Mixed forests, 1500 - 3600 metres[266].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3 - 4 months cold stratification[164]. Germinates in 1 - 6 months at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer [K]. Layering in autumn. Easy, it takes about 6 months[78 200]

nwatta An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes

#### 7.2.186 Arisaema flavum

6 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 0.4 m hkuc pcimhmimhtut cyutli hgattcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli dyat hjonli

drutta Arisaema flavum is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from June to July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked and used as a vegetable[272]. Some caution is advised, see the notes above on toxicity.

tcanta InsecticideUsed as a pesticide[91]. No further details are given, but the report might be referring to the

dwatta Antispasmodic Epilepsy ExpectorantExpectorant. It is used in the treatment of chronic tracheitis, bronchiectasis, tetanus and epilepsy[91].

nrakta E. Asia - Himalayas to China. N. Africa - Yemen. ksacta Mountain slopes, farmland edges and roadsides in sub-alpine steppe, 3500 - 4300 metres in Tibet[91]. Locally common in Kashmir on humus-rich soils[145].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame[134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1 - 6 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer

nwatta Prefers a cool moist peaty soil in the bog, woodland garden or a sheltered border in semi-shade[134, 200]. Prefers a loamy or peaty soil[1] and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too exposed[1, 200]. This species is the most drought tolerant member of the genus. Plants are nearly hardy in Britain, they normally succeed outdoors in the milder areas of the country[1]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants need protection from slugs[200]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year. The flowers of this species are usually either monoecious or all male[266].

#### 7.2.187 Rosa banksiae

Banksia Rose

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 10 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rosa banksiae is a deciduous Shrub growing to 10 m (32ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit raw or cooked. The fruit is about 7mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta Dye Preservative Tannin Tannin obtained from the root bark is used as a brown dve for rope and also to preserve and strengthen rope that is to be immersed in water[46, 61,

dwatta Anthelmintic Astringent Bitter Cancer Tonic VulneraryThe plant is rich in tannins and is used as an astringent[218]. The root is anthelmintic, astringent, bitter and tonic[240]. The leaves are said to be a good vulnerary[240]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A. C and E. flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - China. Naturalized in Austria and Germany[50]. ksacta Growing into trees or hanging down ravines and rocky places to altitudes of 1000 metres in W. China[109, 260].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel. Iuly in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering, Takes 12 months[11]

nwatta Succeeds in most soils[11], preferring a circumneutral soil[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Requires a very sunny position if it s to flower well[11, 245]. This species does not thrive in the cooler moister parts of Britain, growing best in the southeast of the country[11]. It is best given a position on a sunny sheltered wall[219]. A very ornamental plant[1]. After planting out, it takes a few years to settle down and commence flowering[219]. Flowers are produced mainly on wood that is 2 - 3 years old[219]. The flowers have a violet-like perfume[245]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

# 7.2.188 Quercus pungens

Sandpaper Oak, Pungent oak 6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hna7tmwatli hionli

drutta Quercus pungens is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Coffee GumSeed - cooked[161, 177]. The seed is small, up to 1cm long[200]. Up to 22mm according to another report[229]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute. A gum obtained from the bark can be used for chewing[257].

tcanta Dye Gum Repellent TanninA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A tan-coloured dye is obtained from the bark[257].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-western N. America - Texas, New Mexico, Arizona and Mexico. ksacta On dry limestone or igneous slopes, usually in oak, pinyon, and juniper woodlands, chaparral, and sometimes descending into desert vegetation at elevations of 800 - 2000 metres[270].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 7.2.189 Cardiocrinum cordatum

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.8 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cardiocrinum cordatum is a BULB growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: An edible starch is obtained from the bulb[46, 61, 105]. Young leaves - cooked. This use will considerably weaken the plant and is not to be recommended in normal situations[46, 61].

nrakta E. Asia - Japan. ksacta Conifer, oak and bamboo woods in mountains in cool moist situations, especially in N. Japan[47, 90].

propta Seed - best sown as soon as it is ripe in a cold frame in the autumn. The plant has delayed epigeal germination and will often germinate in the spring but can take up to 2 years especially if the seed is stored prior to being sown[134]. An alternative is to mix the seed with some moist leafmould and seal it in a plastic bag. Keep this at a temperature of 20°c for 3 weeks then pot up any seed that germinates and place the rest in a fridge for 4 - 5 weeks at 3 - 5°c before sowing in a warm place[138]. Seedlings should be grown on nots in a shaded position in a cold frame or greenhouse for 3 - 4 years before planting them out in their permanent positions[138]. Bulblets are obtained from the base of the old plant after flowering. Pot up and plant out when well established.

nwatta Prefers a moist well-drained position in shade and a soil that is rich in leafmould[47, 200]. Requires a deep, very fertile humus-laden soil[233]. Prefers growing in woodland conditions[42, 200]. The dormant plant is in general hardy to about -10°c but it comes into growth very early in the year, sometimes in February, and the young growth is susceptible to frost damage[90, 200]. A monocarpic plant, the bulb takes about 7 years to reach flowering size but then dies after flowering. However, it produces a number of new bulblets at the base and can be propagated by these[47, 200]. These bulblets take 3 - 5 years to flower[200]. The flowers are sweetly scented[245]. When planting, only just cover the bulb with leafmould[47]. The bulb is very attractive to slugs, mice and voles and may require protection[200]. Plants seem to be immune to the predations of rabbits[233].

#### 7.2.190 Pinus culminicola

Cerro Potosi Pinvon

6 tlin 9 cvuc 2 kcak 0 tcan 2 dwat 5 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus culminicola is an evergreen Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: SeedEdible Uses: CondimentSeedraw or cooked[81]. The oil-rich seed has a resinous flavour. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile 641. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc.

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and

the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 2001.

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Requires a sunny position[11]. Hardy to about -20°c[200]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. The fruit is produced on long sprigs and is therefore easier to harvest[119]. It is being used in modern breeding programmes for blackcurrants[119].

# 7.2.232 Centaurea depressa

Iranian knapweed

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Centaurea depressa is a ANNUAL/PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Édible Parts: RootEdible Uses: Root - cooked. An agreeable flavour[2, 105].

nrakta W. Asia - Iran and the Caucasus. Naturalized in S.E. Europe[50]. ksacta Fields and roadsides to 2300 metres in S. Europe[50].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. The seed can also be sown as soon as it is ripe in the late summer in a greenhouse and planted out in the late spring. Division in autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. This should be done at least once every three years in order to maintain the vigour of the plants. Basal cuttings in spring. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. A very ornamental plant[1]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 7.2.233 Glaucium flavum

Horned Poppy, Yellow hornpoppy 6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwici hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Glaucium flavum is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Root is poisonous.

kcakta Edible Parts: Oil OilEdible Uses: Oil OilA clear yellow edible oil is obtained from the seed[2, 46, 61, 183].

tcanta Oil OilAn oil obtained from the seed is used for as a fuel for lighting, it burns cleanly[2]. It is also used in soap making[46]

dwatta PoulticePoultice[66].

nrakta Usually near the coast in W. Europe, including Britain, to the Mediterranean and W. Asia. ksacta Shingle banks by the coast[17].

propta The seed can be sown in the middle of spring or in autumn in a cold frame. A period of cold stratification improves germination. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts[1]. If you have sufficient seed it should be worthwhile trying an outdoor sowing in situ in mid spring[1].

nwatta Easily grown in any good well-drained soil[1, 200]. Requires a very well-drained poor soil[187]. Prefers a hot dry position[166] and dislikes shade[200]. A very ornamental but short-lived perennial[1], it is hardy to about -10°c[187]. Plants are resentful of root disturbance and should be placed in their final positions as soon as possible[200]. Flowers are produced in the first year from seed[200].

# 7.2.234 Viburnum japonicum

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum japonicum is an evergreen Shrub growing to 1.8 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[105, 177]. The ovoid fruit is about 8mm long and contains a single large seed[200]. Leaves - cooked. A famine food, they are only used when all else fails[179].

nrakta E. Asia - Japan, Formosa. ksacta In coastal thickets and forests at elevations of 5 - 500 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possible. July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Requires woodland conditions but without competition from other plants. Best if given shade from the early morning sun in spring[200]. This species is hardy at Kew Botanical Gardens but it prefers a warmer climate[11]. Plants are slow-growing in Britain[219], they probably do best if given

growth, otherwise plant them out in late spring or early summer of the following year. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. Cuttings of soft wood in May or June.

nwatta Succeeds in almost any well-drained soil[1]. A polymorphic species[58]. Plants are best grown in a rock garden[1].

# 7.2.229 Chrysolepis

Golden Chinquapin, Giant chinquapin 6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 20 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Chrysolepis is an evergreen Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind, midges. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Seed - raw or cooked[22, 46]. Very sweet and much appreciated[63, 71, 82, 105, 183]. The seed can also be dried, ground into a powder and used as a thickening in soups, mixed with cereals when making bread etc[257]. The seed is about 1cm long and has a hard shell[183].

tcanta Wood - fine-grained, light, soft, not strong. Occasionally used for making ploughs and other agricultural implements, and also as a fuel[46, 61, 82, 229].

nrakta South-western N. America - Washington to Oregon and California. ksacta Forested slopes near the coast in California[71]. Found in many soil types ranging from dry and rocky to deep rich soils[229].

propta Seed - best sown in a cold frame as soon as it is ripe, the seed must be protected from mice etc[200]. The seed has a short viability and should not be allowed to dry out. If stored overwinter it should be kept cool and moist. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors.

nwatta Requires a lime-free soil[1]. Prefers a sheltered semi-shaded position and a light deep moist soil[1, 11]. A very ornamental tree[183], it is slow to moderate growing and can live 400 - 500 years in the wild[229]. One report says that this species only succeeds in Oceanic and Mediterranean climates[200]. This species has a very wide natural range in N. America, seeds should be tried from various provenances to find more suitable selections for Britain[11]. Another report says that the plant is only found in a small area of California and Oregon, but that it grows on a wide range of soil types[229]. There are trees 16 metres tall in Surrey and Buckinghamshire[11], it also fruits in Cornwall[59] and fruits well in addition to self-sowing at Edinburgh botanical gardens[11]. Flowers are produced on the current years growth, the seed taking two summers to mature[229]. The catkins have an unpleasant hawthornlike smell to attract midges for their pollination[245]. This species resists chestnut blight[200].

# 7.2.230 Griselinia littoralis

 $6\ tlin\ 9\ cyuc\ 2\ kcak\ 0\ tcan\ 0\ dwat\ 6\ m\ hkuc$ hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Griselinia littoralis is an evergreen Shrub growing to 6 m (19ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required).

. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - a bitter flavour[173].

tcanta Hedge Hedge WoodGrows well by the sea, making a good hedge that tolerates maritime exposure[11, 29, 49]. Plants are very amenable to trimming[200], they are best cut in early summer[188] and can be cut right back into old wood if required. A slow-growing plant, but it makes a nice dense hedge[K]. Wood - very durable, firm, dense but slightly brittle. Used for ship building, railway sleepers etc[46, 61, 123].

nrakta New Zealand. ksacta Lowland to montane forests in North, South and Stewart Islands[44].

propta Seed - best sown as soon as ripe in a greenhouse. It can also be sown in the spring in a cold frame. Prick out the seedlings when they are large enough to handle and grow on for at least their first winter in a greenhouse. Plant out in late spring after the last expected frosts and give some protection for their first winter outdoors. Cuttings of half-ripe wood 7 cm with a heel, July/August in a frame. Keep the foliage moist. Pot up in August and overwinter in a sheltered position, planting out in late spring after the last expected frosts[78]. Cuttings of mature wood, 7 - 10 cm with a heel, October/November in a frame. High percentage[78].

nwatta Prefers a rich light loam in sun or semishade[200]. Tolerates chalky soils[11]. Plants are very tolerant of strong maritime winds[182] but they can be damaged by cold dry winds. Tolerating temperatures down to about -10°c, this species is somewhat tender in most parts of Britain[11] though it usually regrows if cut back by frost[200]. The young shoots in spring are often cut back by late frosts[K]. Very tolerant of root disturbance, it transplants well even when quite large though it would then require staking at first when growing in exposed positions[166]. A number of cultivars have been developed for their ornamental value[182, 200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. It self-sows abundantly in the milder areas of Britain if both sexes are grown[11].

#### 7.2.231 Ribes bracteosum

Stink Currant

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 2.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes bracteosum is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 85, 101, 118]. Not very palatable[200]. The fruit can cause stomach upsets if eaten in large quantities[257]. The fruit has a mild blackcurrant flavour, though it is not so juicy, has a mealy texture and a slight bitterness[K]. It ripens in September and is acceptable in small quantities raw[K], it can also be used in pies, preserves etc and makes an excellent jam[177, 183]. Native North American Indians considered the fruit to be constipating and so would eat it with oil[256]. The fruit is about 5mm in diameter[200], it is produced on long racemes, making it much easier to harvest than most currants[K].

dwatta Laxative MiscellanyThe fruits can be eaten in quantity as a laxative [257]. An infusion of the stems has been given to children as a treatment for colds [257].

nrakta South-western N. America. ksacta Stream banks and moist woods, especially by seepages[60].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 2 to 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out

as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta South-western N. America - Mexico. ksacta Found only in one site on a mountain in Nuevo Leon in Mexico[120], growing in cloud forest above 3,000 metres[260].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought, succeeding in hot dry positions[200]. A slow growing plant[81], but when mature it is fully hardy in Britain[200]. Young trees are less hardy than mature specimens, only tolerating temperatures down to about -3°c[260]. Plants are often sub-dioecious[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. The cones open and shed their seed whilst still attached to the tree[226]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Plants in this genus are notably susceptible to honey fungus[200].

# 7.2.191 Viburnum erosum

/iburnum

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Viburnum erosum is a deciduous Shrub growing to 1.8 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The ovoid fruit is about 8mm long and contains a single large seed[200].

nrakta E. Asia - China, Japan. ksacta Sunny hills and low elevations in mountains, C. and S. Japan[58].

propta Seed - best sown in a cold frame as soon as it is ripe. Germination can be slow, sometimes taking more than 18 months. If the seed is harvested 'green' (when it has fully developed but before it has fully ripened) and sown immediately in a cold frame, it should germinate in the spring[80]. Stored seed will require 2 months warm then 3 months cold stratification and can still take 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse. Plant out into their permanent positions in late spring or early summer of the following year. Cuttings of soft-wood, early summer in a frame[200]. Pot up into individual pots once they start to root and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, 5 - 8 cm long with a heel if possi-

ble, July/August in a frame[78, 113]. Plant them into individual pots as soon as they start to root. These cuttings can be difficult to overwinter, it is best to keep them in a greenhouse or cold frame until the following spring before planting them out[113]. Cuttings of mature wood, winter in a frame. They should root in early spring - pot them up when large enough to handle and plant them out in the summer if sufficient new growth is made, otherwise keep them in a cold frame for the next winter and then plant them out in the spring. Layering of current seasons growth in July/August. Takes 15 months[78].

nwatta Landscape Uses:Border, Foundation, Massing, Specimen. An easily grown plant, it succeeds in most soils but is ill-adapted for poor soils and for dry situations[1]. It prefers a deep rich loamy soil in sun or semi-shade[11, 200]. Best if given shade from the early morning sun in Britain[10]. This species is perhaps not perfectly hardy in Britain[11]. Another report says that it succeeds in climatic zone 6, which means that it should be hardy in almost all of Britain[200]. Plants are self-incompatible and need to grow close to a genetically distinct plant in the same species in order to produce fruit and fertile seed[11, 200]. Closely related to V. ichangense[1]. Special Features: Not North American native, Attractive flowers or blooms.

# 7.2.192 Picea rubens

Red Spruce

6 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 30 m hkuc

htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Picea rubens is an evergreen Tree growing to 30 m (98ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

pcista The sawdust, the resin from the trunk and even the needles can cause dermatitis in some people[222].

kcakta Edible Parts: Flowers Inner bark Leaves SeedEdible Uses: Gum TeaYoung shoots. An emergency food, used when all else fails[177]. Young male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. The cones are 3 - 5cm in diameter[82]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food, it is only used when all else fails. Seed - raw[172]. The seed is about 2 - 4mm long[229] and is too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172, 257]. A gum is exuded from the tree as a result of injury to the sapwood. It is used for chewing[46, 61, 171].

tcanta Basketry Fibre Gum Pitch WoodThe bark has been used to make baskets[257]. Pitch can be obtained from the trunk[257]. The roots have been used to make thread for sewing baskets, canoe skins etc[257]. Wood - straight-grained, soft, light, not strong[46, 61, 171, 229]. It weighs 28lb per cubic foot[235]. Used for boxes, sash frames etc. It is also valued for its use in the pulp industry to make paper[46, 61, 171, 229] and is commonly used to produce stringed musical instruments[229].

dwatta Pectoral Poultice Vitamin CA tea made from the boughs has been used in the treatment of colds and to 'break out' measles[222, 257]. The pitch from the trunk has been used as a poultice on rheumatic joints, the chest and the stomach in order to relieve congestion and pain[222]. A decoction of the bark has been used in the treatment of lung complaints and throat problems[257].

nrakta Eastern N. America - Newfoundland to New England and North Carolina, south to Tennessee and Georgia. ksacta At or near sea level in the northern part of its range, where it grows in swamps, along bogs or on well-drained

slopes. In the south it is found in mountain ranges, usually in thin soils[229].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame [78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very windfirm in shallow soils[1]. Resists wind exposure to some degree[200]. A shallow-rooted tree, in the wild it is often blown down by strong winds[229]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. This species has been planted experimentally as a timber crop in N. Europe[50]. It is slow to get started, but can then grow fairly rapidly when established though it soon slows down and seems to be fairly short-lived in cultivation, around 100 years is probably the limit[185]. Wild trees live about 300 - 400 years[229]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Seed production commences when the tree is about 15 years old, though reliable crops are not produced for another 5 - 10 years[229]. Heavy crops occur every 4 - 6 years[229]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Closely related to and hybridizes in the wild with P. mariana[229]. It is believed by some botanists to be a hybrid between P. mariana and P. glauca[226]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. The crushed leaves are redolent of apples or camphor [185]. Special Features: North American native. Inconspicuous flowers or blooms.

#### 7.2.193 Ampelopsis arborea

Pepper Vine

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli jlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ampelopsis arborea is an evergreen Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A poor taste[177]. The fruit is about 8mm in diameter and contains 3 seeds[200, 235]. It is carried in small bunches on the plant, rather like grapes[K]. The flesh is thin and inedible[235].

nrakta Southern N. America - Florida to Texas and north to Illinois and Oklahoma. ksacta Swampy woods[43]. Rich moist soils[235]. Stream bottoms, fence posts and disturbed areas in Texas[274].

propta Seed - sow in pots in a cold frame in the autumn or stratify for 6 weeks at 5°c and sow in the spring[200]. Germination can be quite slow, sometimes taking more than a year. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. When they are more than 20cm tall, they

can be planted out into their permanent positions, preferably in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long, July/August in a frame[78]. Cuttings or eyes in late autumn or winter. Either place them in the ground in a greenhouse or cold frame, or put them in pots. An eye cutting is where you have just one bud at the top and a short length of stem with a small part of the bark removed. These normally root well and grow away vigorously, being ready to plant into their permanent positions the following autumn. Layering into pots in late summer. Partially sever the stem in spring and then lift the new plants in the autumn[78].

nwatta Prefers a deep rich loam in a warm sheltered position in sun or semi-shade[200]. A very ornamental plant[1], when dormant it is guite hardy in Britain, but is better grown on a wall[11]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. It rarely flowers or fruits in this country except after a long hot summer[11, 182, 200]. Plants are deciduous in cold winters[219]. Plants climb by means of coiling tendrils but large plants often need tying in to support the weight of foliage[200]. Any pruning is best carried out in the winter[219].

# 7.2.194 Chusquea culeou

Culen

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc

hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chusquea culeou is an evergreen Bamboo growing to 5 m (16ft) by 2.5 m (8ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

kcakta Edible Parts: StemEdible Uses: Young shoots cooked[25, 177].

tcanta Musical WoodThe canes are used in making musical instruments, plain furniture and fencing[139].

nrakta S. America - Argentina, Chile. ksacta Montane woodlands in the Andes[162].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Very difficult[200]. Take divisions with at least four canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings.

nwatta Prefers a damp humus rich soil[200]. Prefers an open loam of reasonable quality, doing well on peat[11]. Likes plenty of moisture in the growing season[11]. Established plants are drought tolerant[25, 162, 195]. They require a position sheltered from cold north and east winds[11, 200]. A very hardy plant[25, 162], tolerating temperatures down to about -15°c[200]. Another report says that the plant is probably only hardy in the milder areas of the country[1]. It succeeds outdoors at Edinburgh Botanical Gardens[195] and is growing well at Kew[K]. This species is found further south in the world than any other species of bamboo. it grows in Chile as far south as latitude 47° south[195]. The rootstock is caespitose, new shoots are produced from late April and can grow 15cm overnight[25]. Plants take 2 - 3 years to settle down after being moved but are then quite fast growing[162]. Another report says that they are slow growing[188]. This species is notably resistant to honey fungus[200]. Plants flower and produce seed annually in the wild without dying as a result of the flowering[162]. Plants of the cultivar 'Tenuis' have been observed to be flowering in

able for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

kcakta Edible Parts: RootEdible Uses: Tuber - it must be thoroughly dried or cooked before being eaten[51, 177]. The tubers are boiled and eaten in Nepal, mixed with lime juice (Citrus aurantifolia) or another sour substance[272]. The tubers are buried in masses in pits until acetous fermentation takes place, they are then dug up, washed and cooked. by which means their acrimonious principles are in part dispersed[2]. However, violent illness has still been known to follow a hearty meal of the tubers[2]. See also the notes above on toxicity.

tcanta InsecticideThe tubers have insecicidal properties[272].

dwatta VermifugeThe roots have been used as a vermifuge in cattle[240, 243]. The juice of the tubers is applied to the wounds of cattle in order to kill any parasites[272]. The dried powdered tubers is applied to snake bites[272]. The seeds have been mixed with salt and used to treat colic in sheep[240, 243, 272].

nrakta E. Asia - Himalayas from Simla to Sikkim and Bhutan, ksacta Forests, shrubberies and open slopes to 3000 metres[51]. Moist shady places at elevations of 1500 - 2200 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame[134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1 - 6 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Prefers a cool peaty soil in the bog garden, woodland garden or a sheltered border in semi-shade[134, 200]. Prefers a loamy or peaty soil and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too hot or exposed[1, 200]. Plants are not very hardy outdoors in Britain and are normally best if given protection[1]. However, they can succeed outdoors in the milder areas of the country if the tubers are planted about 20cm deep[200]. Plants require protection from slugs[200]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year. This species usually bears either monoecious or all male flowers[266].

# 7.2.227 Schisandra sphenanthera

6 tlin 9 cyuc 2 kcak 0 tcan 5 dwat 7 m hkuc

pcimhmim cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Schisandra sphenanthera is a deciduous Climber growing to 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to May, and the seeds ripen from July to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers

kcakta Fruit - raw or cooked. We have no specific information on this species, but the fruit is quite probably edi-

dwatta Antirheumatic Antitussive Aphrodisiac Astringent Cancer Cardiotonic Cholagogue Dysentery Expectorant Hepatic Lenitive Nervine Pectoral Sedative Stimulant Tonic

and is pollinated by Flies. The plant is not self-fertile. Suit- UrinaryThe following report is for S. chinensis. This species is used for similar purposes in southern China[238]. Wu Wei Zi is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. It is an excellent tonic and restorative, helping in stressful times and increasing zest for life[254]. It is considered to be a substitute for ginseng and is said to be a tonic for both the male and the female sex organs[238]. The fruit is antitussive, aphrodisiac, hepatic, astringent, cardiotonic, cholagogue, expectorant, hypotensive, lenitive, nervine, pectoral, sedative, stimulant and tonic[174, 176, 178, 218]. Low doses of the fruit are said to stimulate the central nervous system whilst large doses depress it[218]. The fruit also regulates the cardiovascular system[218]. It is taken internally in the treatment of dry coughs, asthma, night sweats, urinary disorders, involuntary ejaculation, chronic diarrhoea, palpitations, insomnia, poor memory, hyperacidity, hepatitis and diabetes[238]. Externally, it is used to treat irritating and allergic skin conditions[238]. The fruit is harvested after the first frosts and sun-dried for later use[238]. The fruit contains lignans[254]. These have a pronounced protective action on the liver. In one clinical trial there was a 76% success rate in treating patients with hepatitis, no side effects were noticed[254]. The seed is used in the treatment of cancer[218]. The plant is antirheumatic[218]. A mucilaginous decoction obtained from the branches is useful in the treatment of coughs, dysentery and gonorrhoea[218].

nrakta E. Asia - Southern and Western China. ksacta Rich forests and woodland[200]. Thickets, in wet places. slopes at elevations of 600 - 3000 metres[266].

propta Seed - best sown in the autumn in a cold frame[200, 238]. Pre-soak stored seed for 12 hours in warm water and sow in a greenhouse in the spring[238]. Germination can be slow and erratic. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first 2 years. Plant them out into their permanent positions in early summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame. Overwinter in the greenhouse and plant out in late spring[11, 78]. Good percentage[78]. Layering of long shoots in the autumn[200].

nwatta Prefers a rich well-drained moisture retentive soil[11, 200]. Prefers a slightly acid soil but tolerates some alkalinity if plenty of organic matter is added to the soil[200]. Requires some protection from the most intense sunlight[200]. Plants are intolerant of drought[K]. This species is hardy to about -7°c[200]. It will succeed outdoors in the milder areas of Britain if given the protection of a woodland or a south or west-facing wall[200]. The young growth in spring can be damaged by late frosts. Plants climb by twining around supports. Any pruning is best carried out in the spring[219]. Dioecious. Male and female plants must be grown if seed is required.

# 7.2.228 Clinopodium chinense

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Clinopodium chinense is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - cooked[105, 177]. A sweet and aromatic herb tea is made from the leaves[200].

nrakta E. Asia - China, Japan. ksacta Woods and thickets in hills and low mountains all over Japan[58]. Sunny meadows from the lowlands to elevations of 1500 metres in Japan[275].

propta Seed - sow spring in a cold frame. Only just cover the seed. Germination usually takes place within 2 weeks at 21°c. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse. Plant them out in the summer if they have made sufficient

following notes are based on the general needs of this group of plants[K]. Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. A very ornamental tree[11. Plants are apt to die back without any warning[11].

#### 7.2.224 Pistacia chinensis

Chinese Pistache, Chinese Pistachio 6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 9 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Pistacia chinensis is a deciduous Tree growing to 9 m (29ft 6in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from April to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Young shoots and leaves - cooked. Used as a vegetable[11, 46, 182, 183]. Seed - cooked. It is roasted and then eaten, or is used in confectionery[105, 183].

tcanta Dye Miscellany Rootstock WoodThe plant can be used as a rootstock for the pistachio nut, P. vera[200]. A yellow dye can be obtained from the wood[266]. Wood - hard, durable. Used in furniture making and carpentry[51, 266].

dwatta MiscellanyResin from the related P. lentiscus is analgesic, antitussive, expectorant and sedative. It would be worthwhile examining this species[218].

nrakta E. Asia - China. ksacta Riversides and in cultivated areas up to 2400 metres in the Himalayas[51]. Forest on stone hills at elevations of 140 - 3550 metres in southern and western China[266].

propta Pre-soak the seed for 16 hours in alkalized water[78], or for 3 - 4 days in warm water[1], and sow late winter in a cold frame or greenhouse[78, 113]. Two months cold stratification may speed up germination, so it might be better to sow the seed in early winter[113]. The germination is variable and can be slow. Prick out the seedlings into individual pots when they are large enough to handle and grow on the plants for at least their first winter in a greenhouse. Plant out into their permanent positions in early summer and consider giving some protection from winter cold for their first year or two outdoors[K]. Cuttings of half-ripe wood from juvenile trees, July in a frame[113]. Layering.

nwatta Landscape Uses:Pest tolerant, Pollard, Specimen, Street tree. Succeeds in an ordinary loamy soil and in dry soils[1, 11]. Requires a sunny position[1]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. A very ornamental tree[1, 11]. Any pruning that needs to be done is best carried out in the spring[238]. This species strongly resents being transplanted[113], it should be planted out into its permanent position as young as possible and given some protection from winter cold for its first few winters outdoors. Dioecious, male and female plants must be grown if seed is required. Special Features:Not North American native, Naturalizing, Inconspicuous flowers or blooms.

# 7.2.225 Ophrys araneola

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat  $0.5\,\mathrm{m}$  hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ophrys araneola is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white pow-

der that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta S. and C. Europe, ksacta Not known

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230] Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230]. nwatta Plants can be grown in a lawn, but the lawn must

not be cut until the plants have set seed[200]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

# 7.2.226 Arisaema tortuosum

Arisaem

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli dyat hjonli

drutta Arisaema tortuosum is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant)

1994, this is the first record of this species flowering in the northern hemisphere[214].

# 7.2.195 Tulipa edulis

 $6 \ tlin \ 9 \ cyuc \ 2 \ kcak \ 0 \ tcan \ 2 \ dwat \ 0.2 \ m \ hkuc$ htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tulipa edulis is a BULB growing to 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from March to April, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, the bulbs and the flowers of at least one member of this genus have been known to cause dermatitis in sensitive people, though up to 5 bulbs a day of that species can be eaten without ill-effect [65].

kcakta Edible Parts: Leaves RootEdible Uses: Bulb -cooked[22, 105]. A source of starch[46, 61]. The bulb can be up to 4cm in diameter[266]. Leaves - cooked[46, 61, 105]. Unless you have more plants than you need this practise is not recommended since it will greatly weaken the plant[K].

dwatta Antidote Antipyretic Cancer Depurative Expectorant Febrifuge LaxativeThe inner portion of the bulb is antidote, antipyretic, depurative, expectorant, febrifuge and laxative[147, 218]. It is used, mainly as a poultice, in the treatment of ulcers and abscesses[147]. The plant has been used in the treatment of cancer[218]. The leaves are applied externally to abscesses, buboes and breast diseases[218]. The flowers are used in the treatment of dysuria[218].

nrakta E. Asia - E. China, S. Japan, Korea, Manchuria. ksacta Moist places in meadows in lowlands[58, 178], near rivers and on wooded hillsides[90]. Grassy slopes and hillsides from near sea level to 1700 metres in China[266].

propta Seed - best sown in a shady part of the cold frame as soon as it is ripe in early summer[1], or in the early autumn[200]. A spring sowing of stored seed in the greenhouse also succeeds[K]. Sow the seed thinly so that the seedlings can be grown on without disturbance for their first growing season - apply liquid feeds to the pot if necessary. Divide the bulbs once the plants have become dormant, putting 3 - 4 bulbs in each pot. Grow the on in the greenhouse for at least the next year, planting them out when dormant. Division of offsets in July. Larger bulbs can be planted out straight into their permanent positions, or can be stored in a cool place and then be planted out in late autumn. It is best to pot up smaller bulbs and grow them on in a cold frame for a year before planting them out when they are dormant in late summer to the middle of autumn.

nwatta Easily grown in a well-drained soil in a sunny position[1, 90]. This species is not fully hardy in Britain, the plants come into growth in the winter and need protection from severe weather and so are best grown in a bulb frame[1]. Plants are dormant in summer but do not require protection from rain[90]. Bulbs can be harvested in June after they have died down and then stored in a cool dry place, being planted out again in October.

#### 7.2.196 Arctostaphylos columbiana

Hairy Manzanita

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli fyifxre7t hionli

drutta Arctostaphylos columbiana is an evergreen Shrub growing to 1.5 m (5tt). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 177]. The fruit is best harvested when slightly

under-ripe since the fully mature pulp is mealy[183]. The fruit is about 8mm in diameter[200].

tcanta Dye Fuel WoodA yellowish-brown dye is obtained from the leaves, it does not require a mordant[168]. The wood burns with a bright light and so was used at dances and ceremonials by the native North American Indians[257]. The wood is hard and is used for making tools and awl handles[257].

dwatta AstringentA decoction of the bark is used in the treatment of diarrhoea[257].

nrakta Western N. America ksacta Near the coast[60]. propta Seed - best sown in a greenhouse as soon as it is ripe. Pre-soak dried seed in boiling water for 10 - 20 seconds or burn some straw on top of them and then stratify at 2 - 5°c for 2 months[11, 200]. The seed usually germinates in 2 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse or cold frame for at least their first winter, Plant out in late spring or early summer. Cuttings of side shoots of the current season's growth, 5 - 8cm with a heel, August to December in a frame. Takes one year[1, 78]. Division in early spring. Take care because the plant resents root disturbance. Pot the divisions up and keep them in a lightly shaded position in a cold frame or greenhouse until they are growing away actively. Layering in spring[200]. Layering in spring[200].

nwatta Requires a deep moist well-drained light or medium lime-free loam in sun or semi-shade[11, 134, 200] but plants produce less fruit when they are grown in the shade[200]. Plants resent root disturbance and should be placed in their final positions as soon as possible[134]. This species is very closely related to A. tomentosa, but with a more northerly range[11].

# 7.2.197 Yucca filifera

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Yucca filifera is an evergreen Shrub growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit StemEdible Uses: Fruit - raw or cooked. Flowers - raw or cooked. Delicious raw, they can also be dried, crushed and used as a flavouring[164]. Flowering stem - cooked and used like asparagus[164].

tcanta Fibre SoapA fibre obtained from the leaves is used for making ropes, baskets and mats[82, 169]. The roots are rich in saponins and can be used as a soap substitute[82].

nrakta South-eastern N. America. ksacta Dry or stony soils, Blue ridge and Appalachian provinces, Alabama to North Carolina [72].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept at a temperature of 20°c. Prick out the seedlings into individual pots when they are large enough to handle and growthem on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove

small buds from base of stem and rhizomes. Din in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established[78]. Division of suckers in late spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Thrives in any soil but prefers a sandy loam and full exposure to the south[11]. Can succeed in light shade[K]. Plants are hardier when grown on poor sandy soils [200]. Established plants are very drought resistant[200]. Hardy to at least -5°c according to one report[200], whilst another says that it is hardy to about -30c[164]. The leaves can be damaged by strong winds[11]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in about four years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]

# 7.2.198 Cuphea viscosissima

Tarweed. Blue waxweed

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cuphea viscosissima is a ANNUAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta The plant has potential as an oil seed crop (World Economic Plants)

nrakta N. America. ksacta Not known

propta Seed - this can be sown in a greenhouse in early spring, putting the young plants out in late spring after the last expected frosts. Seed can also be sown outdoors in situ in mid to late spring.

nwatta Succeeds in any reasonably fertile soil in full sun or part shade[200].

# 7.2.199 Polygonum multiflorum

He Shou Wu, Tuber fleeceflower 6 tlin 9 cvuc 2 kcak 0 tcan 3 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Polygonum multiflorum is a PERENNIAL CLIMBER growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Leaves - raw or cooked. Seed - raw or cooked. It is rather small and fiddly to utilize[105]. Flowers[179]. No more details are given. Root - cooked[2, 177]. It should be washed several times in order to leech out the bitterness[179]. This process will also remove many of the vitamins and minerals from the roots[K]. A famine food, it is only used when all else fails[105].

dwatta Antibacterial Anticholesterolemic Antipyretic Antispasmodic Antitumor Astringent Cardiotonic Demulcent Deobstruent Hypoglycaemic Laxative Sedative Tonic UrinaryHe Shou Wu is considered to be one of the most important of the Chinese herbal tonics and is widely used in that country[218]. It is said to restore vitality and virility[174], working especially on the liver and the reproductive, urinary and circulatory systems[238]. Some care should be exercised, however, since excessive doses can cause skin rash and numbness of the extremities[238]. The roots and stems are antibacterial, anticholesterolemic, antispasmodic, astringent, cardiotonic, demulcent, depurative, hypoglycaemic, laxative, sedative, tonic[116, 147, 174, 176, 238, 279]. The roots are taken internally in the treatment of menstrual and menopausal complaints, constipation in the elderly, swollen lymph glands and high cholesterol levels[238]. They are very effective in reducing high cholesterol levels in the blood and increase blood sugar levels[254]. Externally, they are used to treat ringworm, bleeding wounds and sores[238]. The roots are harvested in the autumn, preferably from plants 3 - 4 years old, and are dried for later use[238]. The leaves and roots tonify the liver and kidneys, fortify the blood, strengthen the muscles and prevent premature greying of the hair[218]. The stem is deobstruent and sedative[218]. It is taken internally in the treatment of insomnia and neurasthenia whilst it is applied externally to ringworm[176, 238]. The stems are harvested in late summer or early autumn and are dried for later use[238]. Extracts of the plant have shown antipyretic, antitumour, hypoglycaemic and sedative activity[218].

nrakta E. Asia - China. ksacta Woods, north to latitude 42° 30' north[74]. Along the banks of streams and in valley shrub thickets[147].

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle. prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. This species is hardy to at least -15°c[238]. Plants seem to be immune to the predations of rabbits[233]. There is a suggestion that this plant might be dioecious[178], in which case male and female plants will need to be grown if seed is required.

#### 7.2.200 Origanum x majoricum

Hardy Marjoram

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Origanum x majoricum is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaThe following uses are for O. majorana. They almost certainly also apply to this plant. Leaves - raw or cooked[2, 52]. Sweet marjoram is widely used as a flavouring for salad

female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers Leaves Root StemEdible Uses: SaltYoung leaves - raw or cooked[46, 61, 257]. They are mixed with other greens and used as a potherb[183, 257]. The leaves can also be made into a sauerkraut[257]. Young stalks and flower heads - cooked[183]. Roots - cooked[172, 183]. The burnt leaves are used as a salt substitute[172]. The stems and leaves, whilst still green, are rolled up into balls, dried and then placed on top of a very small fire on a rock and burned[207]. A very acceptable condiment for piñole[207].

tcanta Containers StuffingA good ground cover for the wilder areas of the garden[200]. The cotton-like seed heads have been used as a stuffing material for mattresses[257]. The leaves have sometimes been folded into conical containers for collecting fruit[257]. They have also been used to make a temporary funnel[257].

dwatta Antispasmodic Pectoral PoulticeAntispasmodic poultice[172]. An infusion of the dried leaves has been used in the treatment of colds, head and chest congestion[257].

nrakta N. Europe to Northern N. America. ksacta Streamsides, moist woods, bogs and other wet places in N. America[60].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle. prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Seashore, Woodland garden. Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Prefers partial shade[31]. Plants can be grown in quite coarse grass. which can be cut annually in the autumn[233]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Dioecious, male and female plants must be grown if seed is required. Special Features: Attractive foliage, North American native, Invasive, Wetlands plant.

#### 7.2.222 Caulophyllum robustum

Panoose Root

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Caulophyllum robustum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in April, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Some caution is advised, the following note relates to another member of this genus but could have relevance to this species. This plant should not be used during pregnancy prior to the commencement of labour[165].

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[105, 177].

dwatta Anthelmintic Antispasmodic Birthing aid Diaphoretic Diuretic Emmenagogue Oxytoxic SedativeThis herb is said to have similar medicinal properties to C, thalictroides[254]. These are:- Papoose root is a traditional herb of the North American Indians and was used extensively by them to facilitate child birth[207]. Modern herbalists still consider it to be a woman's herb and it is commonly used to treat various gynaecological conditions[254]. An acrid, bitter, warming herb, it stimulates the uterus, reduces inflammation, expels intestinal worms and has diuretic effects[238]. The root is anthelmintic, antispasmodic, diaphoretic, diuretic, emmenagogue, oxytocic and sedative[4,

21, 46, 165, 2071. An infusion of the root in warm water is taken for about 2 weeks before the expected birth date in order to ease the birth[207, 213]. This infusion can also be used as an emmenagogue and a uterine stimulant[213]. Papoose root should therefore be used with some caution by women who are in an earlier stage of pregnancy since it can induce a miscarriage or early delivery[222]. The plant is also taken internally in the treatment of pelvic inflammatory disease, rheumatism and gout[238]. It should not be prescribed for people with hypertension and heart diseases[238]. Any use of this plant is best under the supervision of a qualified practitioner[238]. The roots are normally harvested in the autumn. because they are at their richest at this time[213], and are dried for later use. The root is harvested in early spring as new growth is beginning and is used to make a homeopathic remedy[232]. It is used especially in childbirth and in some forms of rheumatism[232].

nrakta E. Asia - Japan, Korea. ksacta Woods in mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in a shady part of a cold frame[200]. If stored seed is used, it should be sown as soon as it is received. Germination can be erratic. Prick out the seedlings as soon as they are large enough to handle and grow them on in a shady part of a greenhouse or cold frame for at least their first winter. Plant them out into their permanent positions during autumn or early winter. Division in spring or just after flowering[200]. Plants are slow to increase[187].

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. The following notes are based on the general needs of the genus. Easily grown in a damp light humus-rich woodland soil preferring a position in deep shade[1, 200]. One report says that it is best in a peat garden. The seeds rupture the ovary before they are fully ripe and continue to expand naked, they are bright blue when fully ripe[130].

# 7.2.223 Sorbus species

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Sorbus species is a deciduous Tree growing to 10 m (32ft) by 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is selffertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Fruit - raw or cooked[K]. Up to 15mm in diame-

nrakta A range of hybrids of garden origin ksacta Not known in the wild

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring. This is a hybrid and so is unlikely to breed true from seed.

nwatta This record is to cover a series of hybrids of garden origin that belong to the whitebeam section of the genus but have not been placed in a distinct species. The

position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any wet to moisture retentive ground, pond margins and shallow water in full sun or shade[200]

### 7.2.218 Angelica acutiloba

Dong Dang Gui

6 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 0.7 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Angelica acutiloba is a PERENNIAL growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furocoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238].

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[177]

dwatta Emmenagoque Oxytoxic Sedative Tonic Women's complaintsThe root is emmenagogue, oxytocic, sedative and tonic. It is used in the treatment of women's complaints[61, 174, 218] and also eases dizziness[61].

nrakta E. Asia - China, Japan. ksacta In the mountains of central. Japan[58, 275].

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sow in situ as soon as it is ripe.

nwatta Requires a deep moist fertile soil in dappled shade or full sun[200]. Plants are reliably perennial if they are prevented from setting seed[200]. Cultivated as a medicinal plant in Japan[58, 275].

### 7.2.219 Adenophora verticillata

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Adenophora verticillata is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: Leaves RootEdible Uses: Root - raw or cooked[46, 61, 105, 177]. A sweet taste[74]. Leaves cooked[105, 177].

dwatta Antidote Antifungal Cardiotonic Expectorant Febrifuge Sialagogue Stomachic Women's complaintsThis is a commonly used medicinal plant in China. The root is antidote, antifungal, cardiotonic, expectorant, febrifuge, expectorant, sialogogue, stomachic and tonic[176, 218]. It is used in the treatment of women's diseases, chronic bronchitis with dry cough, pulmonary infections with cough and thick yellow sputum, dry throat[218].

nrakta E. Asia - Korea, Siberia. ksacta Broad-leaved forests and shrubby formations[74].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. The seed can also be sown in spring. Surface sow 2 - 3 seeds per pot in the spring in order to avoid transplanting[133]. We have found that if transplanted when very small seedlings grow away without difficulty[K]. Germinates in 1 - 3 months at 10°c[133]. Plant out into their permanent positions whilst young. Basal cuttings in spring[K]. Division

in spring - very difficult because the plant dislikes root disturbance[1].

nwatta Prefers a light rich slightly alkaline soil that is not too dry, and a warm sunny position[1, 200]. Grows well in the semi-shade of shrubs or in light woodland[88]. Plants are intolerant of root disturbance[1]. The young growth is extremely attractive to slugs, they have been known to destroy even mature plants[K].

## 7.2.220 Gaultheria pumila leucocarpa

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli nyanhjen hjonli

drutta Gaultheria pumila leucocarpa is an evergreen Shrub growing to 0.2 m (0ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not selffertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[11, 177]. The fruit is about 17 - 22mm in diameter.

tcanta A useful ground cover for sun or light shade, it spreads rapidly.

nrakta Southern S. America - S. Chile. ksacta Found as far south as latitude 42° south. Growing in the Andes, it is common on volcanic slopes where it grows up to the snow-

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long. July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins. 'Drop' the plants 12 months earlier by digging them up and replanting them deeper in the soil so that the branches are buried and can form roots. This works best in a sandy soil[78]. It is best to pot up the divisions and grow them on in a lightly shaded position in a greenhouse until they are established. Plant them out in the summer. Layering in September/October. Takes 12 months[78].

nwatta Requires a light well-drained lime-free soil[200]. Spreading rapidly[1, 49], this species can be invasive[182]. The plant can make a good nesting place for mice, these mice then eat the bark of the stems in winter causing die-back. Dioecious. Male and female plants must be grown if seed is required. Plants in this genus are notably resistant to honey fungus[200].

### 7.2.221 Petasites frigidus

Sweet Coltsfoot, Arctic sweet coltsfoot, Arrowleaf sweet coltsfoot, Golden Palms Coltsfoot, Butterb

6 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.2 m hkuc pcimhmimhtut cvutli tcuphia7n hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta Petasites frigidus is a PERENNIAL growing to 0.2 m (Oft 8in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from April to May, and the seeds ripen from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and

dressings, vegetables, legumes and oils[7, 14, 27, 61, 171, The young tender leaves are mild and make an excellent 238]. It has a more delicate flavour than the closely related oregano (Origanum vulgare), and is best when used fresh and only added towards the end of cooking[238]. The aromatic seeds are used as a flavouring in sweets, drinks etc[183]. A herb tea is made from the fresh or dried leaves[21, 183]. The flavour resembles a blend of thyme, rosemary and sage[183].

tcanta Disinfectant Dye EssentialThe following uses are for O. majorana. They almost certainly also apply to this plant. The leaves and flowers yield 0.3 - 0.4% essential oil by steam distillation[240]. Called 'Oil of Sweet Marjoram', it is used as a food flavouring and in perfumery, soaps, hair products etc[57, 61, 171, 238]. The plant is often used to disinfect bee hives[7].

dwatta Antiseptic Antispasmodic Aromatherapy Carminative Cholagogue Diaphoretic Disinfectant Emmenagogue Expectorant Stimulant Stomachic TonicThe following uses are for O. majorana. They almost certainly also apply to this plant. The herb is antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, diuretic, emmenagogue, expectorant, stimulant, stomachic and mildly tonic[4, 7, 21]. It is taken internally in the treatment of bronchial complaints, tension headaches, insomnia, anxiety, minor digestive upsets and painful menstruation[238]. It should not be prescribed for pregnant women[238]. Externally, it is used to treat muscular pain, bronchial complaints, arthritis, sprains and stiff joints[238]. The plant is harvested as flowering begins and can be used fresh or dried. Marjoram is often used medicinally in the form of the essential oil, about 400 grams being obtained from 70 kilos of the fresh herb[4]. The oil is used as an external application for sprains, bruises etc[4]. The essential oil is used in aromatherapy. Its keyword is 'Muscle relaxant'[210].

nrakta South-western Europe, ksacta Not known

propta Seed - this species is a sterile hybrid and so does not produce seed. If you wanted to grow it from seed then you would need to hybridise O. vulgare x O. majorana. The resulting seedlings would be rather variable. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings of young barren shoots in June. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a rather dry, warm, well-drained soil, but is not fussy as to soil type[18], thriving on chalk[1, 37]. Prefers slightly alkaline conditions[200]. Plants are not hardy in all parts of Britain, they tolerate temperatures down to about -5°c, possibly lower if the roots are given a good mulch in the autumn[238, K]. This species is probably a hybrid between sweet marjoram (O. majorana) and Oregano (O. vulgare). It resembles O. majorana in appearance and aroma, and has the same culinary uses, but is more tolerant of British winters[238]. A good companion plant, improving the flavour of nearby plants[14, 18, 20]. The flowers are very attractive to bees[108]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 7.2.201 Lactuca serriola

Prickly Lettuce

6 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 1.5 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lactuca serriola is a BIENNIAL growing to 1.5 m (5ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The mature plant is mildly toxic[13].

kcakta Edible Parts: Leaves Oil OilEdible Uses: Oil OilYoung leaves - raw or cooked[13, 55, 62]. A bitter flavour[85]. salad[183, 217], but the whole plant becomes bitter as it gets older, especially when coming into flower[K]. As a potherb it needs very little cooking[183]. Large quantities can cause digestive upsets[62]. Young shoots - cooked. Used as an asparagus substitute[13]. An edible oil is obtained from the seed[46, 61, 105]. The oil must be refined before it is edible[114]. A pleasant flavour[114, 183].

tcanta Oil OilThe seed contains 35.2% of a semi-drying oil[240]. It is used in soap making, paints, varnishes

dwatta Anodyne Antipyretic Diuretic Homeopathy Hypnotic Narcotic Sedative UrinaryThe whole plant is rich in a milky sap that flows freely from any wounds. This hardens and dries when in contact with the air[4]. The sap contains 'lactucarium', which is used in medicine for its anodyne, antispasmodic, digestive, diuretic, hypnotic, narcotic and sedative properties[9, 21, 46, 165, 192, 213, 238]. Lactucarium has the effects of a feeble opium, but without its tendency to cause digestive upsets[4], nor is it addictive[7]. It is taken internally in the treatment of insomnia, anxiety, neuroses, hyperactivity in children, dry coughs, whooping cough, rheumatic pain etc[238]. Concentrations of lactucarium are low in young plants and most concentrated when the plant comes into flower[238]. It is collected commercially by cutting the heads of the plants and scraping the juice into china vessels several times a day until the plant is exhausted[4]. This species does not contain as much lactucarium as L. virosa[4]. An infusion of the fresh or dried flowering plant can also be used[9]. The plant should be used with caution, and never without the supervision of a skilled practitioner. Even normal doses can cause drowsiness whilst excess causes restlessness[238] and overdoses can cause death through cardiac paralysis[7, 9]. The fixed oil from the seeds is said to possess antipyretic and hypnotic properties[240]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of chronic catarrh, coughs, swollen liver. flatulence and ailments of the urinary tract[9].

nrakta S. and C. Europe, incl Britain, from the Netherlands south and east to N. Africa and the Himalayas. ksacta Waste places, walls, occasionally on more or less stable dunes[17].

propta Seed - sow spring in situ and only just cover the seed. Germination is usually fairly quick.

nwatta Prefers a light sandy loam in a sunny position[1, 13]. The wild lettuce is cultivated for the oil in its seed in Egypt[46, 61]. A compass plant, the top leaves align north-

#### 7.2.202 Pinus thunbergii

Japanese Black Pine

6 tlin 9 cvuc 2 kcak 0 tcan 2 dwat 15 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasilut hpa7tli flatprik hpa7tmwatli dvat hionli

drutta Pinus thunbergii is an evergreen Tree growing to 15 m (49ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to May, and the seeds ripen from January to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Inner barkEdible Uses: CondimentInner bark[105]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide Shelterbelt Soil stabilization WoodTolerant of salt spray, this species makes a good shelterbelt for exposed maritime positions[75, 200]. Trees were 9 metres tall after 30 years in a very exposed position at Rosewarne in N. Cornwall [75]. Planted to stabilize sand dunes by

the coast[11]. A tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc.

dwatta AntirheumaticThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters. poultices, herbal steam baths and inhalers[4].

nrakta E. Asia - Japan. ksacta Sand dunes by the coast in E. Japan.

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Landscape Uses:Firewood, Screen, Seashore, Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200] and maritime exposure[81, 188]. The Japanese black pine bears cones whilst still young and produces cones very freely in Britain[185]. The trees thrive in Britain but do not grow very large[1] and are probably not going to be long-lived[185]. Young trees grow about 50cm per year but this soon tails off and older trees average less than 30cm per year[185]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. This species hybridizes in the wild with P. densiflora[58]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

### 7.2.203 Dianthus caryophyllus

Carnation, Clove Pink, Border Carnation 6 tlin 8 cvuc 2 kcak 0 tcan 2 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli fyifxre7t hjonli

drutta Dianthus caryophyllus is a PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from July to August, and

the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FlowersEdible Uses: Condiment-The flower petals have a strong smell of cloves and are candied, used as a garnish in salads, for flavouring fruit, fruit salads etc. They can also be used as a substitute for rose petals in making a syrup[183, 238]. The petals should be removed from the calvx and their bitter white base should be removed[183].

tcanta Essential SoapAn essential oil is obtained from the flowers[46, 171]. It is used in perfumery. 500kg of flowers produce 100g of oil[61]. The flowers are harvested when they are fully open in the morning, preferably after 3 hours exposure to sunlight[238]. The flower heads are dried and used in pot-pourri, scented sachets and cosmetic products[238, 268]. The plant is quite rich in saponins. The leaves can be simmered in water and this water can then be used as a soap for cleaning the skin, clothes etc[201].

dwatta Antispasmodic Cardiotonic Diaphoretic Febrifuge Nervine StimulantCarnation flowers are an aromatic, stimulant herb that has been used in tonic cordials in the past to treat fevers, though this use is now obsolete[238]. It is traditionally prescribed in European herbal medicine to treat coronary and nervous disorders[254]. The flowers are considered to be alexiteric, antispasmodic, cardiotonic, diaphoretic and nervine[240]. The plant has been used as a vermifuge in China[240].

nrakta Europe - W. and S. France. Occasionally naturalized in Britain[17], ksacta A plant of limestone soils, it is often found on old walls in Britain[17].

propta Seed - sow spring in slight heat in a greenhouse[1]. The seed usually germinates in 2 - 3 weeks at 15°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Lavering in July[1]. Cuttings of non-flowering basal shoots, June/July in a frame[200]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container, Rock garden, Seashore, Specimen. Succeeds in a sunny position in most good soils[111, 200] tolerating a pH range from 6 to 8 but disliking acid soils[200]. A very tolerant plant, succeeding in the salt laden air and strong winds of the coast as well as in the sulphur polluted air of cities [200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -10°c[200]. A very ornamental plant[1], the carnation is widely cultivated in the flower garden and is grown commercially in France for its essential oil[46]. There are many named varieties[200]. The flowers of the species have a rich clove-like perfume, though almost no scent is present in the orange and yellow-flowering cultivars[245]. The flowers are very attractive to butterflies and moths[17]. Plants are prone to mildew or leaf spot in humid climates[201]. Special Features: Edible, Not North American native, Suitable for cut flowers, Fragrant flowers.

#### 7.2.204 Ribes californicum

Hillside Gooseberry

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ribes californicum is a deciduous Shrub. See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers welldrained soil. Suitable pH: mildly acid, neutral and basic

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. Plants climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

### 7.2.215 Brassica rapa campestris

Wild Turnip

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Brassica rapa campestris is a ANNUAL growing to 0.8 m (2ft.7in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is selffertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista The oil contained in the seed of some varieties of this species can be rich in erucic acid which is toxic. However, modern cultivars have been selected which are almost free of erucic acid.

kcakta Edible Parts: Leaves Oil OilEdible Uses: Oil Oil-Leaves - raw or cooked. A strong radish/cabbage flavour. An edible oil is obtained from the seed, it is best when cold pressed[171]. Some varieties are rich in erucic acid which can be harmful[K].

tcanta Oil OilThe seed contains up to 45% of a semidrying oil. It is used as a lubricant, luminant and in soap making[1, 46, 57, 61, 74, 171].

dwatta Antiscorbutic Vitamin CThe tuberous roots and seeds are considered to be antiscorbutic[243]. A rather strange report, the leaves are much more likely to contain reasonable quantities of vitamin C than the roots or seeds[K].

nrakta Europe - Mediterranean. Naturalized in Britain[17]. ksacta River banks, arable and waste land[17]. propta Seed - sow spring or autumn in situ.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[16, 200]. Succeeds in any reasonable soil but prefers one on the heavy side[16]. Tolerates a pH in the range 4.8 to 8.3. This is the wild form of the turnip with a non-tuberous tap-root[17]. It is closely related to the cultivated forms that are grown for their edible oil-bearing seeds[17].

### 7.2.216 Pistacia atlantica

Betoum, Mt. Atlas mastic tree, Mount Atlas Mastic 6 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 20 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Pistacia atlantica is a deciduous Tree growing to 20 m (65ft 7in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 9. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not selffertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: Gum OilFruit raw[61, 177]. A turpentine flavour[183]. The fruit is about 8mm long and 6mm wide and contains a single seed[200]. An excellent edible oil is obtained from the seed[183].

tcanta Dye Gum Ink Oil Resin Rootstock Tannin WoodUsed as a rootstock for P. vera, the pistachio nut[183]. A resin is obtained from the tree[117]. No more details. A gum is obtained from the tree. It is used medicinally[93]. It is possible that the gum and the resin are the same thing[K].

sult of a fungus. It is used to make an ink and a dye[61]. The leaves contain 22.2% tannin[223]. The wood is useful[46].

dwatta AntisepticAntiseptic[93].

nrakta S. Europe to N. Africa. ksacta Dry hillsides, cemeteries, field edges and roadsides from sea level to 1500 metres in Turkey[93].

propta Pre-soak the seed for 16 hours in alkalized water[78], or for 3 - 4 days in warm water[1], and sow late winter in a cold frame or greenhouse[78, 113]. Two months cold stratification may speed up germination, so it might be better to sow the seed in early winter[113]. The germination is variable and can be slow. Prick out the seedlings into individual pots when they are large enough to handle and grow on the plants for at least their first winter in a greenhouse. Plant out into their permanent positions in early summer and consider giving some protection from winter cold for their first year or two outdoors[K]. Cuttings of half-ripe wood from juvenile trees, July in a frame[113]. Layering.

nwatta Requires a sunny position in a deep well-drained light soil[200]. Succeeds in dry soils. This species is not very cold-hardy in Britain[1], though it can succeed outdoors in the mildest areas of the country. This plant is sometimes grown near P. vera, the pistachio, as a pollinator[183]. Any pruning that needs to be done is best carried out in the spring[238]. Plants are prone to fungal root rots[200]. Dioecious, male and female plants must be grown if seed is reguired. Special Features: Not North American native, Naturalizing, Inconspicuous flowers or blooms.

## 7.2.217 Scirpus validus

River Club-Rush

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1.5 m hkuc

hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scirpus validus is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: Leaves Pollen Root SeedEdible Uses: Root - raw or cooked[159, 161, 172, 183]. Rich in starch. The root contains a meagre amount of starch[193]. The sweet roots are eaten raw in mid summer[257]. The bruised young roots, when boiled in water, furnish a sweet syrup[183]. The rhizomes are 3 - 10mm in diameter[270]. Young shoots - cooked[55, 62, 85, 183]. The tender base of the stem is eaten raw in salads[183, 257]. The pollen is used in soups or mixed with flour and used in making bread[177, 183]. It is rich in protein. Seed[62, 85, 159, 183]. No further details are given but it is probably ground into a powder and used in making bread etc. The seed is small and rather fiddly to harvest and utilize.

tcanta Basketry WeavingThe stems are used in weaving and basket making[189, 257]. They are used to make good quality mats for use on the floor, for sleeping on and for making temporary partitions[257]. The stems are pulled off the plant rather than cut to ensure the maximum length of stem[257].

dwatta Astringent Diuretic HaemostaticThe root is astringent and diuretic[152]. The stem pith is haemostatic[257]. A poultice of the stem pith has been placed under a dressing in order to stop wounds bleeding[257].

nrakta N. America - all areas except the extreme north. ksacta Fresh to brackish marshes, fens, bogs, lakes, stream banks and bars, pioneering in disturbed places, often emergent in water up to 1 metre deep, from sea level to elevations of 2400 metres[270].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded

as a tea substitute. It is said that this make one of the best-tasting of all herb teas[183].

tcanta Cleanser EssentialA strong infusion of the herb is used in the autumn to clean wine barrels in preparation for the new vintage[183]. An essential oil is obtained from the plant, it contains 19% thymol[4] and is also rich in carvacrol[238]. It is used in the pharmaceutical industry[238]. A good bee plant[148]. Members of this genus are rarely if ever troubled by browsing deer[233]. Dynamic accumulator.

dwatta Antibacterial Aromatic Digestive Expectorant TonicThe leaves are antibacterial, aromatic, digestive, expectorant and tonic[148, 238]. They are used internally to treat minor digestive discomfort and bronchial congestion[238]. The leaves are harvested during the growing season and can be used fresh or dried[238].

nrakta S.E. Europe - Balkans, Crete, Greece. ksacta Sunny positions on dry rocky hills[50, 148].

propta Seed - surface sow in April in a greenhouse. Do not allow the compost to dry out. Germination can be slow and erratic[1] but usually takes place within a month[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle. It is usually possible to plant out into their permanent positions during the summer, but if the plants have not grown sufficiently, or if you live in an area of cold winters, it might be best to grow them on in a cold frame for their first winter and plant them out in late spring or early summer of the following year[K]. Cuttings of half-ripe wood, 5 - 8cm taken at a node, July/August in a frame. Pot up in autumn and overwinter in a frame, planting out in late spring or early summer of the following year. A high percentage usually succeed[78]. Cuttings of young wood, preferably with a heel, April/May in a frame[1, 37]. Plant out in the summer if the plants grow well, otherwise overwinter them in a cold frame and plant out in late spring or early summer of the following year[K]. Division in early spring as growth commences[78, 200]. This works best if soil has been mounded up into the bottom 20cm of the plant early in the previous summer[78]. Pot up the divisions and grow them on in a cold frame until they are established. Plant them out in the sum-

nwatta Requires a sunny position in a well-drained soil[200]. Plants are intolerant of soils that remain damp[200]. Prefers a neutral to alkaline soil[238]. This species is not very hardy outdoors in Britain, plants suffer damage at temperatures below freezing but they can be grown as annuals, flowering and setting seed in their first year[200]. Plants will be hardier in soils that are very well drained and also if the soil is a bit on the poor side[K].

#### 7.2.213 Amaranthus blitoides

Mat Amaranth

6 tlin 10 cyuc 2 kcak 1 tcan 0 dwat 0.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Amaranthus blitoides is a ANNUAL growing to  $0.2~\mathrm{m}$  (0ft 8in) by  $0.3~\mathrm{m}$  (1ft). See above for USDA hardiness. It is hardy to UK zone 6 and is frost tender. It is in leaf from April to October, in flower from August to September, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista No members of this genus are known to be poisonus, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves - raw or cooked[46, 61, 95, 105]. Rich in vitamins and minerals, it is used as a spinach[206, K]. The leaves can be dried and used as a winter food[257]. Seed - raw or cooked[46, 61, 95, 105, 257]. Very small and fiddly, about 1.5mm in diametra[266], but the seed is very nutritious. Rich in starch[177]. The seed can be ground into a powder and used in making

porridge, bread, mush, as a flavouring in soups etc[257]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K].

tcanta Adhesive DyeYellow and green dyes can be obtained from the whole plant[168]. A glue is made from the plant[257]. No more information is given, it is likely that the starch from the seed was used[K].

nrakta N. America - Washington to Utah and Mexico, east to Maine and New Jersey. ksacta A weed of disturbed and waste ground[43].

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. There is some confusion over the correct name for this species, some authorities say that it is part of A. graecizans[58, 60], whilst others say that it is a distinct species[50]. Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196].

### 7.2.214 Vitis californica

California Grape, California wild grape 6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis californica is a deciduous Climber growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw, cooked or dried for winter use[105, 161, 177, 257]. It can also be made into jellies, pies etc[183]. The fruit is quite juicy but is very small. The fruit is about 8mm in diameter[200], but it has a thin flesh and is of little value even in America for its fruit[11, 200]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked. A pleasantly sour snack when eaten raw1831.

tcanta Basketry Dye StringA yellow dye is obtained from the fresh or dried leaves[168]. The roots have been used as a basketry material for basket bottoms[257]. Woody parts of the vines have been used for the rims of large cone-shaped carrying baskets[257]. Smaller vines have been twisted to make a strong rope[257].

nrakta South-western N. America - Oregon to California. ksacta Stream banks and canyons below 1200 metres[71].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

(mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 161, 177, 257]. The fruit can also be made into preserves or can be dried for winter use[257].

nrakta South-western N. America. ksacta Open slopes and rocky canyons below 750 metres in California[71].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at 1 to 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Requires a sunny position[11]. Hardy to about -20°c[200]. This species is closely related to R. menziesii[200]. A polymorphic species[71]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

### 7.2.205 Thymus zygis

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Thymus zygis is an evergreen Shrub growing to  $0.3 \,\mathrm{m}$  (1ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe leaves are used as a condiment[177, 183]. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200].

tcanta Deodorant Disinfectant EssentialThe essential oil obtained from the leaves is used in perfumery, as a mouth wash, medicinally etc[200]. This plant is the main commercial source of thyme oil[238].

dwatta Antiseptic Deodorant DisinfectantThe leaves, and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta S.W. Europe - Spain, Portugal. ksacta Dry sunny hills

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, Iluly/Auoust in a frame[2001, Lavering.

nwatta Requires a light well-drained preferably calcareous soil in a sunny position[1, 200]. Succeeds in dry soils. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to about -10°c but are best given some protection in the winter, a pane of glass supported above the plant is usually adequate[1]. This species is harvested commercially for its essential oil[218]. The flowers are rich in nectar and are very attractive to honey bees[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200].

### 7.2.206 Adenophora triphylla

Nan Sha Shen

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Adenophora triphylla is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root - cooked[105, 177]. The root is thick and carrot shaped[275]. Leaves - cooked[105, 177].

dwatta Antifungal Cardiotonic ExpectorantThe root is antifungal, carditonic and expectorant[174, 279]. It is used I Korea to treat bronchial catarrh and coughs, especially where there is excess phlegm[279]. The rot has been shown to contain saponins and triterpenes which are responsible for its expectorant action[279].

nrakta E. Asia - China, Japan ksacta Grassy places in low-land and mountains, also on woodland edges [187]. In meadows from the lowlands to elevations of 1000 metres [275].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. The seed can also be sown in spring. Surface sow 2 - 3 seeds per pot in the spring in order to avoid transplanting[133]. We have found that if transplanted when very small seedlings grow away without difficulty[K]. Germinates in 1 - 3 months at  $10^{\circ}$ c[133]. Plant out into their permanent positions whilst young. Basal cuttings in spring[K]. Division in spring - very difficult because the plant dislikes root disturbance[1].

nwatta Prefers a light rich slightly alkaline soil that is not too dry and a warm sunny position[1, 200]. Prefers a moist peaty soil in sun or partial shade[187]. Plants are hardy to about -20°c[187]. This species is extremely polymorphic, and several varieties and forms have been described in Japan. The many variations in several characters (hairiness, leaf-shape, inflorescence-shape etc.) can be seen in individuals growing intermixed[275]. This species succeeds in a meadow if the grass is not cut until after the plant flowers[200]. Intolerant of root disturbance[1]. The young growth is extremely attractive to slugs, they have been known to destroy even mature plants[K].

### 7.2.207 Angelica pubescens

Du Hu

6 tlin 9 cvuc 2 kcak 0 tcan 3 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Angelica pubescens is a PERENNIAL growing to 1.8 m (6ft). See above for USDA hardness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furocoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105, 177].

dwatta Anodyne Antiinflammatory Antirheumatic Carminative Emmenagogue Nervine VasodilatorThe roots and rhizomes are anodyne, anti-inflammatory, antirheumatic, carminative, nervine and vasodilator[147, 176]. A decoction

is used to promote menstruation[218], to treat rheumatoid arthritis, rheumatism, headache, toothache and abscesses[147]. This herb is used medicinally in the same ways as A. dahurica (Bai Zhi)[254]. These uses are as follows:- Bai Zhi has been used for thousands of years in Chinese herbal medicine where it is used as a sweat-inducing herb to counter harmful external influences[254]. Bai Zhi is contraindicated for pregnant women[254]. The root is analgesic, anodyne, antibacterial, antidote, carminative, diaphoretic, diuretic, poultice and stimulant[176, 178, 218]. It is used in the treatment of frontal headache, rhinitis, boils, carbuncles and skin diseases[176]. It appears to be of value in treating the facial pain of trigeminal neuralgia[254]. Small quantities of angelicotoxin, one of the active ingredients in the root, have an excitatory effect on the respiratory centre, central nervous system and vasculomotor centre. It increases the rate of respiration, increases blood pressure, decreases the pulse, increases the secretion of saliva and induces vomiting [176]. In large doses it can cause convulsions and generalized paralysis[176].

nrakta E. Asia - Japan ksacta Damp habitats in hills and low mountains, C. and S. Japan[58, 200].

propta Seed - best swm in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sow in situ as soon as it is ripe.

nwatta Requires a deep moist fertile soil in dappled shade or full sun[200]. Plants are reliably perennial if they are prevented from setting seed[200]. A polymorphic species[58].

#### 7.2.208 Celtis tournefortii

Oriental hackberry

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

d'ntta Celtis tournefortii is a deciduous Tree growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in April, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177]. Small[183]. We have no further information, but the fruit is liable to consist of a thin, sweet, though dry and mealy flesh around a large seed[K].

nrakta S.E. Europe to W. Asia. ksacta Open rocky places, 300 - 1500 metres in Turkey[93]. Bushy places in Greece and the Balkans[45].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Stored seed is best given 2 - 3 months cold stratification and then sown February/March in a greenhouse[78, 200]. Germination rates are usually good, though the stored seed might take 12 months or more to germinate. The seed can be stored for up to 5 years[113]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The leaves of seedlings often have a lot of white patches without chlorophyll, this is normal and older plants produce normal green leaves. Grow the seedlings on in a cold frame for their first winter, and plant them out in the following late spring or early summer[K]. Give them some protection from the cold for their first winter outdoors. Cuttings

nwatta Succeeds in any reasonably good soil, preferring a good fertile well-drained loamy soil[1, 11, 200]. Succeeds on dry gravels and on sandy soils[200]. Established plants are very drought resistant[200]. Trees prefer hotter summers and more sunlight than are normally experienced in Britain, they often do not fully ripen their wood when growing in this country and they are then very subject to die-back in winter[1, 11, 200]. Trees can be very long-lived, perhaps to 1000 years[200]. This tree is more likely to thrive in Britain

than most species in the genus[200]. This species is closely related to C. glabrata[11]. Plants in this genus are notably resistant to honey fungus[200].

### 7.2.209 Clinopodium vulgare

Wild Basil

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Clinopodium vulgare is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies), insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaEdible leaves - used fresh or dried as a flavouring in cooked foods[5, 8, 12, 183] or fresh as a flavouring in salads[177]. A sweet and aromatic herb tea is made from the fresh leaves[183]

tcanta DyeA yellow and a brown dye are obtained from the leaves[46, 61].

dwatta Aromatic Astringent Cardiotonic Carminative Diaphoretic ExpectorantThe plant is aromatic, astringent, cardiotonic, carminative, diaphoretic and expectorant[4, 145]. An infusion of the plant helps to overcome weak digestion[244]

nrakta Most of Europe, including Britain, south and west to N. Africa, Siberia, central and western Asia. ksacta Heaths and dry grassy places, usually on calcareous soils[5, 17].

propta Seed - sow spring in a cold frame. Only just cover the seed. Germination usually takes place within 2 weeks at 21°c. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse. Plant them out in the summer if they have made sufficient growth, otherwise plant them out in late spring or early summer of the following year. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. Cuttings of soft wood in May or June.

nwatta Succeeds in almost any well-drained soil[1].

#### 7.2.210 Isatis tinctoria

Woad, Dyer's woad

6 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Isatis tinctoria is a BIENNIAL/PERENNIAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - they require long soaking in order to remove a bitterness, and even then they are still bitter[177, 179]. There is no record of the seeds being edible, but they contain 12 - 34% protein and 12 - 38% fat on a zero moisture basis[218].

tcanta Dye PreservativeWoad is historically famous as a dye plant, having been used as a body paint by the ancient Britons prior to the invasion of the Romans[238]. A blue dye is obtained from the leaves by a complex process that involves fermenting the leaves and produces a foul stench[6, 14, 46, 57, 100, 238]. The dye is rarely used nowadays, having been replaced first by the tropical Indigofera tinctoria

and more recently by synthetic substitutes[238]. Nevertheless, it is a very good quality dye that still finds some use amongst artists etc who want to work with natural dyes. A very good quality green is obtained by mixing it with Dyer's greenwood (Genista tinctoria)[238]. Woad is also used to improve the colour and quality of indigo, as well as to form a base for black dyes[244]. The leaves are harvested when fully grown and 3 - 4 harvests can be made in total[244]. Recent research in Germany has shown that (the dyestuff in?) this plant is a very good preservative for wood[Radio 4 Farming programme].

dwatta Antibacterial Antiviral Astringent CancerWoad has rather a mixed press for its medicinal virtues. One author says it is so astringent that it is not fit to be used internally it is only used externally as a plaster applied to the region of the spleen and as an ointment for ulcers, inflammation and to staunch bleeding[4]. However, it is widely used internally in Chinese herbal medicine where high doses are often employed in order to maintain high levels of active ingredients[238]. The leaves are antibacterial, anticancer, antiviral, astringent and febrifuge[148, 176, 218, 238]. It controls a wide range of pathogenic organisms, including viruses[218, 238]. It is used internally in the treatment of a wide range of disorders, including meningitis, encephalitis, mumps, influenza, erysipelas, heat rash etc[238]. The leaves are harvested in the summer and can be used fresh or dried[238]. They are also macerated and the blue pigment extracted. This is also used medicinally, particularly in the treatment of high fevers and convulsions in children, coughing of blood and as a detoxifier in infections such as mumps[238]. The root is antibacterial and anticancer[176]. It is used in the treatment of fevers, pyogenic inflammation in influenza and meningitis, macula in acute infectious diseases, erysipelas mumps and epidemic parotitis[176]. Its antibacterial action is effective against Bacillus subtilis, haemolytic streptococcus,, C. diphtheriae, E. coli, Bacillus typhi, B. paratyphi, Shigella dysenteriae, S. flexneri and Salmonella enteritidis[176]. Both the leaves and the roots are used in the treatment of pneumonia[218]. The root and the whole plant have anticancer properties whilst extracts of the plant have shown bactericidal properties[218].

nrakta C. and S. Europe. Naturalized in S. and C. England. ksacta Cliffs and cornfields, often on chalky soils[17, 200]

propta Seed - sow spring in situ. Fresh seed can also be sown in situ in late summer, it will take 20 months to flower but will produce more leaves[169].

nwatta An easily grown plant, it prefers a well-drained fertile soil in a sunny position[14], though it succeeds in ordinary garden soil[1]. Prefers neutral to alkaline conditions[238]. Plants deplete the soil of nutrients and cannot be grown successfully on the same site for more than two years[4]. Plants are hardy to about -15°c[200]. Woad is a biennial, or occasionally a short-lived perennial plant. It has a very long history as a dye plant, being used by the ancient Britons to give a blue colouring to the skin. At one time woad was widely cultivated for this blue dye obtained from its leaves but with the advent of chemical dyes it has fallen into virtual disuse[4]. It is currently (1993) being grown commercially on a small scale in Germany as a wood preservative (An item on BBC's Radio 4 Farming Programme). Plants self-sow freely when they are grown in a suitable position[14], though they tend not to thrive if grown in the same position for more than two years[238].

#### 7.2.211 Rosa x beanii

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rosa x beanii is a deciduous Shrub. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation

to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit SeedÉdible Uses: Fruit - raw or cooked. There is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground into a powder and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

dwatta Antiphlogistic Blood tonic CancerAntiphlogistic, blood tonic[178]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

prakt E, Asia - E, China? This is a hybrid species, ks-

acta Rocky places at low altitudes in W. Hupeh[109].

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to shorten this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as vet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months[K]. Stored seed should be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of halfripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy
clay soils. Dislikes water-logged soils[200]. A rather tender
species, it is best grown on a wall in Britain[1, 11]. Grows
well with alliums, parsley, mignonette and lupins[18, 20].
Garlic planted nearby can help protect the plant from disease
and insect predation[18, 20]. Grows badly with hoxwood[18].
A hybrid species, there is enormous confusion over its origins, some botanists believe that it is R. multiflora x R. laevigata or R. banksiae, others believe that it is R. banksiae x
R. moschata[200]. Hybridizes freely with other members of
this genus[80]. Plants in this genus are notably susceptible
to honey fungus[200].

### 7.2.212 Satureia thymbra

Thyme-Leaved Savory

6 tlin 9 cyuc 2 kcak 3 tcan 2 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Satureja thymbra is a SHRUB growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: midly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves have a thyme-like flavour and are used as a seasoning for pulses, savoury breads, brine-cured olives, vegetables etcl 4, 177, 183, 2381. The leaves and young shoots are used

the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta E. Asia - China, Japan, Korea. ksacta About 1000 m. Hebei, Jiangsu, Liaoning, Shaanxi, Sichuan[266].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

### 7.2.368 Ilex macropoda

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta llex macropoda is a deciduous Tree growing to 13 m (42ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in June, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

kcakta Edible Parts: Edible Uses: TeaA tea is made from the leaves[177].

nrakta E. Asia - China, Japan, Korea. ksacta In forests in low mountains all over Japan[58, 275]. Mixed forests, forest margins, thickets, roadsides, mountains at elevations of 800 - 1900 metres in China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to derminate Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel. August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils so long as they are not water-logged[200]. This species is closely related to I. montana[200]. Resents root disturbance, especially as the plant grows older[1, 11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Dioecious Male and female plants must be grown if seed is required.

#### 7.2.369 Rosa chinensis

China Rose 6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

d'ntta Rosa chinensis is a deciduous Shrub growing to 6 in (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Flowers Fruit Leaves Seed StemEdible Uses: The young shoot tips, flower buds and flowers are parboiled and eaten as potherbs or added to soups[177, 179, 183]. Fruit - raw or cooked. The fruit is about 20mm in diameter[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Some care has to be taken when eating this fruit, see the notes above on known hazards. Young peeled shoots can be eaten raw[179]. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

dwatta Anodyne Cancer Women's complaintsThe flowers, and to a lesser degree the roots and leaves, are anodyne, emmenagogue and used in the treatment of women's complaints[147]. They regulate menstruation and stimulate blood circulation[147]. The leaves, fruits and roots are decocted and used in the treatment of arthritis, boils, coughs etc[218]. The fruit is applied to sprains, ulcers and wounds[218]. The flower buds are used in the treatment of dysmenorrhoea, poor circulation, stomach pains and swellings[218]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - China. ksacta Not known in a truly wild situation.

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle. Plant out in the summer if the plants are more than 25cm tall, otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Layering. Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 20]. Grows badly with boxwood[18]. This species is one of the parents of all the modern large, repeat-flowering roses grown in the world today[260]. It is occasionally cultivated for speciality restaurants, there is at Plants are hardier when grown on poor sandy soils[200]. Established plants are very drought resistant[190]. Judging by its native habitat, this plant should tolerate maritime exposure[K]. Very cold hardy, tolerating temperatures down to at least -15°c[200], or to -25°c according to another report[187], but plants are subject to injury and decay by winter damp and snow[11]. A very ornamental plant[1], there are some named varieties[187]. Plants do not flower every year, requiring hot summers to initiate flowering[190]. The flowers are produced in the autumn and are often damaged by early frosts[233]. The scent of the flowers is most pronounced at night[245]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in later years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]. Special Features:North American native, Attracts butterflies, Fragrant flowers, Blooms are very showy.

### 7.2.265 Jasminum officinale

Jessamine, Poet's jasmine 6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Jasminum officinale is a deciduous Climber growing to 10 m (32ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Edible Uses: Condiment TeaFlowers - fragrant. Eaten or used to flavour or scent tea[183]. The dried flowers are a tea substitute[177]. An essential oil from the flowers is used as a condiment in various foods, especially Maraschino cherries but also baked goods, ice cream, sweets, chewing gum etc[183, 238]. It imparts a bitter-sweet floral tone[183].

tcanta Essential ParasiticideAn essential oil from the flowers is used in perfumery[46, 171, 200]. The flowers are picked soon after opening each morning and used fresh for oil extraction[238].

dwatta Antiseptic Antispasmodic Aphrodisiac Aromatherapy Galactogogue Parasiticide TonicThe leaf juice is applied to corns and ear discharges[218, 240]. The leaves contain salicylic acid (found also in the bark of Salix species and used as an analgesic, febrifuge etc)[218, 240]. The flowers are aphrodisiac, antiseptic, antispasmodic, galactogogue and tonic[178, 218, 238]. They are mainly used in aromatherapy (see below). The essential oil is used in aromatherapy. Its keyword is 'Aphrodisiac'[210]. It is used in the treatment of depression, nervous tension, impotence, frigidity, menstrual disorders and weak digestion[238].

nrakta W. Asia to E. Asia. ksacta Shrubberies and forests, usually on humus-rich soils, 1200 - 3000 metres in the Himalayas[51, 145]. Valleys, ravines, thickets, woods, along rivers, meadows; 1800 - 4000 metres in W. China[266].

propta Seed - best sown as soon as it is ripe in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy. Cuttings of mature wood in November. Layering.

nwatta Succeeds in a good well-drained loam[200], preferring a sunny position[182]. Very shade tolerant, it succeeds on a north facing wall[200]. Plants are hardy to about -15°c[184]. They require the protection of a wall in northern Britain but are fully hardy in the south[11]. Another report says that they are hardy to about -10°c, and that the stem

tips are often killed back in the winter though the plant soon recovers[202]. Climbs by means of twining[182]. It is self-supporting[200] and fast-growing[202]. Any pruning is best carried out in late winter and early spring[202]. A very ornamental plant[1], there are some named varieties[200]. The flowers are very fragrant[202] and the plant is sometimes cultivated for the essential oil in its flowers, the sub-species J. officinale grandiflorum (L.)Kobuski. is used[171]. Flowers are produced on the current year's growth and also on older wood[202]. Plants in this genus are notably resistant to honey fungus[200].

### 7.2.266 Anthriscus sylvestris

Cow Parsley, Wild chervil

6 tlin 9 cyuc 2 kcak 1 tcan 1 dwat 1.2 m hkuc

pcimhmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anthriscus sylvestris is a BIENNIAL growing to 1.2 m (4ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to June, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista This plant is suspected of being poisonous to mammals[76]. It also looks very similar to some very poisonous species so great care must be taken when identifying it[12].

kcakta Edible Parts: Leaves RootEdible Uses: The leaves are eaten raw, cooked as a potherb or used as a flavouring[5, 12, 53, 183]. They taste somewhat less than wonderfull Kl. Root - cooked[183].

tcanta DyeA beautiful green dye is obtained from the leaves and stem but it is not very permanent[115].

dwatta TonicThe root is soaked for several days in rice washings and then cooked with other foods as a tonic for general weakness[218].

nrakta Most of Europe, including Britain, south and east to N. Africa and Siberia. ksacta A very common plant of road-sides, hedges  ${\it etc}[5]$ .

propta Seed - sow as soon as ripe (June/July) in situ. The seed can also be sown April/May in situ. It usually germinates in 1 - 3 months at 20°c.

nwatta Succeeds in most soils. Shade tolerant[31]. The root has been recommended for improvement by selection and breeding as an edible crop[183]. This plant looks quite similar to some poisonous species, make sure that you identify it correctly.

### 7.2.267 Campanula medium

Canterbury Bells, Cup and Saucer, Canterbury Bells 6 tlin 8 cyuc 2 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli priklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Campanula medium is an evergreen Biennial growing to 1.2 m (4ft) by 0.3 m (1ft in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - raw or cooked[177]. Root - cooked[177].

tcanta DyeGreen and pale blue dyes are obtained from the flowers[168].

nrakta S. Europe. Naturalized in Britain[17]. ksacta Railway banks in the S.E. and E. Midlands of Britain[17]. Stony banks amongst calcareous rocks in Europe[221].

propta Seed - best sown in an outdoor seedbed in May, the seedlings are transplanted when large enough and then

placed in their final positions in the autumn[221]. The seed usually germinates in 2 - 4 weeks at 18°c[138].

nwatta Landscape Uses: Border, Container, Ground cover. Succeeds in most fertile well-drained soils[233], though it prefers a moist but well-drained rich sandy loam and a neutral or alkaline soil in sun or partial shade[1, 200]. A very ornamental plant, it is often grown in the flower garden and there are many named varieties[17]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. Plants usually self-sow in British gardens[221]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Not North American native, Suitable for

#### 7.2.268 Ehretia ovalifolia

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 12 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ehretia ovalifolia is a deciduous Tree growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit, No. more details. Young buds and leaves[105, 177]. No more de-

nrakta E. Asia - C. and S. Japan. ksacta In forests from lowlands to 500 metres[275].

propta Seed - we have no information on this species but suggest sowing it as soon as it is ripe in a greenhouse. Sow stored seed in late winter or early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame.

nwatta Prefers a moderately fertile well-drained sandy loam in a sunny position[200]. Requires a sheltered position[299]. Plants are shade tolerant in continental climates but they require more sun in maritime areas in order to ripen the wood[200]. Rich fertile soils tend to encourage soft sappy growth which is then subject to frost damage over winter[200]. Young trees are tender in Britain but they become perfectly hardy as they grow older[11]. The young growth in spring is frost-tender[K]. Closely allied to E. acuminata and included in that species by some botanists[11]. A tree was 10 metres tall at Bath botanical gardens in 1989[K]. The flowers, which are produced on the ripened wood of the previous season's growth, have a soft sweet perfume[245].

## 7.2.269 Magnolia grandiflora

Southern Magnolia, Bull Bay, Large-flowered Magnolia, Southern Magnolia

6 tlin 10 cvuc 2 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Magnolia grandiflora is an evergreen Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FlowersEdible Uses: Condiment-The flowers are pickled in some parts of England and are considered to have an exquisite flavour[2, 183]. They are also said to be used as a spice and a condiment[183].

tcanta Essential Shelterbelt WoodA fairly wind-tolerant tree, it can be used in shelterbelt plantings[200]. An essential oil is obtained from the flowers[240]. Wood - hard and fairly heavy, but weak and not durable[227]. White when first cut, it turns brown on exposure to air[229]. It is used in limited amounts for fuel, baskets, crates, woodenware and furniture[82, 227].

dwatta Diaphoretic Hypotensive Malaria Salve Stimulant TonicThe bark is diaphoretic, stimulant, tonic[46, 61, 240]. It is used in the treatment of malaria and rheumatism[240]. A decoction has been used as a wash and a bath for prickly heat itching[257]. The decoction has also been used as a wash for sores and as a steam bath for treating dropsy[257]. An alcoholic extract of the plant reduces the blood pressure, produces a slight acceleration in respiration but has no action on the heart[240].

nrakta South-eastern N. America - North Carolina to Florida and Texas. ksacta Hammocks, sand dunes, buffs and sandy bottoms[72]. Rich moist soils[227]. Always found in lowland areas, never above 105 metres altitude[229]

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[200].

nwatta Landscape Uses:Espalier, Firewood, Pest tolerant, Aggressive surface roots possible, Screen, Seashore, Specimen, Street tree. Best grown in a warm position in a moderately rich free soil of an open texture[1]. Tolerates moderately limey soils[200, 202] so long as they are deep and rich in humus[188]. The branches are brittle so a sheltered position is required[200]. Another part of the same book says that this species is fairly wind-resistant[200]. Succeeds in full sun or semi-shade[219]. Plants are hardy to about -10°c[200]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182]. A very ornamental plant[1], a number of named forms have been developed[200]. The flowers are very large (up to 25cm across) and have a delicious and very powerful scent[202, 245]. This is perhaps the most strongly scented flower in the world[245]. They can be produced in trees as young as 10 years old[229]. The form 'Exmouth Variety' (also known as elliptica) produces its flowers when younger than the species, these flowers have a refreshing lemon scent[245]. There is no main flush of flowering. instead the flowers open intermittently throughout the summer[K]. Plants do not normally need pruning, any cutting out of dead wood etc is best carried out in July[219]. Special Features: Attracts birds, Attractive foliage, North American native, Fragrant flowers, Attractive flowers or blooms.

#### 7.2.270 Miscanthus floridulus

Pacific Island silvergrass, Giant Eulalia Grass, Giant Chinese Silver Grass

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Miscanthus floridulus is a PERENNIAL growing to 2.5 m (8ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FlowersEdible Uses: The unopened flower spikes are edible[105, 177].

tcanta Hedge HedgePlants can be grown as a screen. Although they die down in the winter they quickly attain their full height each season[200].

nrakta E. Asia - Japan. ksacta Moist soils in meadows[200], of lowland Japan[58].

propta Seed - surface sow in spring in a greenhouse and keep moist. Germination should take place within a couple (clay) soils. Suitable pH: mildly acid, neutral and basic is taken internally, and is also applied externally to the fore-(mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: LeavesEdible Uses: Young sprouts and leaves - cooked[105, 177].

dwatta Analgesic Antipruritic Antirheumatic Hypotensive Parasiticide SedativeThe leaves are mildly analgesic, antipruritic, hypotensive and sedative[176, 218, 254]. They are used externally in the treatment of dermatitis and internally for the treatment of hypertension, rheumatoid arthritis, joint pain, numbness and paralysis[176, 218, 254]. When used in a clinical trial of 171 people, the blood pressure of 81% of the people dropped significantly - this effect was reversed when the treatment was stopped[254]. The plant is normally used in conjunction with Bidens bipinnata[218]. When used with the herb Siegesbeckia pubescens it is antiinflammatory[254]. The roots and leaves are antirheumatic and hypotensive[147]. A decoction is used in the treatment of rheumatoid arthritis and hypertension[147]. The pounded seed is used to kill lice[218].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets on mountain slopes, throughout most of China except Nei Mongol, below elevations of 2400 metres[266].

propta Seed - best sown as soon as possible in a greenhouse. Germination can be erratic but usually takes place within 20 - 60 days at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer after the last expected frosts. Root cuttings, 6 - 8cm long, December in a greenhouse. High percentage [78]. Division of suckers in the dormant season. Very easy, they can be planted out direct into their permanent positions if required.

nwatta Landscape Uses: Espalier, Standard, Specimen, Succeeds in a sunny position in ordinary garden soil but prefers a fertile humus-rich well-drained loam[164, 200]. The soil must not be allowed to dry out in the growing season[1]. Requires a position sheltered from cold drying winds[1, 200]. Plants are generally hardy to about -15°c[184, 200], they succeed outdoors at Kew though the branches are pithy and are apt to die back in winter[11]. The sub-species C. trichotomum fargesii. (Dode.)Rehder. is somewhat hardier, tolerating temperatures down to about -20°c[184]. Plants produce the occasional sucker[182]. The leaves have a heavy unpleasant odour when crushed[11, 1821. Flowers are produced on the current seasons growth and are sweetly scented[200]. Special Features: Not North American native, Attractive flowers or blooms.

#### 7.2.366 Clematis buchananiana

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Clematis buchananiana is a deciduous Climber growing to 6 m (19ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: DrinkTender young leaves - coked as a vegetable[272]. Some caution is advised, see the notes above on toxicity[K]. The plant is used in Nepal to make marcha, a fermented cake from which an alcoholic beverage is distilled[272].

dwatta Analgesic Odontalgic Poultice Stomachic VulneraryA paste of the roots is used as a poultice to treat swellings caused by inflammation[272]. The juice of the root is used in the treatment of peptic ulcers[272]. The juice is also inhaled to get rid of coughs and colds[272]. A paste of the stem or root bark is kept pressed against the teeth for about 15 minutes to relieve toothache[272]. The juice of the plant is applied externally to cuts and wounds[272]. It is also taken internally in the treatment of indigestion[272]. The leaf juice head, in the treatment of coughs and colds[272]. It is also warmed and placed inside the nose when treating sinusitis[272]

nrakta E. Asia - Himalayas from Kashmir to Tibet, Burma and western China, ksacta Warm broad-leaved to cool mixed forests, forest margins, generally growing on small trees and bushes, occasionally over rocks along the sides of streams at elevations of 460 - 3650 metres[273].

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade and its shoots growing up to the light[164]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Succeeds in acid as well as alkaline soils[200]. A very variable species, it varies considerably in hardiness according to the region from which the plant was first obtained - those obtained from the higher limits of its range being more coldtolerant[273]. It grows best in the milder or sub-tropical areas where its late-flowering habit can be fully appreciated. In colder areas the flowers are often badly damaged by frost[273]. A vigorous plant, capable of putting out new shoots up to 4 metres long in a season[273]. A twining plant, the leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. Plants flower on the current seasons growth. They usually require no pruning, especially if left to clamber into large shrubs and trees. Weak or dead stems can be removed in the winter and, where pruning may be required to reduce the size of the plant, shoots can be cut back by up to two thirds in the winter[273]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 7.2.367 Salix chaenomeloides

Japanese Pussy Willow

6 tlin 8 cyuc 1 kcak 3 tcan 2 dwat 6 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhien hionli

drutta Salix chaenomeloides is a deciduous Tree growing to 6 m (19ft 8in) at a fast rate. It is not frost tender. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - raw or cooked. They are not very palatable[172].

tcanta Landscape Uses:Border, Massing, Specimen, Winter interest. Special Features: Not North American native. Attractive flowers or blooms. Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in

for their ornamental value. This species usually self-sows in the garden if growing in a good position[1]. A fast-growing plant[188], it makes a good edging to a plant bed[245]. The forms of this species with white flowers have the refreshing scent of new-mown hay - flowers of other colours having little or no scent[245]. A good bee and butterfly plant[17, 30]. Special Features: Attractive foliage, Naturalizing, Fragrant flowers

### **7.2.362** Ilex integra

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ilex integra is an evergreen Tree growing to 6 m (19ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in April, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in guan-

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked. A famine food, it is only used when all else fails 1771.

nrakta E. Asia - E. China, Japan, Korea. ksacta Thickets and woods in hills and low mountains, often near the sea, in C. and S. Japan[58, 184].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils so long as they are not water-logged[200]. Somewhat tender for its first two or three years from seed[11, 182], this species is hardy to about -10°c[184] when it gets older. Resents root disturbance, especially as the plant grows older[1, 11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

### 7.2.363 Pachyphragma macrophylla

6 tlin 9 cvuc 1 kcak 0 tcan 0 dwat m hkuc pcimhmim cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pachyphragma macrophylla is an evergreen Perennial growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from March to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: It would be worthwhile trying out the leaves of this species for edibility. They are almost certainly not poisonous[K].

tcanta An excellent weed-smothering ground cover plant for shady areas[200]. The plants have persistent basal rosettes but only achieve full ground cover from mid or late spring until early winter each year[200].

nrakta W. Asia - N.E. Turkey to W. Caucasus. Naturalized in Britain. ksacta Wet beech forests to elevations of 1900 metres in Turkey[187]

propta Seed - sow autumn in a greenhouse[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in late spring[200]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a leafy soil and a damp shady position[187, 200]. Another report says that it succeeds in dry soils and, once established, tolerates drought[190]. Succeeds in heavy clays[200]. Very shade tolerant[200]. Succeeds in full sun or partial shade[188]. Possibly hardy to about -15°c[187, 200]. Plants have persistent basal

### 7.2.364 Dracocephalum moldavica

Moldavian Balm, Moldavian dragonhead 6 tlin 9 cvuc 1 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dracocephalum moldavica is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaThe lemonscented leaves are used to make a tea[183]. Young shoots[183]. No further details are given.

tcanta EssentialThe plant contains an essential oil, this is a possible source of citral[240].

dwatta Astringent Carminative Tonic VulneraryThe seeds are astringent, carminative and tonic[240]. They are used as a demulcent in the treatment of fevers[240]. The plant is astringent, tonic and vulnerary[240].

nrakta E. Europe to E. Asia. ksacta Dry hills, stony riverbanks and valleys at elevations from 200 - 2,700 metres in western China.

propta Seed - sow early spring in situ. Pinch back the shoot tips in May in order to encourage bushy growth[200].

nwatta Succeeds in a sunny position in a fertile welldrained soil[200]. The plant is sometimes cultivated for its essential oil[266]. The plant is very fragrant[200], with both the leaves and the flowers emitting a most refreshing scent of lemons[245]. The flowers remain fragrant and fresh for several weeks[245]. It is a useful plant for filling gaps in the summer border[200].

### 7.2.365 Clerodendrum trichotomum

Chou Wu Tong, Harlequin glorybower, Ferruginous clerodendrum, Harleguin Glory Bower

6 tlin 11 cyuc 1 kcak 0 tcan 3 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Clerodendrum trichotomum is a deciduous Tree growing to 6 m (19ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy

of weeks. When they are large enough to handle, prick the 7.2.272 Polygonum molle seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or early autumn[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Container, Erosion control, Seashore, Specimen, Winter interest. Prefers a deep fertile loamy soil that does not dry out in summer[200] but it also succeeds in any ordinary soil that is not too dry[1, 162], in sun or light shade[200]. Plants can be grown as a focal point in lawns, they also succeed in guite coarse grass[233]. The young growth in spring can be damaged by late frosts. This species is closely related to M. sacchariflorus[233]. The leaves have saw-toothed edges that can cut the unwary gardener, it is best to wear gloves when working with the plant[200]. Plants seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Not North American native. Suitable for cut flowers. Suitable for dried flowers

### 7.2.271 Mahonia gracilipes

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1.5 m hkuc pcimhmim cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia gracilipes is an evergreen Shrub growing to 1.5 m (5ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. We have no specific information on the fruit of this species, but all members of the genus have more or less edible fruit.

dwatta Antibacterial Antitumor Bitter DysenteryBerberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta E. Asia - Western China western Sichuan province. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in a cold frame for at least their first winter. Plant them out in late spring or early summer. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta An easily grown shrub, it thrives in any good garden soil[11] including heavy clays. Prefers a semi-shaded woodland position in a damp, slightly acid to neutral humusrich soil[200]. Plants can tolerate temperatures down to about -10°c[200]. Plants are very tolerant of pruning and can be cut right back into old wood if they have outgrown their welcome[182]. Plants produce suckers and form gradually spreading clumps[200]. Hybridizes freely with other members of this genus.

6 tlin 9 cvuc 2 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Polygonum molle is a PERENNIAL growing to 2.5 m (8ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Young shoots - raw or cooked as a vegetable[146, 177, 272]. Pleasantly acid, they are used like rhubarb[105]. Seed - raw or cooked. It is rather small and fiddly to utilize

tcanta Soil stabilizationPlants are very fast growing and are used to reclothe and stabilize land slips[146]. They are best spaced about 1.2 metres apart each way[208].

dwatta AstringentThe whole plant is astringent[240].

nrakta E. Asia - Himalayas from Uttar Pradesh to S.W. China. ksacta Forest, scrub and damp ground, often gregarious, 900 - 4250 metres[51, 187], Slopes, forests, grassy places and thickets in valleys at elevations of 1300 - 3500

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. A very fast growing plant[146]. Plants seem to be immune to the predations of rabbits[233].

### 7.2.273 Brassica rapa dichotoma

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Brassica rapa dichotoma is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Leaves - raw or cooked. A bit on the coarse side, though the young leaves can be added in moderation to salads whilst older leaves make an acceptable vegetable[K]. An edible oil is obtained from the seeds.

nrakta A cultivated form of B, rapa, ksacta Not known

propta Seed - sow in situ in the spring.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Prefers a light sandy soil and dislikes a heavy soil[37]. Prefers cool moist growing conditions[16]. Succeeds in any reasonable soil. Tolerates a pH in the range 4.3 to 8.3. Indian rape is cultivated mainly in India and Nepal for its oil-rich seeds.

### 7.2.274 Rosa laevigata

Cherokee Rose

6 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rosa laevigata is an evergreen Shrub growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to July, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There is a layer of hairs around the seeds just beneath the flesh of the fruit. These hairs can cause irritation to the mouth and digestive tract if ingested.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit raw or cooked[177]. The pear-shaped fruit is up to 4cm long[200], but there is only a thin layer of flesh surrounding the many seeds[K]. Sugar can be extracted from the fruit, it is also used to ferment rose wine[266]. Some care has to be taken when eating this fruit, see the notes above on known hazards. The seed is a good source of vitamin E, it can be ground and mixed with flour or added to other foods as a supplement[102, 183]. Be sure to remove the seed hairs[102].

tcanta TanninThe root bark contains tannin[266]..

dwatta Antibacterial Anticholesterolemic Astringent Cancer Carminative Depurative Diuretic Dysentery Emmenagogue Infertility Kidney Stomachic Urinary VulneraryThe leaves are a famous vulnerary[218]. The fruits, root and leaves are emmenagogue and depurative[147]. Their use stabilizes the kidneys [147]. A decoction is used in the treatment of chronic dysentery, urinary tract infections, wet dreams, prolapse of the uterus, menstrual irregularities and traumatic injuries[147]. The root bark is astringent and used in the treatment of diarrhoea and menorrhagia[218]. The dried fruits are antibacterial, anticholesterolemic, astringent, carminative, diuretic and stomachic[176, 178, 218, 238]. They are used internally in the treatment of urinary dysfunction, infertility, seminal emissions, urorrhoea, leucorrhoea and chronic diarrhoea[238]. The root is used in the treatment of uteral prolapse[218]. The flowers are used in the treatment of dysentery and to restore hair cover[218]. The fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A. C and E. flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Southern China from Sichuan and Hubei to Taiwan. ksacta Rocky places at low altitudes[109]. In open fields, farmland, or in scrub at elevations of 200 - 1600 metres[266]

propta Seed. Rose seed often takes two years to germinate. This is because it may need a warm spell of weather after a cold spell in order to mature the embryo and reduce the seedcoat[80]. One possible way to reduce this time is to scarify the seed and then place it for 2 - 3 weeks in damp peat at a temperature of 27 - 32°c (by which time the seed should have imbibed). It is then kept at 3°c for the next 4 months by which time it should be starting to germinate[80]. Alternatively, it is possible that seed harvested 'green' (when it is fully developed but before it has dried on the plant) and sown immediately will germinate in the late winter. This method has not as yet(1988) been fully tested[80]. Seed sown as soon as it is ripe in a cold frame sometimes germinates in spring though it may take 18 months. Stored seed can be sown as early in the year as possible and stratified for 6 weeks at 5°c[200]. It may take 2 years to germinate[200]. Prick out the seedlings into individual pots when they are large enough to handle.

Plant out in the summer if the plants are more than 25cm tall. otherwise grow on in a cold frame for the winter and plant out in late spring. Cuttings of half-ripe wood with a heel, July in a shaded frame. Overwinter the plants in the frame and plant out in late spring[78]. High percentage[78]. Cuttings of mature wood of the current seasons growth. Select pencil thick shoots in early autumn that are about 20 - 25cm long and plant them in a sheltered position outdoors or in a cold frame[78, 200]. The cuttings can take 12 months to establish but a high percentage of them normally succeed[78]. Division of suckers in the dormant season. Plant them out direct into their permanent positions. Lavering, Takes 12 months[11].

nwatta Succeeds in most soils[11], preferring a circumneutral soil and a sunny position[200]. Grows well in heavy clay soils. Dislikes water-logged soils[200]. A very ornamental plant[1], but it is not very hardy in Britain and only succeeds outside in the warmer parts of the country[11]. It can be cut back to the ground even in southern England in cold winters, though it will usually resprout from the base[260]. It is the state flower of Georgia[219] and is also the parent of several modern garden cultivars[219]. The flowers have a clove-like fragrance[245]. If any pruning is necessary then this should be carried out immediately after the plant has finished flowering[219]. Grows well with alliums, parsley, mignonette and lupins[18, 20]. Garlic planted nearby can help protect the plant from disease and insect predation[18, 201. Grows badly with boxwood[18]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

### 7.2.275 Mimulus luteus

Monkey Musk, Yellow monkey-flower 6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Mimulus luteus is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[105, 257]. Eaten as greens[257].

nrakta S. America - Chile. Naturalized in Britain. ksacta Wet places[60]. Locally naturalized by streams in Scotland.

propta Seed - sow spring in a greenhouse and only lightly cover the seed[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can also be sown in situ in late spring after the last expected frosts[200]. Division in spring[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of softwood, 5cm long in spring or summer[200].

nwatta Prefers rather moist places such as damp borders, margins of streams and boggy spots[1]. Grows well in heavy clay soils. Thrives in full sun so long as the soil does not dry out[200]. Hardy to about -20°c[187]. There is some confusion over the naming of this plant, the entry on edibility may refer to M. guttatus, which is closely related to this species[161, 200]. Hybridizes with M. guttatus[187].

### 7.2.276 Juniperus rigida

Temple Juniper, Needle Juniper 6 tlin 7 cyuc 2 kcak 0 tcan 1 dwat 8 m hkuc htut cyutli hgatkyuctcup hwicli hrasilutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus rigida is an evergreen Tree growing to 8 m (26ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be the treatment of colds, coughs, neuralgia, rheumatism and 7.2.360 Salvia moorcroftiana water on the knee[218].

nrakta E. Asia - Himalayas. ksacta Thickets[11]. Mountainous areas in Vietnam, occasionally on the edges of forests[283].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. It can be slow to germinate. Stored seed requires 6 months warm followed by 3 months cold stratification[113] and can be very slow to germinate[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least the first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[113, 200]. Cuttings of ripe wood of the current season's growth, 15 - 30cm long in a cold frame[238]. Root cuttings in late winter[200]. Division of suckers in the dormant season[200]

nwatta Prefers a light warm open loamy humus-rich soil and a position sheltered from north and east winds.[1, 11, 200] Prefers a well-drained soil and full sun[200]. Tolerates urban pollution and poor soils[200]. All parts of the plant are particularly fragrant[283]. Plants are hardy to between -10 and -15°c if they are sheltered from cold winds[200].

### 7.2.359 Cornus monbeigii

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cornus monbeigii is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The following notes are for C. macrophylla, they guite probably also apply to this closely related species[K]. Fruit - raw or cooked[2, 105, 146, 158, 200, 218]. The fruit is about 6mm in diame-

tcanta WoodThe following notes are for C. macrophylla, they quite probably also apply to this closely related species[K]. Wood - hard, close grained, warps badly[158]. It makes a good charcoal[146, 158].

dwatta Anodyne Astringent Dysentery TonicThe following notes are for C. macrophylla, they quite probably also apply to this closely related species[K]. Anodyne, astringent, tonic[178]. The wood is anodyne and a uterosedative[218]. The stem bark is used in the treatment of dysentery[218].

nrakta E. Asia - China. ksacta Dense and sparse forests, open hillsides at elevations of 1100 - 3200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80. 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame[188]. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78], Lavering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[188], growing well in thin woodland[11]. This species is closely related to C. macrophylla[200]. Plants in this genus are notably resistant to honey fungus[200].

6 tlin 9 cvuc 1 kcak 0 tcan 1 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Salvia moorcroftiana is a PERENNIAL growing to 0.9 m (3ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: StemEdible Uses: Stems peeled[105, 177]. They are occasionally eaten[183].

dwatta Astringent Dysentery Emetic PoulticeThe roots are used in the treatment of colds and coughs[240]. The seed is emetic[240]. It is used in the treatment of dysentery, haemorrhoids, colic and, externally, boils[240]. A poultice of the leaves is used as a dressing for wounds and is also applied to itchy skin[240].

nrakta E. Asia - Himalayas from Pakistan to W. Nepal. ksacta Open slopes and wasteland, 1500 - 2700 metres[51].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Plants can be killed by excessive winter wet[200]. Closely related to S. argentea[1]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 7.2.361 Lobularia maritima

Sweet Alvssum

6 tlin 9 cvuc 1 kcak 0 tcan 1 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Lobularia maritima is a ANNUAL/PERENNIAL growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf from April to October, in flower from June to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Edible Uses: CondimentThe young leaves, stems and flowers are sometimes used as a flavouring in salads and other dishes where pungency is required[183].

dwatta Antiscorbutic Astringent DiureticThe plant is commonly used in Spain as an antiscorbutic and diuretic[240]. It is also highly esteemed there as an astringent in the treatment of gonorrhoea[240].

nrakta Europe - Mediterranean. Naturalized in Britain. ksacta Dry sunny places in the Mediterranean [50]. Grows by the coast in Britain[17].

propta Seed - it can be sown in situ during mid to late spring and should germinate within 2 weeks[200]. Seedlings can be transplanted. In order to obtain an earlier display of the flowers, the seed can be sown in a greenhouse in late winter. When large enough to handle, the seedlings are pricked out into individual pots and are then planted out in late spring.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Seashore, Succeeds in an ordinary garden soil in a sunny position[200]. Succeeds in sandy soils[188]. Grows well on dry walls[1]. Tolerates maritime conditions[200]. Although a short-lived perennial, it soon loses its compact habit if grown for more than one year and so is usually grown as an annual plant in gardens[245]. A very ornamental plant, there are several named forms developed

Used in turner[46, 61]. An excellent charcoal is obtained from the stems[100].

dwatta Diuretic Emmenagogue MouthwashDiuretic, emmenagogue. Also used as a mouthwash[46, 61].

nrakta S.E. Europe to W. Asia. ksacta Evergreen thick-

ets and rocky slopes[45, 50], mainly on limestone[184]. propta Seed - best sown in a cold frame as soon as it is

ripe[200]. Sow stored seed as early in the year as possible. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Takes 15 months. High percentage[78]. Layering in autumn. Takes 12 months[78].

nwatta Thrives in any soil of moderate quality[11] Prefers a neutral to acid soil but tolerates some lime[200]. Succeeds in sun or semi-shade[200]. Tolerates maritime exposure[75, Kl. Plants are hardy to about -15°c[184]. A slow growing plant[182]. The flowers have a rich fruity perfume[245]. This species is cultivated for its edible olive-like fruit in southern Europe[2]. (This report is possibly a mistake[K].) Plants in this genus are notably resistant to honey

### 7.2.356 Lithocarpus glaber

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 7 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Lithocarpus glaber is an evergreen Tree growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed cooked[177]. The seed probably contains bitter-tasting tannins. These can be removed by soaking the seed in water for a few days, changing the soak water regularly. The process can be speeded up by grinding the seed into a powder prior to soaking[K].

nrakta E. Asia - E. China, Japan. ksacta Mixed mesophytic forests, frequent on sunny slopes; below 1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, Zhejiang[266]

propta The seed is best sown as soon as it is ripe in the autumn in a cold frame[200]. It needs to be protected from mice, squirrels and other seed eaters. The seed has a short viability but can be stored for a few months if kept cool and slightly damp - the salad compartment of a fridge is a good storage place. Germination takes place in the winter or early spring. When they are large enough to handle, prick the seedlings out into individual pots. If the plants are 15cm or more tall by the summer they can be planted out into their permanent positions. Give them a good weed-excluding mulch and some protection from the cold for their first couple of years outdoors. If growth is not sufficient then grow them on in the greenhouse for their first winter and plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Prefers a deep fertile soil with medium drainage[200]. Plants are often confused with L. edulis[11]. The botanical name of this species is confusing - glaber means smooth but the young shoots of this species are hairy whilst the young shoots of L. edulis are smooth[11].

### 7.2.357 Pyracantha crenulata

Nepalese White Thorn, Nepalese firethorn 6 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyracantha crenulata is an evergreen Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to July. The species is hermaphrodite (has both male

and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: FruitEdible Uses: TeaThe leaves are made into a tea-like beverage[177, 183]. The fruits are rich in sugar[177]. The ripe fruit is eaten fresh[272]. The fruit is 6 - 8mm in diameter[200].

tcanta Hedge Hedge WoodThe plant makes an excellent hedge[272]. Wood - hard, very close and even grained. Used for walking sticks[51, 146, 272].

dwatta Astringent DysenteryThe powdered, dried fruit, combined with yoghurt, is used in the treatment of bloody dysentery[272].

nrakta E. Asia - Himalayas to China. ksacta Shrubberies, open slopes, cultivated areas, 1000 - 2400 metres from Kashmir to S.W. China[51]. Slopes, roadsides, streamsides, among shrubs, grassy places, valleys[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Remove all the fruit flesh since this can inhibit germination[200]. Stored seed requires 3 months cold stratification, sow it as early in the year as possible in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of almost mature wood, 5 -10cm with a heel, mid-August in a cold frame[78]. Pot up in October or the following spring[78].

nwatta Prefers a good well-drained, moisture retentive loamy soil[1, 200]. Succeeds in any soil that is warm and not very heavy[11]. Another report says that it grows well in heavy clay soils. Succeeds in sun or part shade, though it does not fruit so well in a shady position[200]. Tolerates atmospheric pollution and reasonable exposure, though it requires protection from cold winds[200]. Closely related to P. coccinea, but it is not as hardy as that species and is best grown on a south-facing wall in Britain[11]. Susceptible to scab and fireblight[11], especially when grown on acid sandy

### 7.2.358 Eleutherococcus trifoliatus

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hyishrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eleutherococcus trifoliatus is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked[111, 177].

dwatta Antirheumatic Infertility Nervine TonicThe root bark and stem bark contain triterpenoid saponins and oleanolic acid[283] They are used in the treatment of rheumatism lumbago, ostealgia and impotence[283]. The bark is also considered to be a stimulant and tonic for the central nervous system and to improve the memory[283]. The bark is collected in the summer and autumn, wrapped to bring out the aroma and then thoroughly dried[283]. The plant is used in

found on any one plant so both male and female plants must be harvested as it comes into flower and either be distilled be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Fruit OilEdible Uses: Condiment OilFruit - raw or cooked[183]. It can also be ground into a powder and used as a spice[105, 177, 183]. The cones are about 7 - 11mm in diameter, they take 2 years to mature[200].

tcanta Oil WoodAn oil is obtained from the fruit. It is mentioned as being diuretic[61], is this an essential oil? Wood. Used for construction, agricultural implements, fencing etc[61].

dwatta DiureticThe fruit is diuretic[61, 254].

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Hills and mountains in C. and S. Japan[58]. Dry areas in mountains below 2200 metres in China[266].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Screen, Specimen. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[11] and succeeding on chalk[200]. Established plants are drought tolerant, succeeding in hot dry positions[200]. A very ornamental plant[1], it thrives in S. England[11]. Trees are very slow growing in Britain, normally averaging only 15cm a year increase in height[185]. Cultivated for its wood in Asia[61]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Fragrant foliage, Inconspicuous flowers or blooms.

### 7.2.277 Thymus capitatus

Headed Savory, Thymus 6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hrasilut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Thymus capitatus is an evergreen Shrub growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaThe plant is sometimes used as a condiment[183]. An essential oil from the plant is used for flavouring baked goods. condiments, beverages, ice creams etc. It is called 'Spanish oregano oil'[183, 238]. Leaves - raw in salads or added as a flavouring to cooked foods[2]. An aromatic tea is made from the leaves. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200].

tcanta Deodorant Disinfectant EssentialThe essential oil, known as 'Spanish oregano oil', obtained from the leaves is also used in perfumery and soaps, as a mouth wash, medicinally etc[46, 57, 89, 100, 200, 238].

dwatta Antiseptic Deodorant DisinfectantThe leaves. and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[200, 238]. The plant can be used fresh at any time of the year, or it can for the oil or dried for later use[238]. The essential oil should not be used in aromatherapy because it is highly irritant to the mucous membranes[238].

nrakta Europe - Mediterranean. ksacta Dry, usually calcareous soils[45, 50].

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Prefers a light, well-drained calcareous soil and a sunny position[200]. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to about -10°c[200]. This species used to be cultivated as a culinary herb in the herb garden but it has now fallen into disuse[2]. The flowers are rich in nectar and are very attractive to honey bees[89, 148, 200, 238]. The growing plant is a beneficial companion for most plants[54]. The plant is powerfully pungent when handled[245]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200].

### 7.2.278 Yucca harrimaniae

Spanish Bayonet, New Mexico Spanish bayonet 6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.4 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Yucca harrimaniae is an evergreen Shrub growing to 0.4 m (1ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit StemEdible Uses: Fruit - the immature fruit is cooked. A bitter taste, but most of the bitterness is in the skin[85]. Flowers - raw or cooked[85]. They are delicious raw, and can also be dried, crushed and used as a flavouring[164]. Flowering stem peeled, cooked and used like asparagus[164]. The whitish inner portion is eaten[85].

tcanta Broom Fibre SoapA fibre obtained from the leaves is used for making ropes, baskets and mats[82, 85 1691 The leaves themselves can be used as paint brushes[92], brooms or woven to make mats etc[85]. The roots are rich in saponins and can be used as a soap substitute[85].

nrakta Central N. America - Utah to Colorado, ksacta High plains grasslands to open coniferous woods[228].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept. at a temperature of 20°c. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their

first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established[78]. Division of suckers in late spring[111]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Thrives in any soil but prefers a sandy loam and full exposure to the south[11]. Requires a sunny position[11]. Plants are hardier when grown on poor sandy soils[200]. Established plants are very drought resistant, this species is also tolerant of cool damp weather[11]. Hardy to at least -30°c[164]. Closely allied to Y. glauca[1]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be guite easily and successfully done using something like a small paint brush. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in later years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]

### 7.2.279 Pinus ayacahuite

Mexican White Pine

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 55 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hjonli

drutta Pinus ayacahuite is an evergreen Tree growing to 55 m (180ft 5in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: SeedEdible Uses: CondimentSeed-raw or cooked[183]. The seed is about 8mm long[200]. Rich in oil, the seed has a resinous flavour. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dve Herbicide Resin WoodA tan or green dve is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 641 In general trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc.

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment

for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta Southern N. America - Mexico. ksacta Lower pine forests in cool mountains in Mexico[181]. Sheltered valleys and mountain slopes at elevations of 2,400 - 3,300 metres[260].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Thrives in a light well-drained sandy or gravelly loam[1]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. Growth of older trees tends to be very slow but many younger trees are growing fairly quickly averaging more than 30cm a year[185]. This tree is unique in being the only tree from the tropics (it is found between latitudes 14 and 20°north) to succeed in central Scotland, latitude 57°north[200]. It tolerates temperatures down to about -15°c[260]. The cones open and shed their seed whilst still attached to the tree[226]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Seed cones are up to 30cm long[200]. A tree at Kew in January 1995 was about 12 metres tall and had well over 50 large cones on it. Another mature tree of the same species growing nearby had only a very few cones[K]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Plants in this genus are notably susceptible to honey fungus[200].

### 7.2.280 Quercus myrsinaefolia

6tlin 9 cyuc 2 kcak 0 t<br/>can 2 dwat m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flat<br/>priklwis hpa7tmwatli hjonli

drutta Quercus myrsinaefolia is an evergreen Tree growing to 15 m (49ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower in June, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable formedium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[105, 177]. The seed is up to 25mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

#### 7.2.352 Ilex latifolia

Tarajo

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta llex latifolia is an evergreen Tree growing to 10 m (32ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

kcakta Edible Parts: Edible Uses: Coffee TeaThe leaves are used as a tea substitute[177, 183]. The roasted seed is used as a coffee substitute[177, 183].

nrakta E. Asia - China, Japan. ksacta Evergreen broadleaf forests, shrub forests and bamboo forests at elevations of 200 - 1500 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils so long as they are not water-logged[200]. One report says that this species is hardy to about -15°c[184], another that it is hardy to about -5'c[260], whilst others say that it is not fully hardy in many parts of Britain and is best grown in the milder areas of the country[188, 200]. Plants succeed but they do not thrive outdoors at Kew, though they thrive just a few miles south of there[11]. Resents root disturbance, especially as the plant grows older[1, 11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

### 7.2.353 Lithocarpus edulis

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Lithocarpus edulis is an evergreen Tree growing to 9 m (29ft 6in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[123, 177, 183]. Not of a good taste[105]. The poor taste is probably due, at least in part, to the presence of tannins. These can be removed by soaking the seed in water for a few days, changing the soak water regularly. The process

can be speeded up by grinding the seed into a powder prior to soaking[K]. The seed is an acorn about 25mm long and 8mm wide[K].

nrakta E. Asia - C. and S. Japan. ksacta Not known

propta The seed is best sown as soon as it is ripe in the autumn in a cold frame[200]. It needs to be protected from mice, squirrels and other seed eaters. The seed has a short viability but can be stored for a few months if kept cool and slightly damp - the salad compartment of a fridge is a good storage place. Germination takes place in the winter or early spring. When they are large enough to handle, prick the seedlings out into individual pots. If the plants are 15cm or more tall by the summer they can be planted out into their permanent positions. Give them a good weed-excluding mulch and some protection from the cold for their first couple of years outdoors. If growth is not sufficient then grow them on in the greenhouse for their first winter and plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Prefers a deep fertile soil with medium drainage[200]. This species is only hardy in the southern half of England[11]. A tree growing in deep shade did not produce seed at Kew in the very hot summer of 1989[K]. A tree at Hilliers produced lots of seed in 1994, but they were not fertile and did not contain endosperm[K]. Plants are often confused with L. glabra[1].

### 7.2.354 Euptelea polyandra

Funtale

6 tlin 7 cyuc 1 kcak 0 tcan 0 dwat 8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euptelea polyandra is a deciduous Tree growing to 8 m (26ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked. A famine food, used when all else fails[179].

nrakta E. Asia - Japan. ksacta Forests in mountains, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering.

nwatta Landscape Uses:Border, Hedge, Screen, Standard, Specimen. Prefers an open moderately rich free soil[1] and full sun[200]. Grows well in an open situation in a woodland garden or shrub border[200]. Special Features:Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

#### 7.2.355 Phillyrea latifolia

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phillyrea latifolia is an evergreen Tree growing to 8 m (26ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - olive-like[2]. It is possibly edible[105]. The fruit is an ovoid drupe about 6mm in diameter with a single seed[200].

tcanta Charcoal Hedge Hedge WoodBears pruning well and can be grown as a hedge, tolerating maritime exposure though it is fairly slow growing[11, 49, 75]. Any trimming is best carried out in the spring[188]. Wood - fine grained.

drutta Sorbus vestita is a deciduous Tree growing to must be viewed with some scepticism, the plant is unlikely 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The seeds probably contain hydrogen cyanide. This is the ingredient that gives almonds their characteristic flavour. Unless the seed is very bitter it should be perfectly safe in reasonable quantities. In small quantities, hydrogen cvanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 146, 272]. The fruits are up to 2cm across[200]. nrakta E. Asia - Himalayas. ksacta Mixed forests at elevations of 2500 - 3700 metres from Uttar Pradesh to Sikkim[51, 272].

propta Seed - best sown as soon as it is ripe in a cold frame[78, 80]. If you have sufficient seed it can be sown in an outdoor seedbed[78, 80]. Stored seed germinates better if given 2 weeks warm then 14 - 16 weeks cold stratification[98], so sow it as early in the year as possible. Prick out the seedlings into individual pots when they are large enough to handle. Seedlings are very slow to put on top-growth for their first year or two[11], but they are busy building up a good root system. It is best to keep them in pots in a cold frame for their first winter and then plant them out into their permanent positions in late spring.

nwatta Succeeds in most reasonably good soils in an open sunny position[11]. Tolerates light shade[188], though it fruits better in a sunny position[K]. Plants are susceptible to fireblight[188]. A very ornamental tree[11], unfortunately the fruit is not freely borne in Britain[11]. Plants are apt to die back without any warning[11].

### 7.2.350 Euphorbia tetragona

6 tlin 9 cvuc 1 kcak 2 tcan 1 dwat 10 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Euphorbia tetragona is an evergreen Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The sap contains a latex which is toxic on ingestion and highly irritant externally, causing photosensitive skin reactions and severe inflammation, especially on contact with eyes or open cuts. The toxicity can remain high even in dried plant material[200]. Prolonged and regular contact with the sap is inadvisable because of its carcinogenic nature[214].

kcakta Edible Parts: NectarEdible Uses: The flowers are rich in nectar and this is sometimes used in confectionery[183].

tcanta MiscellanyWildlife - The flowers are rich in nectar. Dynamic accumulator.

dwatta MiscellanyOne report says that this species also supplies the drug, though it fails to say what the drug is or its medicinal actions[4]

nrakta S. Africa - Cape Province ksacta Not known

propta Seed - sow spring in a shaded position in a greenhouse[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Prefers a light well-drained moderately rich loam in an open position[200]. Succeeds in dry soils[1]. According to [200] this species is hardy to climatic zone 7 (tolerating temperatures down to about -10°c). This statement

1194

to be at all frost-tolerant. Hybridizes with other members of this genus[200]. The ripe seed is released explosively from the seed capsules[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. This genus has been singled out as a potential source of latex (for making rubber) for the temperate zone, although no individual species has been singled out[141].

#### 7.2.351 Cornus nuttallii

Mountain Dogwood, Pacific dogwood, Western Dogwood 6 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cornus nuttallii is a deciduous Tree growing to 10 m (32ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: The fruit is possibly edible[177]. The fruit is about 10mm in diameter[200] and has a thin, mealy flesh[82].

tcanta Basketry Dye Tannin WoodAn intense brown dye is obtained by boiling the bark[257]. The bark is rich in tannin and has been used as a preservative [257]. The long slender branches have been used in making baby baskets[257]. Wood - exceedingly hard, heavy, strong, close grained. It is used for tool handles, cabinet making etc[46, 61, 82, 118].

dwatta Antiperiodic Febrifuge Laxative Malaria Tonic-The bark is antiperiodic, cathartic, febrifuge, laxative and tonic[46, 61, 118, 257]. An infusion is used as a quinine substitute in the treatment of malaria[46, 118, 226]. The infusion has also been used in the treatment of stomach complaints[257]. Externally, it is used to treat ulcers[257].

nrakta Western N. America - British Columbia to California and east to Idaho. ksacta Usually found in moist welldrained soils in the shade of coniferous trees to 1800 metres[82].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of about 3 days warm stratification at 15°c before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta Landscape Uses:Border, Specimen, Woodland garden. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Another report says that it does not thrive in poor chalky soils[182]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. Plants are hardy to about -15°c[184], but they require long hot humid summers in order to promote good growth[200]. A very ornamental tree[1], but it is usually short-lived in Britain and does not do well in the north of this country[11]. There is some evidence to suggest that trees grow better on poor soils and can be killed by too much kindness. A very good tree has been seen on a poor gravel soil[182]. Closely related to C. florida[226]. This species is the floral emblem of British Columbia [226]. A number of named varieties have been developed for their ornamental value[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Blooms are very showy.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff[4].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - S. China, Japan. ksacta Warmer areas of Japan[58]. Mixed mesophytic forests in mountain valleys at elevations of 200 - 2500 metres[266].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best. sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The seed ripens in its first year[200]. Plants grown under this name in Britain are often O. bambusifolia, Q. glauca, Q. salicina or Q. stenophylla[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

### 7.2.281 Saussurea costus

6 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Saussurea costus is a PERENNIAL growing to 3 m (9ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe aromatic root is sometimes used as a spice[183]. It has a characteristic penetrating odour reminiscent of violet, orris and vetiver[183]

tcanta Essential Hair IncenseAn essential oil obtained from the roots is used medicinally, in perfumery, incenses and as a hair rinse when it is said to darken grey hair[61]. It has a strong lingering scent[238]. The smell is at first like violets, but as it ages it can become more fur-like or eventually become unpleasantly goat-like[245]. The roots are cut into lengths about 8cm long and then dried before being exported[211]. Smaller pieces of the root are ground into a powder and then used to make incense sticks[211]. The longer clean pieces are cut into very thin slices and then burnt at shrines or used as a tonic in hot baths[211].

dwatta Anodyne Antibacterial Antispasmodic Aphrodisiac Carminative Emmenagogue Skin Stimulant Tonic VermifugeCostus is a commonly used medicinal herb in China and is considered to be one of their 50 fundamental herbs[218]. It is also used in Avurvedic medicine where it is valued mainly for its tonic, stimulant and antiseptic properties[254]. It is said to be aphrodisiac and to be able to prevent the hair turning grey[254]. The root is anodyne, antibacterial, antispasmodic, aphrodisiac, carminative, skin, stimulant, stomachic, tonic and vermifuge[61, 147, 176, 218]. It is used internally in the treatment of abdominal distension and pain, chest pains due to liver problems and jaundice. gall bladder pain, constipation associated with energy stagnation, and asthma[238]. The root is harvested in the autumn or spring and either dried for later use or decocted for the essential oil[238]. It is normally used with other herbs[218]. The root is also used in Tibetan medicine where it is considered to have an acrid, sweet and bitter taste with a neutral potency[241]. It is used in the treatment of swelling and fullness of the stomach, blockage and irregular menses, pulmonary disorders, difficulty in swallowing and rotting/wasting of muscle tissues[241]. An oil from the root is very beneficial in the treatment of rheumatism[211].

nrakta E. Asia - Himalayas. ksacta A casual in irrigated areas, 2000 - 3300 metres from Pakistan to Himachel Pradesh[51]. Usually found in moist shady situations in Kashmir, sometimes forming the undergrowth in birch

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame in the spring. Surface sow, or only just cover the seed, and make sure that the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring after the last expected frosts. Division in spring might be possible.

nwatta Succeeds in most soils in a sunny well-drained position[1]. Cultivated as a medicinal plant and for its use in perfumery in the Himalayas[51, 245]. The dried root has something of the mossy smell of violets when fresh, becoming fur-like or even unpleasantly goat-like with age[245]. Most of the roots are exported to China and Japan and the plant forms quite a large article of commerce in Kashmir, the trade being controlled by the State[211]. Wild plants have been greatly over-collected and the plant has been placed on the CITES I list of endangered species - it is now illegal to dig them up for export[238].

### 7.2.282 Picea sitchensis

Sitka Spruce

1167

6 tlin 7 cvuc 2 kcak 0 tcan 2 dwat 50 m hkuc

htut cyutli tcuphja7n hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Picea sitchensis is an evergreen Tree growing to 50 m (164ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower in May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil. The plant can tolerate maritime exposure. It cannot tolerate atmospheric pollution.

kcakta Edible Parts: Flowers Inner bark Seed SeedpodEdible Uses: Condiment Gum TeaYoung shoots raw[118, 256]. Young male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. The cones are 6 - 10cm long[82]. Inner bark - raw or cooked[256]. It can be dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. The inner bark was usually harvested in the spring, though it was also sometimes taken in the summer[256]. An emergency food, it is only used when all else fails. Seed - raw[172]. The seed is about 2 - 4mm long[229]. It is rich in fats and has a pleasant slightly resinous flavour but is too small and fiddly to be worthwhile unless you are desperate[172, K]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172]. A gum obtained from the bark is hardened in cold water and then used for chewing[118, 177, 256]. It should be aged for 3 days or more before using it. The best gum is obtained from the southern side of the tree

tcanta Adhesive Basketry Fuel Gum Pitch String Varnish Waterproofing WoodThe tough and flexible root is used in basket making and as a string[118, 229]. The roots were burnt over an open fire to remove the bark, then they were dried and split to make hats, ropes etc[257]. The main body

material of baskets was made from the roots. These were cut into lengths 75 - 90cm long and 12 - 25mm in diameter. Whilst still full of sap and soft, these were split into broad flat bands and these in turn were sub-divided by knife and teeth until the desired size was obtained - a little larger than coarse thread, about like small twine. The vertical rods were made of hazel (Corylus spp) and the overlay was bear grass (Xerophyllum tenax)[257]. The roots were used by several native North American Indian tribes to make tightly woven baskets that would hold water[226]. The limbs and roots can be pounded, shredded and used to make ropes[257]. A pitch is obtained from the tree and is used for caulking boats, waterproofing boxes etc[118, 257]. The rendered pitch has been used as a glue[257]. The pitch can be melted then used as a protective varnish-like coat on wood[257]. Wood - strong according to some reports[171, 229], not strong according to others[1, 11, 46]. The quality of the wood for aircraft construction is unsurpassed, it is remarkably strong yet light and its resistance - weight ratio is among the highest[226]. The wood is elastic, soft, light, straight grained. Equal in quality to P. abies but more quickly produced, the wood is used for shipbuilding, construction, packing cases, doors, posts etc[1, 11, 46, 226]. The wood is also valued for making musical instruments[226] and is widely used in the pulp industry to make paper[171]. The wood is a good fuel, knotted bits of wood would keep the fire burning all night[257].

dwatta Analgesic Antirheumatic Antiseptic Diuretic Laxative Ophthalmic Pectoral Poultice Salve Stomachic TB Vitamin CSitka spruce was widely employed medicinally by several native North American Indian tribes who used it especially for its antiseptic and pectoral qualities in the treatment of lung complaints, wounds, sores etc[257]. It is little, if at all, used in modern herbalism. The inner bark is laxative[256, 257]. It has been chewed in the treatment of throat problems, coughs and colds[257]. A decoction of the branch tips and the bark has been used in the treatment of rheumatism, stomach pains, constipation and gonorrhoea[257]. A decoction of the cones has been taken in the treatment of pain[257]. The cones have also been used in steam baths to treat rheumatism[257]. A decoction of the bark has been used as a steam bath in the treatment of back aches[257]. The resin is antiseptic and diuretic[257]. A decoction has been used in the treatment of gonorrhoea[257]. A poultice of the resin has been used as a rub on rheumatic joints[257]. Combined with Indian Hellebore roots (Veratrum viride), it has been used as a poultice on rheumatic joints[257]. The resin has also been used as a dressing or poultice on cuts, broken skin, boils, wounds, infections and suppurating sores[257]. The resin has been chewed as a breath freshener and as a treatment for TB[257]. The gum from new shoots and small branches has been placed in the eyes as a treatment for snow blindness[257]. A decoction of the roots has been used in the treatment of diarrhoea[257].

nrakta Western N. America - Alaska to N. California. ksacta Moist, sandy, often swampy soils, occasionally on wet rocky slopes in the far north of its range[82]. Alluvial soils from sea level to 300 metres, usually close to the coast[118].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame [78]. A position in light shade is probably hest[78] Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Landscape Uses:Screen, Specimen. Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet, cold, poor and shallow soils[81]. Trees have succeeded on pure chalk when on a north facing hollow deep in beech woods[200]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Very tolerant of exposure[81], resisting salt laden gales[172].

though trees are not very wind firm in shallow soils[1]. A long-lived tree, with specimens 700 - 800 years old being recorded[229]. It is slow growing for its first two or three years, though it soon becomes an extremely fast growing tree and is very widely planted for timber in Britain and other temperate areas[11, 17]. Even trees 30 metres tall are increasing in height by 1 metre a year[185]. New growth takes place from May to July or August and some very vigorous trees will produce a second flush of growth until September 1851. Although the dormant tree is very cold-hardy, growth can be severely checked if the trees are growing in a frost hollow, because the young shoots are very susceptible to damage by late frosts[125, 185]. In Britain the best stands are produced in the sheltered valleys of W. Scotland. Trees are unsurpassed for rapid volume wood production in cool wet mountain sites on blanket peat in W. Britain[200]. In areas with cool wet summers (1200mm of rain per year) it makes a huge specimen tree[200]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[1, 200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus [200]. Many trees do not bear female flowers in most years. Subject to damage by the green spruce aphid[1], trees are also often attacked by a bark beetle and so should be kept away from more valuable plantings[125]. A biological control for the bark beetle is being introduced (1990)[125]. Special Features: North American native, Inconspicuous flowers or

#### 7.2.283 Ehretia dicksonii

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Ehretia dicksonii is a deciduous Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 177]. No further details. The fruit is about 2cm in diameter[200].

tcanta WoodWood - light and tough. Used for carrying poles[46, 109].

nrakta E. Asia - Japan and southern China. ksacta Warm rocky valleys in the warmer areas of C. and S. Japan[58]. In evergreen forests near the sea[275].

propta Seed - we have no information on this species but suggest sowing it as soon as it is ripe in a greenhouse. Sow stored seed in late winter or early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame.

nwatta Prefers a moderately fertile well-drained sandy loam in a sunny position[200]. Requires a sheltered position[200]. Plants are shade tolerant in continental climates but they require more sun in maritime areas in order to ripen the wood[200]. Rich fertile soils tend to encourage soft sappy growth which is then subject to frost damage over winter[200]. Succeeds on chalky soils[200]. Mature plants are frost hardy, though young plants are often cut back by the frost[200]. The young growth in spring is also susceptible to frost-damage[K]. A tree was 6 metres tall at Kew in 1989[K]. This species closely resembles Ehretia macrophylla Wall. of the E. Himalaya, but the latter has the thin chartaceous, narrower leaves without scabrous on the upper surface and with sparse pubescent hairs on the lower surface, and smaller drupes, ca. 8 mm in diam[275]. The flowers, which are borne

diseases[218]. A gum from the stems is used in the treatment of foul sores[218]. The down of the seeds is used in the treatment of fevers, haemorrhages, jaundice, rheumatism etc[218]. The fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta The origin of this species is obscure. ksacta Not known in a truly wild situation.

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy. Plant into their permanent positions in the autumn. Cuttings of half-ripe wood. Iune to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Rarely thrives on chalk[200]. This species rarely thrives in Britain[11], it is very subject to canker and has been largely replaced in cultivation by S. 'Chrysocoma'[188]. The root system is rather aggressive and can cause problems with drains[200]. Hybridizes freely with other members of this genus[200]. Hybridizes freely with other members of this genus[200]. Hybridizes freely with other members of this genus[200]. Hybridizes freely with other members or this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Not North American native, Wetlands plant, Inconspicuous flowers or blooms.

### 7.2.347 Platycarva strobilacea

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Platycarya strobilacea is a deciduous Tree growing to 12 m (39ft) by 12 m (39ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177]. A famine food, only used when all else fails[179].

tcanta Dye Fuel IncenseA black dye is obtained from the fruits. It is used for dyeing cloth[46, 61, 109]. A black dye is obtained from the bark. It is used for dyeing nets[46, 61]. (It quite possibly contains tannin which will also help to preserve the nets[K].) The root is very fragrant when it is burnt. It is used in baths[178]. The wood is a good fuel[178].

nrakta E. Asia - China, Korea. ksacta Thickets and woods from sea level to 1300 metres[109]. Mixed forests on mountain slopes, sometimes on limestone, at elevations of 400 -2,200 metres[266].

propta The seed is best sown as soon as it is ripe in a cold frame. Stored seed requires a period of cold stratification[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Consider giving the plants some protection from the cold for at least their first winter outdoors. Lavering[200].

nwatta Requires a deep moist humus-rich loam and a sunny sheltered position[200]. Trees are hardy to about - 12°c in Britain[200], but they are not usually a success in our climate[1], preferring a warm dry continental climate[200]. A tree in Hampshire is growing and fruiting well[11]. A tree at Kew flowered heavily in the hot summer of 1989[K].

#### 7.2.348 Rhododendron arboreum

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat

hpa7tmwatli xre7t hjonli

drutta Rhododendron arboreum is an evergreen Shrub growing to 12 m (39ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves are poisonous[51, 240]. The flowers can cause intoxication in large quantities[183].

kcakta Edible Parts: Flowers LeavesEdible Uses: The tender leaves are used as a cooked vegetable[105, 158, 183]. Caution is advised, see the notes above on toxicity. Flowers - raw or cooked[272]. A sweet-sour taste, they are said to make a good sub-acid jelly[183]. Th flowers are sometimes simply pickled by adding salt and chili[272]. Caution is advised, large quantities can cause intoxication[2, 183].

tcanta Charcoal Fuel Repellent WoodThe juice of the leaves is spread over cots and beds to get rid of bed lice[272]. Wood - soft, even grained, seasons badly. Used in turnery, it can also be used to make charcoal and for fuel[51, 158]. Th wood is much employed in Nepal where it is used for making household implements, building small houses and fences[272]. Planks of the wood are carved to make boxes, cupboards and other furniture[272]. It is a very good fuel, burning well with a long-lasting heat - overcollection of the wood for fuel, and also for making charcoal, has become a cause for conservation concern[272].

dwatta Astringent Dysentery Poultice StomachicThe young leaves are astringent and poultice[158]. They are made into a pasteand then applied to the forehead in the treatment of headaches[240, 272]. The juice of the bark is used in the treatment of coughs, diarrhoea and dysentery[272]. A decoction of the flowers is used to check a tendency to vomit, especially if there is also a loss of appetite[272]. The juice of the flowers is used in the treatment of menstrual disorders[272]. The petals are eaten to assist the removal of any animal bones that have become stuck in the throat[262].

nrakta E. Asia - Himalayas to Sri Lanka. ksacta Forests and shrubberies with Pieris ovalifolia and Quercus incana, 1500 - 3600 metres from Pakistan to S.E. Tibet in the Himalayas[51].

propta Seed - best sown in a greenhouse as soon as it is tipe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in most humus rich lime free soils except those of a dry arid nature or heavy or clayey[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires[200]. Requires a pH between 4.5 and 5.5[200]. Hardy to between -10 and -15°c, the pink flowered form is hardier than the red[184]. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. There are many named varieties selected for their ornamental value[200]. Plants form a root ball and are very tolerant of being transplanted, even when quite large, so long as the root ball is kept intact[200]. This plant is the national flower of Nepal[51]. The flowers are sold in local markets and used as offerings to the Gods and Godesses[272]. A very ornamental plant[1], it is not very hardy outdoors in much of Britain, but grows well in the milder areas of the country[1]. Plants in this genus are notably susceptible to honey fungus[200].

### 7.2.349 Sorbus vestita

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

water[80] then cold stratify for 2 - 3 months[98, 113]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer of the following year[240]. Cuttings of halfripe wood, July/August in a frame[113]. Cuttings of mature shoots, November in a frame. Only use vigorous shoots[113]. Layering. Division of suckers in the dormant season[188].

nwatta Prefers a sunny position in a rich strong loam with abundant moisture at the roots[11, 200]. Grows well by water[11]. Succeeds in areas that do not experience prolonged winter temperatures below about -12°c[200], but young plants and the young shoots of older trees can be cut back by winter frosts[11]. A very ornamental tree[1], it fruits freely in Britain[11]. The leaves are sweetly resinous[245]. The deeply furrowed bark is aromatic[245]. Produces suckers profusely[98]. Plants in this genus are notably resistant to honey fungus[200].

#### 7.2.344 Aphananthe aspera

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 20 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Aphananthe aspera is a deciduous Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 177]. The fruit is about 6 - 8mm in diameter[200].

tcanta Fibre Paper Sandpaper WoodThe leaves, gathered in autumn, are used as a sandpaper on wood[46, 61]. The fibre from the bark is used for manufacturing ropes and staple rayon[266]. The wood is fine and strong[266].

nrakta E. Asia - China, Japan, Korea. ksacta Lowlands and hills, C. and S. Japan[58]. Hills, valleys, stream sides and slopes at elevations of 100 - 600 metres (500 - 1000 metres in E and N China)[266].

propta Seed - it probably requires 2 - 3 months stratification. It is best to sow the seed as soon as it is ripe in a cold frame, otherwise sow as soon as possible in the year. Remove any pulp from the seed before sowing it[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter before planting them out in late spring or early summer, after the last expected frosts.

nwatta Succeeds in most soils, including dry gravels, but prefers a deep fertile soil[200]. Plants are frost tender when young but they are able to regrow from the base if cut back[11]. A tree growing outdoors at Kew Botanical Gardens has reached a height of 8 metres[11].

#### 7.2.345 Juniperus recurva

Himalayan Juniper 6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 12 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus recurva is an evergreen Tree growing to 12 m (39ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The cones are up to 11mm long and 8mm wide[200].

tcanta Essential IncenseThe wood and leaves are used as an incense[272]. The resinous twigs are burnt as an

incense[2, 146]. The leaves contain about 1.7% essential oil[272].

dwatta EmeticSmoke from the green wood is emetic and produces long-continued vomiting[240].

nrakta E. Asia - Himalayas to N. Burma. ksacta Wetter areas of the Himalayas, to 4600 metres[51]. Forests and thickets at elevations from 1800 - 3900 metres in SE Xizang and NW Yunnan[266].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 811. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78], Lavering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11] and succeeding on chalk[200]. Prefers a humid sheltered site, doing well in areas with high rainfall[200]. Does not succeed in dry areas[200]. Unlike most members of the genus, this species grows better in the wetter western part of Britain[11]. A very ornamental plant[1] but slow growing in Britain, even young trees fail to average 25cm a year[185]. Plants are resistant to honey fungus[88]. Dioecious. Male and female plants must be grown if seed is required.

#### 7.2.346 Salix babylonica

Weeping Willow, Babylon Weeping Willow 6 tlin 9 cyuc 1 kcak 4 tcan 3 dwat 12 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Salix babylonica is a deciduous Tree growing to 12 m (39ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in April, and the seeds ripen in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Inner bark Leaves MannaEdible Uses: TeaInner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots and flower buds - cooked[105, 177, 183]. Not very palatable[172]. Older leaves are used to adulterate tea[183]. A source of a mannalike substance[183].

tcanta Basketry Hair Soil stabilizationLandscape Uses: Erosion control, Aggressive surface roots possible, Pollard, Specimen. The stems are very flexible and are used in basket making[146, 272]. The plant is usually coppiced annually when grown for basket making, though it is possible to coppice it every two years if thick poles are required as uprights. The extensive root system makes this species useful for binding soils[146, 272]. A decoction or infusion of the bark has been used as a wash to make the hair grow[257]. Dynamic

dwatta Anodyne Antirheumatic Astringent Febrifuge Poultice SkinThe leaves and bark are antirheumatic, astringent and tonic[178, 240]. A decoction of the leaves is used in the treatment of abscesses, carbuncle, fever, rheumatism, skin diseases, ulcers etc[218]. An infusion of the bark has been used to treat diarrhoea and fevers[257]. The bark can be used as a poultice[257]. The stem bark is used in the treatment of skin eruptions due to parasities[218]. The root bark is used in a bath for the treatment of parasitic skin

on the ripened wood of the previous season's growth, emit a powerful spicy fragrance [245].

A polymorphic species [17], it also hybridizes readily with other members of the genus [230]. This species is a colo-

### 7.2.284 Dactylorhiza incarnata

Marsh Orchid

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dactylorĥiza incarnata is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked. Very nutritious[4, 46, 61]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, north to Norway and east to W. Asia. ksacta Wet meadows and marshes in rich soils[17, 42].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division in autumn. The plant is very intolerant of root disturbance, any moving or dividing should be attempted in the autumn, keep a large ball of soil around the plant[1]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Very easily grown in any good moist soil[42]. Another report says that it requires a deep rich soil[1]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

A polymorphic species[17], it also hybridizes readily with other members of the genus[230]. This species is a colonizer of disturbed ground and bare soils, new colonies can spring up many kilometres from the plants nearest known locality[230]. They have been known to colonize sites such as waste heaps of clinker at power stations[230]. Plants are very impatient of root disturbance[1].

### 7.2.285 Dryopteris carthusiana

Narrow Buckler Fern, Spinulose woodfern 6 tlin 8 cyuc 2 kcak 0 tcan 4 dwat 1 m hkuc hmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Dryopteris carthusiana is a FERN growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caution is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised.

koakta Edible Parts: Leaves RootEdible Uses: Root -baked[61]. Some caution is advised, see notes above on toxicity. Old leafstalks on the underground stems can be roasted, peeled and the inner portion eaten[257]. Young curled fronds, harvested as they are developing in the spring, can be boiled and eaten like asparagus[257].

tcanta When spaced about 30cm apart each way, the plants can be grown as a ground cover[208].

dwatta VermifugeThe root contains 'filicin', a substance that paralyses tapeworms and other internal parasites and has been used as a worm expellent[4, 222, 238]. It is one of the most effective treatments known for tapeworms - its use should be immediately followed by a non-oily purgative such as magnesium sulphate in order to expel the worms from the body[238]. An oily purge, such as caster oil, increases the absorption of the fern root and can be dangerous[238]. The root is harvested in the autumn and can be dried for later use, it should not be stored for longer than 12 months[238]. This remedy should be used with caution and only under the supervision of a qualified practitioner[238]. The root is toxic and the dosage is critical[238]. See also the notes above on toxicity.

nrakta Europe, including Britain, from Scandanavia south and east to Spain and Siberia. N. America.. ksacta Damp and wet woods, marshes and wet heaths[17].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at  $20\,^\circ\text{c}$ . Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Landscape Uses:Foundation, Ground cover, Massing, Woodland garden. Prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position[175, 200]. Requires permanently moist conditions at its roots. A very ornamental plant[1], it is often evergreen in mild winters[188]. Plants spread slowly at the rootstock[233]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features:Attractive foliage, Not North American native, Naturalizing, There are no flowers or blooms.

### 7.2.286 Gymnadenia conopsea

Fragrant Orchid

6 tlin 9 cvuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Gymnadenia conopsea is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Moths. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb - cooked. Very nutritious[4, 46, 61]. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a flour[2, 105, 177]. Salep is a starch-like substance with a sweetish taste and a faint somewhat unpleasant smell[4]. It is said to be very nutritious and is made into a drink or can be added to cereals and used in making bread etc[100, 183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe, including Britain, to north and west Asia. ksacta Locally abundant in base-rich grassland, especially on chalk or limestone, fens and marshes[17].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division in autumn. The plant is very intolerant of root disturbance, any moving or dividing should be attempted in the autumn, keep a large ball of soil around the plant[1]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths. whilst the new rosette should continue in growth and flower normally[230]

nwatta Very easily grown in any good moist soil[42]. Requires a deep rich soil[1]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. A polymorphic species[17], it also hybridizes readily with other members of the genus[230]. The flowers have a delicious perfume which is more pronounced at night in order to attract Night Hawkmoths for pollination[245]. The sub-species G. conopsea densiflora has larger, more strongly scented flowers[245]. This species is a colonizer of disturbed ground and bare soils, new colonies can spring up many kilometres from the plants nearest known locality[230]. They have been known to colonize sites such as waste heaps of clinker at power stations[230]. Plants are very impatient of root disturbance[1].

### 7.2.287 Acer palmatum

Japanese Maple

6 tlin 8 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Acer palmatum is a deciduous Tree growing to 8 m (26ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH; mildly acid. neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves SapEdible Uses: The sap contains a certain amount of sugar and can either be used as a drink, or can be concentrated into a syrup by boiling off the water[105, 177, 183]. The syrup is used as a sweetener on many foods. The concentration of sugar is considerably lower than in the sugar maples (A. saccharum). The tree trunk is tapped in the early spring, the sap flowing better on warm sunny days following a frost. The best sap production comes from cold-winter areas with continental climates. Leaves - cooked[105, 177, 179]. We have eaten nicer

tcanta PreservativeThe leaves are packed around apples, rootcrops etc to help preserve them[18, 20].

nrakta E. Asia - Japan ksacta Woods and thickets in a wide range of soils and exposures in lowland and mountains to 3000 metres in C. and S. Japan[58, 200].

propta Seed - best sown as soon as it is ripe in a cold frame, it usually germinates in the following spring. Pre-soak stored seed for 24 hours and then stratify for 2 - 4 months at 1 - 8°c. It can be slow to germinate. The seed can be harvested 'green' (when it has fully developed but before it has dried and produced any germination inhibitors) and sown immediately. It should germinate in late winter. If the seed is harvested too soon it will produce very weak plants or no plants at all[80, 113]. When large enough to handle, prick the seedlings out into individual pots and grow them on until they are 20cm or more tall before planting them out in their permanent positions. Layering, which takes about 12 months, is successful with most species in this genus. Cuttings of young shoots in June or July. The cuttings should have 2 - 3 pairs of leaves, plus one pair of buds at the base. Remove a very thin slice of bark at the base of the cutting, rooting is improved if a rooting hormone is used. The rooted cuttings must show new growth during the summer before being potted up otherwise they are unlikely to survive the winter. Only strong-growing cultivars succeed from cuttings, plants of the dissected or variegated cultivars will rarely grow into good

nwatta Landscape Uses:Border, Pest tolerant, Rock garden, Standard, Specimen, Woodland garden. Of easy cultivation, it succeeds in most soils preferring a good moist well-drained soil on the acid side and partial shade[11, 182]. Grows well in heavy clay soils. Chlorosis can sometimes develop as a result of iron deficiency when the plants are grown in alkaline soils, but in general maples are not fussy as to soil pH. Requires some shelter in the cooler areas of Britain and protection from cold drying winds[1]. Plants are hardy to about -25°c[184], but spring growth is subject to damage by late frosts[11]. A very ornamental tree[1], it is a polymorphic species[1] and there are many named varieties[11, 1821. Grows well with rhododendrons. Most maples are bad companion plants, inhibiting the growth of nearby plants[18, 20]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

increase in height for at least the first 50 years[185]. Trees can produce cones when only 10 years old, though 30 - 40 years is more usual[229]. Good crops are produced most years in the wild[229]. The cones are 5-15cm long, they open and shed their seed whilst still attached to the tree and usually persist on the tree for a further year [82, 226]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Attracts birds, North American native, Inconspicuous flowers or blooms.

### 7.2.341 Nothofagus pumilio

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 40 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hna7tmwatli hionli

drutta Nothofagus pumilio is a deciduous Tree growing to 40 m (131ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind, Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Inner bark SapEdible Uses: The sap and scrapings are eaten in spring[69]. The term scrapings probably refers to the inner bark. Inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread.

tcanta Lighting WoodUsed for making torches[69]. This is probably a reference to the bark, since this is the part used in N. betuloides. Wood - useful[11]. No further details are

nrakta Southern S. America. ksacta Dominant or codominant in deciduous forest on better drained sites and well developed soils from sea level to 1800 metres[69].

propta The seed is best sown as soon as it is ripe in a cool greenhouse or cold frame. Spring-sown seed requires 2 - 3 months stratification at 1 - 5°c[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed must not be allowed to dry out according to one report[80] whilst another says that the seed can be stored dry at 2°c for long periods[200]. Cuttings of half-ripe wood, 6 - 10cm with a heel, July/August in a frame[78]. Layering.

nwatta Prefers an open well-drained loamy soil in a sunny position[1, 200]. Succeeds on most soils but dislikes calcareous soils[11]. Prefers a pH between 5 and 7, but dislikes acid peats[200]. Prefers cool wet summers in temperate maritime zones[200]. This species is closely related to N. Antarctica[11]. Trees have poor wind resistance in Britain, probably because they grow so fast[11]. Plants at Crarae in western Scotland are very hardy but fairly slow growing[191]. Trees up to 4 metres tall can be successfully established, though the optimum size for transplanting is about 30 - 80cm. The roots are very sensitive to desiccation and extreme care should be taken when transplanting them[200]. Plants in this genus are notably resistant to honey fungus[200].

### **7.2.342** Abies firma

Momi Fir, Japanese Fir

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 30 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli hionli

drutta Abies firma is an evergreen Tree growing to 30 m (98ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes

can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: SeedEdible Uses: Seed roasted[105, 177]. No more details are given, but the seed is very small and fiddly to utilize[K].

tcanta WoodWood - light, soft, coarse grained, not very durable. Used for construction, pulp, etc[61].

nrakta E. Asia - S. Japan ksacta Hills and mountains, C. and S. Japan[58].

propta Seed - sow early February in a greenhouse or outdoors in March[78]. Germination is often poor, usually taking about 6 - 8 weeks [78]. Stratification is said to produce a more even germination so it is probably best to sow the seed in a cold frame as soon as it is ripe in the autumn[80, 113]. The seed remains viable for up to 5 years if it is well stored[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in pots. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Alternatively, if you have sufficient seed, it is possible to sow in an outdoor seedbed. One report says that it is best to grow the seedlings on in the shade at a density of about 550 plants per square metre[78] whilst another report says that they are best grown on in a sunny position[80].

nwatta Landscape Uses:Christmas tree, Pest tolerant, Screen, Specimen. Prefers a good moist but not waterlogged soil[1]. Grows well in heavy clay soils. Plants are very shade tolerant, especially when young, but growth is slower in dense shade[81]. Intolerant of atmospheric pollution[1]. Prefers slightly acid conditions, down to a pH of about 5[200]. Prefers growing on a north-facing slope[200]. New growth of the side shoots starts in April and this is very susceptible to damage by late frosts[11, 185]. The terminal buds do not open until mid-May and usually escape damage[185]. Trees are fairly fast growing when young, sending up new growth of 60cm a year from the age of about 6 years[185]. Side shoots grow with equal vigour, however and the tree often loses apical dominance[185]. Trees grow best in the Perthshire valleys of Scotland[11]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm in height. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. The flowers are produced in axils of the previous year's shoots[275]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Special Features:Not North American native. There are no flowers or blooms

### 7.2.343 Pterocarya fraxinifolia

Caucasian Wingnut

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 30 m hkuc

htut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Pterocarva fraxinifolia is a deciduous Tree growing to 30 m (98ft) by 20 m (65ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in June, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed[2, 105]. No more details are given but the seed is very small and would be very fiddly to use[K].

tcanta Weaving WoodThe bast from the bark is used for weaving hats etc[74]. Wood - soft, hard to split. Used for matches, shoes etc[46, 61].

dwatta DiaphoreticDiaphoretic[74].

nrakta W. Asia - Iran and the Caucasus, ksacta Mixed woods near rivers in boggy or inundated places[74].

propta Seed - best sown as soon as it is ripe in a cold frame[80, 113]. Pre-soak stored seed for 24 hours in warm 61, 82, 171, 226, 229]. It is also a major source of pulp[226]. The wood makes a slow-burning fuel and so can be used to bank up a fire to keep it burning overnight[257].

dwatta Astringent Diaphoretic Diuretic Parasiticide Poultice SkinWestern hemlock was commonly employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. The bark is astringent, diaphoretic and diuretic[21]. A decoction of the pounded bark has been used in the treatment of haemorrhages, tuberculosis and syphilis[257]. The boiled bark, combined with liquorice fern (Polypodium glyccyrhiza), has been used in the treatment of haemorrhages[257]. An infusion of the inner bark or twigs is helpful in the treatment of kidney or bladder problems[21]. It can also be used as a good enema for treating diarrhoea and as a gargle or mouthwash for mouth and throat problems[21]. Externally, it can be used as a wash on sores and ulcers[21, 257]. A poultice of the plant has been applied to bleeding wounds[257]. A moxa of the twigs has been used to get rid of warts[257]. The powdered bark can be put into shoes for tender or sweaty feet or for foot odour[21]. The gum obtained from the trunk has been applied to cuts[257]. It has been applied to the skin to prevent chapping and sunburn[257]. A poultice of the chewed leaves has been used in the treatment of burns[257].

nrakta Western N. America - Alaska to N. California, ksacta Forests, especially where moist and especially in deep forests from sea level to 1500 metres[60, 270].

propta Seed - it germinates better if given a short cold stratification[80, 113] and so is best sown in a cold frame in autumn to late winter. It can also be sown in early spring. though it might not germinate until after the next winter. If there is sufficient seed, an outdoor sowing can be made in spring[78]. Pot-grown seedlings are best potted up into individual pots once they are large enough to handle - grow them on in a cold frame and plant them out in early summer of the following year. Trees transplant well when they are up to 80cm tall, but they are best put in their final positions when they are about 30 - 45 cm or less tall, this is usually when they are about 5 - 8 years old[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

nwatta Landscape Uses:Hedge, Aggressive surface roots possible, Screen, Specimen, Woodland garden. An easily grown plant, it thrives best when growing in a deep welldrained soil in the western parts of Britain where it appreciates the higher rainfall[11]. However, it succeeds in most soils and positions, being especially good on acidic sandy soils[81] but also tolerating some lime[11] so long as there is plenty of humus in the soil[208]. Plants are very shade tolerant when young, but need more sunlight as they grow older[81, 200]. Plants are thin and poor when grown in dry or exposed places[200]. Occasionally cultivated for its timber in Britain, it can grow 60 - 150cm per year[11, 185]. New growth takes place from mid-May to mid-September, at first it hangs downwards but begins to straighten towards the end of the season[185]. There are trees more than 50 metres tall in Britain[200]. Trees live for several centuries in the wild and often produce large quantities of seed[229]. Plants often form pure stands and cast a dense shade, thus preventing the regeneration of other trees whilst being able to reproduce itself[226]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native. Inconspicuous flowers or blooms

#### **7.2.340** Pinus taeda

Loblolly Pine

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 40 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik

hpa7tmwatli dyat hjonli

drutta Pinus taeda is an evergreen Tree growing to 40 m (131ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from March to May, and the seeds ripen from October to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the

shade. It prefers dry or moist soil and can tolerate drought. pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Edible Uses: CondimentA vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide Resin WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. This tree is a source of resin but it is not exploited commercially [64]. The flow of resin checks too guickly and labour costs are too high[227]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - weak, brittle, coarse grained, resinous, not durable[61, 82, 171, 229]. The wood weighs 34lb per cubic foot[227]. Used for lumber, cooperage, crates, the interior of buildings, pulp etc[61, 82, 171,

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta South-eastern N. America - New Jersey to Florida and Texas. ksacta Flatlands or rolling hills from sea level to 700 metres[229]. Found on a variety of soil types from low poorly drained areas to well drained soils, but usually on poor upland soils[229].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Agroforestry Services: Windbreak Industrial Crop: Hydrocarbon Management: Standard Regional TimberLandscape Uses:Pest tolerant, Aggressive surface roots possible, Specimen. Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200]. This species comes from an area with long hot summers and mild winters[229]. It is fast growing and is cultivated as a timber tree on a small scale in Europe[50]. It does not grow well in Britain, however[1]. The trees are fully hardy in this country except when they are young[81]. Rarely found in Britain, the few trees that have been planted are all found in southern England and are all growing well[185]. It is proving to be a fairly vigorous tree here, averaging 30cm annual

#### 7.2.288 Carduus nutans

Musk Thistle, Nodding plumeless thistle 6 tlin 9 cyuc 2 kcak 3 tcan 2 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Carduus nutans is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to August, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

kcakta Edible Parts: Oil StemEdible Uses: Curdling agent OilPith of stem - boiled[61]. A pleasant taste[105], it is eaten like asparagus[177]. Said to be delicious[183]. The dried flowers are used as a curdling agent for plant milks etc[61, 183].

tcanta Oil PaperThe down of the plant is used to make paper[4]. The seed of all species of thistles yields a good oil by expression[4]. This species contains 41 - 44% oil[240]. The plant is very attractive to bees, hoverflies and butterflies[13, 245], it is a food plant for the caterpillars of many lepidoptera species[30]. Dynamic accumulator.

dwatta Blood purifier FebrifugeThe flowers are febrifuge and are used to purify the blood[145, 240]. The seeds contain a fixed oil that is rich in linoleic acid[240]. This has proved of benefit in the prevention of atherosclerosis[240].

nrakta Most of Europe, including Britain, north to Norway, south and east to N. Africa, Siberia and W. Asia ksacta Pastures, arable fields and waste places on calcareous soils[17].

propta Seed - sow spring in situ.

nwatta Succeeds in a sunny position in ordinary garden soil[1, 200]. The flowers, and indeed the whole plant, give off a pleasing musk-like perfume[245]

### 7.2.289 Berberis empetrifolia

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis empetrifolia is an evergreen Shrub growing to 0.3 m (1ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 69, 105, 177]. The fruits are about 7mm long[200]. tcanta DyeA yellow dye is obtained from the root and

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine [218]. Berberine has also shown antitumour activity[218].

nrakta S. America - S. Argentina, S. Chile. ksacta Waste ground near the sea and at elevations up to 1300 metres[67,

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it

can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Pot up in the spring[113]. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants are hardy to about -15°c[184]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back guite severely, they resprout well from the base[200].

### 7.2.290 Gaultheria pumila

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli nyanhjen hjonli

drutta Gaultheria pumila is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.6 m (2ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Used like huckleberries[11, 69, 177]. The fruit is up to 22mm in diameter[200].

nrakta S. America - Falklands, S. Chile. ksacta Heath, bogs, swamps, open wet places and woods to 900 metres, north to latitude 50° south in Chile[69].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins. 'Drop' the plants 12 months earlier by digging them up and replanting them deeper in the soil so that the branches are buried and can form roots. This works best in a sandy soil[78]. It is best to pot up the divisions and grow them on in a lightly shaded position in a greenhouse until they are established. Plant them out in the summer. Layering in September/October. Takes 12 months[78].

nwatta Requires a light moist but well-drained humusrich lime-free soil in sun or semi-shade[1, 11]. Grows well in a rock garden[11]. Fruits are produced abundantly on plants growing in the wild[11]. Dioecious. Male and female plants must be grown if seed is required. Plants in this genus are notably resistant to honey fungus[200].

#### 7.2.291 Lavandula latifolia

Spike Lavender, Broadleaved lavender 6 tlin 9 cvuc 2 kcak 5 tcan 2 dwat 0.4 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Lavandula latifolia is an evergreen Shrub growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is

pollinated by Bees, Lepidoptera (Moths and Butterflies). It August, The species is hermaphrodite (has both male and feis noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers welldrained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Edible Uses: CondimentLeaves raw[2, 15]. Used as a condiment in salads[177]. Very aromatic[7], they cannot be eaten in quantity[K]. An essential oil from the flowers is used as a food flavouring[183].

tcanta Essential Incense Pot-pourri RepellentAn essential oil is obtained from the flowers - used in soap making, perfumery, food flavouring, veterinary medicines, porcelain painting etc[46, 61]. This species yields up to three times the quantity of essential oil than is obtained from L. angustifolia, but the quality is inferior to that species[4, 11, 171]. When growing the plant for its essential oil content, it is best to harvest the flowering stems as soon as the flowers have faded[245]. The aromatic leaves and flowers are used as an insect repellent in the linen cupboard etc[46, 61]. They are also used in pot-pourri[245] and are said to repel mice[20]. The flowering stems, once the flowers have been removed for use in pot-pourri etc, can be tied in small bundles and burnt as incense sticks[245].

dwatta Abortifacient Antibacterial Antiseptic Antispasmodic Aromatherapy Carminative EmmenagogueSpike layender has similar medicinal properties to common layender (L. angustifolia). It yields more essential oil than that species but is of inferior quality[254]. The flowering stems, and the essential oil obtained from them, is abortifacient, antibacterial, antiseptic, antispasmodic, carminative and emmenagogue[46, 61, 254]. They can be used in all the ways that common layender is used, externally to treat wounds. burns, insect stings etc and internally to treat digestive disorders[254]. The essential oil is used in aromatherapy. Its keyword is 'Immune system'[210].

nrakta Europe - W. Mediterranean. ksacta Arid hillsides, especially on limestone[184].

propta Seed - sow spring in a greenhouse and only just cover the seed[4]. It usually germinates in 1 - 3 months at 15°c. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings of half-ripe wood 7 - 10cm with a heel, July/August in a frame. Usually very east, a high percentage will root within a few weeks[78]. Grow them on in the greenhouse for their first winter and plant them out in late spring after the last expected frosts. Cuttings 7cm with a heel succeed at almost any time of the vear[1]. Lavering.

nwatta Succeeds in almost any soil so long as it is welldrained and not too acid[1, 200]. Prefers a sunny position in a neutral to alkaline soil[14, 200]. Prefers a light warm dry soil[37]. When grown in rich soils the plants tend to produce more leaves but less essential oils[4]. Very tolerant of salt wind exposure. Established plants are drought tolerant[190]. When growing for maximum essential oil content, the plant must be given a very warm sunny position and will do best in a light sandy soil, the fragrance being especially pronounced in a chalky soil[245]. This species of layender is cultivated for its essential oil in S. France and England[46, 61]. It is very closely related to L. angustifolia but perhaps not so hardy, tolerating temperatures down to about -10°c[11, 200]. Plants are not very long-lived and soon become straggly unless pruned. Any trimming of the plant is best done in spring and should not be done in the autumn since this can encourage new growth that will not be very cold-hardy[200]. A good bee plant[7, 24], also attracting butterflies and moths[30]. A good companion for most plants[54], growing well with cabbages[14].

## 7.2.292 Thymus mastichina

6 tlin 9 cvuc 2 kcak 0 tcan 2 dwat m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Thymus mastichina is an evergreen Shrub growing to 0.3 m (1ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to

male organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe leaves are used as a seasoning[183]. They have a pungent eucalyptus-like aroma[238]. If the leaves are to be dried, the plants should be harvested in early and late summer just before the flowers open and the leaves should be dried quickly[200]. The plant is also the source of an essential oil, called 'oil of marjoram', that is used extensively as a flavouring for soups etc[4, 61, 177, 183, 238].

tcanta Deodorant Disinfectant EssentialThe essential oil obtained from the leaves is also used in perfumery, as a mouth wash, medicinally etc[200].

dwatta Antiseptic Deodorant DisinfectantThe leaves. and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[4, 200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta S.W. Europe - Spain, Portugal. ksacta Dry hills[50], rocky ground and roadsides[238].

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Requires a light well-drained preferably calcareous soil in a sunny position[1, 200]. Succeeds in dry soils. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to about -10°c[200], but are best given some protection in the winter - a pane of glass supported over the plant is usually sufficient[1]. The flowers are rich in nectar and are very attractive to honey bees[200]. The bruised leaves are powerfully aromatic[245]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[1].

### 7.2.293 Camellia oleifera

Tea-Oil Plant, Tea Oil Camellia 6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Camellia oleifera is an evergreen Shrub growing to 4 m (13ft) by 1.5 m (5ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from October to April, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers welldrained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Oil OilEdible Uses: Oil OilAn oil obtained from the seed is used in cooking[2, 11, 109].

tcanta Dve Insecticide Oil OilA non-drying oil is obtained from the seed - used in textile manufacture, soap making and as an illuminant[1, 11, 166, 178]. The oil consists mainly of olein. It is not subject to polymerize or oxidize, nor does it form solids at low temperatures[174]. A grey dye is obtained from the pink or red petals[168]. The seed cake has insecticidal activity[218].

dwatta AnthelminticThe seed oil is used in the treatment of ringworm[218].

tcanta DveA vellow dve is obtained from the fresh or dried leaves[168]. Plants can be used as a ground cover in a sunny position[188]. They are best spaced about 3.5 metres apart each way[208]. They can be encouraged to cover the ground by laying brushwood flat on the ground and pegged into position. The twigs would eventually rot and the plant would assume complete and constant control[208].

nrakta E. Asia - China. ksacta Usually found growing into trees and shrubs in thickets on hillsides and in valleys[109, 266].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth. December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. The young growth in spring can be damaged by late frosts. Plants climb by means of tendrils[182]. They grow particularly well into elm trees[18]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants are occasionally cultivated for their edible fruits[46, 61]. Plants in this genus are notably susceptible to honey fungus[200].

#### 7.2.338 Ouercus acuta

Japanese Evergreen Oak 6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 25 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Quercus acuta is an evergreen Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed cooked[105, 177]. About 2cm long[200]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tanning, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff[4].

dwatta Astringent DysentervAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - China, Japan, N. Korea. ksacta Not

propta Seed - quickly loses viability if allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed but must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Screen, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Unsuitable for chalky soils[1]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. A very ornamental tree[1], it grows best in the milder areas of the country[11]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus [200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or

### 7.2.339 Tsuga heterophylla

Western Hemlock

6 tlin 7 cyuc 1 kcak 0 tcan 2 dwat 70 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hionli

drutta Tsuga heterophylla is an evergreen Tree growing to 70 m (229ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Inner barkEdible Uses: Condiment Gum TeaInner bark - raw or cooked[213, 257]. It can be dried, ground into a powder and then used as a thickening in soups etc or mixed with cereals when making bread[161]. It has also been used as a sweetener for other foods[257]. The inner bark was often cooked and then dried for use in the winter[256]. At its best in spring[172], it was one of the staple foods of the Alaskan Indians[82]. An emergency food, it is only used when all else fails[183]. The leaves and twigs yield 'spruce oil', used commercially to flavour chewing gum, soft drinks, ice cream etc[183]. Pitch, obtained from crevices in the bark, has been chewed as a gum[257]. The leaves and young shoots have been chewed as an emergency food to keep one alive when lost in the woods[257]. A herbal tea is made from the leaves and shoot tips[172, 183]. These tips are also an ingredient of 'spruce beer'[183].

tcanta Dye Fuel Gum Hedge Hedge Parasiticide Resin Rust Tannin WoodYields a resin similar to Abies balsamea, it is gathered by incisions in the trunk or by boiling the wood[46, 61, 64]. The bark contains 8 - 18% tannin and is a major source of tannin in America[46, 82, 171, 226]. A reddish-brown dve is obtained from the bark[21, 46, 257]. A decoction of the bark has been used to clean rust off iron and steel[257]. A pitch (called hemlock pitch), is obtained by distillation of the young branches[46]. The pitch is rubbed on the hair to get rid of head lice[257]. Tolerant of light trimming, plants can be grown as a hedge[81]. This species makes a good hedge in Britain[124, 200]. Wood - light, hard, tough, easy to work. Commercially superior to other members of this genus, it is an important tree for construction, the outside of buildings etc and for carving into spoons etc[46,

nwatta Prefers a woodland soil or a sandy loam with leafmould[1]. Grows well in shady rather moist places[1]. A Mediterranean plant, it commences growth in the autumn and, since the leaves are not very hardy, the plant is best grown under protection[90]. It should succeed outdoors at least in the milder parts of the country, if grown in a sheltered woodland. The plant is hardy to about -10°c for short periods but should be given a good mulch in the winter[200]. The plant becomes dormant in spring/summer[200].

### 7.2.335 Crataegus apiifolia

Parsley-Leaved Hawthorn

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 4 m hkuc

hmimhtut cyutli hgattcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Crataegus apiifolia is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Midges. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The fruit can be used in making pies, preserves, etc. and can also be dried for later use. About 7.5mm in diameter[200] with a thin flesh[227]. There are up to five fairly large seeds in the centre of the fruit, these often stick together and so the effect is of eating a cherry-like fruit with a single seed[K].

tcanta RootstockUsed as a dwarfing rootstock for C. aestivalis[183]. Wood - heavy, hard, strong, close-grained[82, 227, 235]. It weighs 46lb per cubic foot[227, 235]. It has no particular commercial value[227], though it is useful for making tool handles, mallets and other small items[82].

dwatta Cardiotonic HypotensiveAlthough no specific mention has been seen for this species, the fruits and flowers of many hawthorns are well-known in herbal folk medicine as a heart tonic and modern research has borne out this use. The fruits and flowers have a hypotensive effect as well as acting as a direct and mild heart tonic[222]. They are especially indicated in the treatment of weak heart combined with high blood pressure[222]. Prolonged use is necessary for it to be efficacious[222]. It is normally used either as a tea or

nrakta Southern N. America - Virginia to Florida, west to Texas and Missouri. ksacta Along streams and the borders of swamps[235]. Also found in hummocks in pine barrens near the coast[82]. Acidic sandy soils, woods and roadsides in Texas[274].

propta Seed - this is best sown as soon as it is ripe in the autumn in a cold frame, some of the seed will germinate in the spring, though most will probably take another year. Stored seed can be very slow and erratic to germinate, it should be warm stratified for 3 months at 15°c and then cold stratified for another 3 months at 4°c[164]. It may still take another 18 months to germinate[78]. Scarifying the seed before stratifying it might reduce this time[80]. Fermenting the seed for a few days in its own pulp may also speed up the germination process[K]. Another possibility is to harvest the seed 'green' (as soon as the embryo has fully developed but before the seedcoat hardens) and sow it immediately in a cold frame. If timed well, it can germinate in the spring[80]. If you are only growing small quantities of plants, it is best to pot up the seedlings as soon as they are large enough to handle and grow them on in individual pots for their first year, planting them out in late spring into nursery beds or their final positions. When growing larger quantities, it might be best to sow them directly outdoors in a seedbed, but with protection from mice and other seed-eating creatures. Grow them on in the seedbed until large enough to plant out, but undercut the roots if they are to be left undisturbed for more

nwatta A very easily grown plant, it prefers a welldrained moisture retentive loamy soil but is not at all fussy[11, 200]. Once established, it succeeds in excessively moist soils and also tolerates drought[200]. It grows well on

a chalk soil and also in heavy clay soils[200]. A position in full sun is best when plants are being grown for their fruit, they also succeed in semi-shade though fruit yields and guality will be lower in such a position[11, 200]. Most members of this genus succeed in exposed positions, they also tolerate atmospheric pollution[200]. This species is not hardy in all parts of Britain, it usually succeeds outdoors for a number of years at Kew, but is killed in severe winters there[11]. It does not seem to fruit well in Britain[11]. The flowers have a foetid smell somewhat like decaying fish. This attracts midges which are the main means of fertilization. When freshly open, the flowers have more pleasant scent with balsamic undertones[245]. Hybridizes freely with other members of this genus[200]. Seedling trees take from 5 - 8 years before they start bearing fruit, though grafted trees will often flower heavily in their third year[K]. Seedlings should not be left in a seedbed for more than 2 years without being trans-

### 7.2.336 Pyrus persica

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Pyrus persica is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is about 3cm in diameter[200].

nrakta S. Europe to W. Asia. ksacta Not known in a truly wild situation[11]

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn, it will then usually germinate in mid to late winter. Stored seed requires 8 - 10 weeks cold stratification at 1°c and should be sown as early in the year as possible[200]. Temperatures over 15 - 20°c induce a secondary dormancy in the seed[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for their first year. Plant them out in late spring or early summer of the following year.

nwatta Prefers a good well-drained loam in full sun[200]. Grows well in heavy clay soils. Tolerates light shade but does not fruit so well in such a position. Tolerates atmospheric pollution, excessive moisture and a range of soil types if they are moderately fertile[200]. Established plants are drought tolerant[200]. Plants are hardy to about -15°c[200]. This species is closely related to P. amygdaliformis[11].

### 7.2.337 Vitis davidii

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitis davidii is a deciduous Climber growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or dried for winter use[1, 61]. A harsh flavour[22, 183]. A pleasant flavour according to other reports[11, 200]. Small but sweet[182]. The fruit is about 16mm in diameter[200]. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour[55]. Young tendrils - raw or cooked[55, 85].

nrakta E. Asia - China ksacta Forests, thickets, banks of 7.2.295 Passiflora x colvillii streams and foothills at elevations of 500 - 1300 metres[109,

propta Seed - can be sown as soon as it is ripe in a greenhouse[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10 - 15cm with a heel, August/September in a shaded frame. High percentage but slow[78]. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leaf-bud cuttings, July/August in a frame

nwatta Landscape Uses:Pest tolerant, Standard, Specimen. Prefers a woodland soil but thrives in a warm open welldrained loam if leafmould is added[1, 11, 200]. A calcifuge plant, preferring a pH between 5 and 7[11, 200]. Prefers the partial shade of a light woodland[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It succeeds on a wall at Kew and outdoors in milder areas[11]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200]. This species has been cultivated for many centuries in China for the oil in its seed[109, 219]. A very ornamental plant, some named forms have been developed for their ornamental value. This species is closely related to C. sasangua[11]. Special Features: Not North American native, Attractive flowers or blooms

### 7.2.294 Polygonatum stenanthum

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Polygonatum stenanthum is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some members of this genus have poisonous fruits and seeds.

kcakta Edible Parts: Leaves RootEdible Uses: Young shoots - cooked[105, 177]. They can be used as an asparagus substitute. Root - cooked[105, 177]. Rich in starch.

nrakta E. Asia - Japan, ksacta Mountains and woods all over Japan[58].

propta Seed - best sown as soon as it is ripe in early autumn in a shady part of a cold greenhouse[200]. Sow stored seed as early in the year as possible. Germination can be slow, they may not come true to type[200] and it takes a few years for them to reach a good size. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in March or October. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a fertile humus rich moisture-retentive well-drained soil in cool shade or semi-shade[200] Plants are intolerant of heat and drought but they tolerate most other conditions[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. The young shoots of most members of this genus are very attractive to slugs. Hybridizes with other members of this genus[200].

Passion Flower

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc

htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Passiflora x colvillii is an evergreen Climber growing to 10 m (32ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from June to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Fruit - raw or cooked[262].

nrakta A hybrid of garden origin, P. incarnata x P. caerulea, ksacta Not known in a wild situation

propta Pre-soak the seed for 12 hours in warm water and then sow late winter or early spring in a warm greenhouse. If sown in January and grown on fast it can flower and fruit in its first year[88]. The seed germinates in 1 - 12 months at 20°c. Prick out the seedlings into individual pots when they are large enough to handle. It you are intending to grow the plants outdoors, it is probably best to keep them in the greenhouse for their first winter and plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Mulch the roots well in late autumn to protect them from the cold. This species is a hybrid and, as such, will not breed true from seed. Cuttings of young shoots, 15cm with a heel, in spring[1]. Leaf bud cuttings in spring. Cuttings of fully mature wood in early summer. Takes 3 months. High percentage[3].

nwatta Requires a well-drained soil with plenty of moisture in the growing season, otherwise it is not fussy[1, 200]. Dislikes highly alkaline soils[202]. Hardy to about -15°c, if plants are cut down to the ground by frost they can regenerate from the base[200]. It is best to apply a good mulch to the roots each winter in order to protect them from the cold[262]. Very fast growing[11]. Roots of outdoor grown plants should be restricted to encourage fruiting[1]. Plants produce tendrils and climb by attaching these to other plants. If fruit is required, especially when the plant is grown indoors, it is best to hand pollinate using pollen from a flower that has been open for 12 hours to pollinate a newly opened flower before midday[88, 200]. The flowers open in sunny weather and do not open on dull cloudy days[219]. Plants are very tolerant of pruning and can be cut back to ground level if required to rejuvenate the plant[202]. Any pruning is best carried out in the spring[219]. Plants in this genus are notably resistant to honey fungus[200].

### 7.2.296 Duchesnea filipendula

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Duchesnea filipendula is a PERENNIAL growing to 0.1 m (0ft 4in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[61, 177]. The fruit has the appearance and texture of a strawberry but very little flavour[K].

nrakta E. Asia - China, ksacta Not known

propta Seed - sow spring in a sunny position in a greenhouse. Germination usually takes place within 1 - 6 weeks or more at 15°c. A period of cold stratification may speed up germination. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division of runners in spring or late summer. Very easy, they can be planted out straight into their permanent

nwatta We have very little information on this species and do not know if it will be hardy in Britain. Judging by other members of this genus it probably prefers a moist but welldrained soil in a sunny position and grows well in a rock garden. This species is cultivated for its edible fruit in China[61].

#### 7.2.297 Berberis calliantha

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.7 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis calliantha is an evergreen Shrub growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy). medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[K]. An acid flavour[K].

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine [218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - S.E. Tibet. ksacta Montane regions.

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Roots in 4 - 8 weeks[113]. Pot up in spring[113]. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils and in full sun[11, 200]. Grows well in heavy clay soils. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely and resprout well from the base[200].

#### **7.2.298** Ulmus alata

Winged Elm

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ulmus alata is a deciduous Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in May, and the seeds ripen in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked.

tcanta String WoodThe inner bark is very fibrous and can be used as a string[46, 61, 82, 149]. Wood - closegrained, heavy, hard, not strong, brittle, difficult to split. It weighs about 46lb per cubic foot, is not considered to be as

strong as other elms, but is used for tool handles, wheel hubs etc[46, 61, 82, 149, 227, 229].

nrakta Eastern and Central N. America - Virginia to Florida, west to Illinois, Missouri and Texas. ksacta Dry gravelly uplands, less often in alluvial soils on the borders of swamps and banks of streams, occasionally in inundated swamps[82].

propta Seed - if sown in a cold frame as soon as it is ripe, it usually germinates within a few days[200]. Stored seed does not germinate so well and should be sown in early spring[200]. The seed can also be harvested 'green' (when it has fully developed but before it dries on the tree) and sown immediately in a cold frame. It should germinate very guickly and will produce a larger plant by the end of the growing season[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Plants should not be allowed to grow for more than two years in a nursery bed since they form a tap root and will then move badly. Layering of suckers or coppiced shoots[200].

nwatta Landscape Uses:Specimen, Street tree. Prefers a fertile soil in full sun[188], but can be grown in any soil of at least moderate quality so long as it is well drained[1]. A fastgrowing tree in its native range[227], but this species does not thrive in Britain[1]. Closely related to U. thomasii[11]. Susceptible to 'Dutch elm disease', a disease that has destroyed the greater part of all the elm trees growing in Britain. The disease is spread by means of beetles. Mature trees killed back by the disease will often regrow from suckers, but these too will succumb when they get larger. There is no effective cure (1992) for the problem, but most E. Asian, though not Himalayan, species are resistant (though not immune) to the disease so the potential exists to use these resistant species to develop new resistant hybrids with the native species[200]. The various species of this genus hybridize freely with each other and pollen is easily saved, so even those species with different flowering times can be hybridized[200]. Special Features: Attracts birds. North American native, Inconspicuous flowers or blooms.

### 7.2.299 Cardamine lyrata

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Cardamine lyrata is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves raw or cooked[105, 177]. Root - raw or cooked[105, 177].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Wet places and paddy fields in lowland and foothills, C. and S.

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Succeeds in most soils[1]. Prefers a moist humus rich soil in shade or semi-shade[200]. A stoloniferous species[200].

The stems are a pungent, bitter, warm herb that dilates the 9, 21, 165]. They are often used for their healing effect bronchial vessels whilst stimulating the heart and central nervous system[238]. The stems are also diaphoretic. diuretic and vasodilator[4, 61, 165, 238]. They are used internally in the treatment of asthma, hay fever and allergic complaints[238]. They are also combined with a number of other herbs and used in treating a wide range of complaints 238]. This herb should be used with great caution, preferably under the supervision of a qualified practitioner[238]. It should not be prescribed to patients who are taking monoamine oxidase inhibitors, or suffering from high blood pressure, hyperthyroidism or glaucoma[238]. Ephedrine is seen as a performance-boosting herb and, as such, is a forbidden substance in many sporting events such as athletics[K]. The stems are used in Tibetan medicine, where they are considered to have a bitter taste and a cooling potency[241]. Febrifuge, tonic and vulnerary, they are used in the treatment of severe bleeding and chronic fevers[241]. A decoction of the stems and roots is used in Russia to treat rheumatism and syphilis[243]. The stems can be harvested at any time of the year and are dried for later use[238]. The juice of the berries is used to treat respiratory affections[243].

nrakta E. Asia - S.W. China to the Himalayas. ksacta Stony slopes and gravel terraces in drier areas of the Himalayas at 2400 - 5000 metres from Afghanistan to Bhutan[51].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[200]. It can also be sown in spring in a greenhouse in a sandy compost[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse. Plant out in the spring or early summer after the last expected frosts and give some protection in their first winter[K]. Division in spring or autumn[238]. Layering.

nwatta Requires a well-drained loamy soil and a sunny position[11]. Established plants are drought resistant and are also lime tolerant[200]. Plants are hardy to about 15°c[200]. Dioecious. Male and female plants must be grown if seed is required.

### 7.2.333 Pulmonaria officinalis

Lungwort, Common lungwort, Jerusalem Sage, Jerusalem Cowslip

6 tlin 9 cyuc 2 kcak 0 tcan 3 dwat 0.3 m hkuc

pcimhmim cyutli hgattcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pulmonaria officinalis is an evergreen Perennial growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from March to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 7, 8, 9, 105]. They can be added to salads or used as a potherb[183]. A fairly bland flavour but the leaves are low in fibre and make an acceptable addition to mixed salads, though their mucilaginous and slightly hairy texture make them less acceptable when eaten on their own[K]. The young leaves make a palatable cooked vegetable[244], though we have found the texture to be somewhat slimy[K]. The plant is an ingredient of the drink Vermouth[244].

tcanta A tolerant and slow growing ground cover plant for open woodland and border edges[197, 200]. Plants should be spaced about 50cm apart each way[208].

dwatta Astringent Demulcent Diaphoretic Diuretic Emollient Expectorant Homeopathy Ophthalmic ResolventLungwort has a high mucilage content and this makes it useful in the treatment of chest conditions, being of particular benefit in cases of chronic bronchitis[254]. It combines well with other herbs such as coltsfoot (Tussilago farfara) in the treatment of chronic coughs including whooping cough and can also be taken to treat asthma[254]. The leaves and flowering shoots are astringent, demulcent, diaphoretic, diuretic, emollient, mildly expectorant and resolvent[4, 7, in pulmonary complaints[4] and their mucilaginous nature makes them beneficial in treating sore throats[244]. The leaves can also be used externally to stop bleeding[254]. They are harvested in the spring and dried for later use[7]. A distilled water made from the plant is an effective eyewash for tired eyes[7]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of bronchitis, coughs and diarrhoea[9].

nrakta Europe. Naturalized in Britain. ksacta Moist grasslands, damp woods and hedgerows in Britain, avoiding acid soils[13, 17, 244]. Usually found on limestone[200].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn or after flowering in early summer if the soil is not too dry[200]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Specimen, Woodland garden, Grows well in any moderately good soil including heavy clay soils[1, 31]. Prefers full to part shade in a moist humus rich soil[200]. Succeeds in the sunless shade of buildings[200]. Plants growing in shady positions tolerate drought if the soil is rich in humus[190]. The leaves tend to wilt in hot weather when the plant is grown in full sun[190]. Hardy to about -20°c[187]. Members of this genus are rarely if ever troubled by browsing deer and rabbits[233]. A valuable early nectar source for bees[200]. There are several named forms. selected for their ornamental value[233]. Hybridizes freely with other members of this genus[200]. Special Features: Not North American native. Extended bloom season in Zones 9A and above.

### 7.2.334 Arisarum vulgare

Friar's Cowl

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Arisarum vulgare is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf from October to July, in flower in May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water[65].

kcakta Edible Parts: Leaves RootEdible Uses: Root cooked. The acrid juice should first be removed by thorough and repeated washing leaving behind a nutritious and innoxious residue[2, 105, 177]. Thorough drying or cooking will also destroy any harmful elements of this root[K]. The root is frequently used as an emergency food in times of scarcity, it is about the size of a walnut[2]. One report suggests that the leaves might be edible[177]. If they are they must be well cooked first[K]

tcanta A good ground-cover plant for a shady place[1]. nrakta S. Europe. ksacta Grassy places, open ground[45] and rocky ground[90].

propta Seed - we have no details for this species but suggest sowing the seed in a shady part of the greenhouse as soon as it is ripe in the spring if this is possible. Sow stored seed in early spring. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least the first winter in a greenhouse and plant out when dormant in the summer once the tuber has reached a reasonable size. Division in spring after the plant dies down[1].

in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Manna SeedEdible Uses: Condiment GumSeed - ground into a powder and used with cereal flours in making cakes and breads[177, 183]. An oleo-resin obtained from the leaves and stems is eaten raw or used as a commercial food flavouring in baked goods, ice cream, chewing gum etc[2, 105, 177, 183, 238]. The plant is said to yield a sweet manna[183].This report is probably referring to the oleo-resin mentioned above[K].

tcanta Gum ResinThe glandular hairs on the leaves yield the oleo-resin 'ladanum', used medicinally and in soaps, perfumery, fumigation etc[4, 11, 46, 61, 64, 89, 100]. This resin is an acceptable substitute for ambergris (which is obtained from the sperm whale) and so is important in perfume manufacture[238]. The resin is collected by dragging a type of rake through the plant, the resin adhering to the teeth of the rake, or by boiling the twigs and skimming off the resin[64, 89]. Most resin is produced at the hottest time of the year[46].

dwatta Antibiotic Emmenagogue Expectorant StimulantLabdanum is an aromatic, expectorant, stimulant herb that controls bleeding and has antibiotic effects[4, 238]. It is used internally in the treatment of catarrh and diarrhoea[238] and as an emmenagogue[4]. The leaves are harvested in late spring and early summer and can be dried for later use, or the resin extracted from them[238].

nrakta Europe - W. Mediterranean. ksacta Pine woods, copses and on dry usually granitic hills[89, 184].

propta Seed - gather when ripe and store dry[78]. Surface sow in late winter in a greenhouse[164]. The seed usually germinates in 1 - 4 weeks at  $20^{\circ}$ c[164]. Prick out the seedlings as soon as they are large enough to handle into individual pots. Grow them on in the greenhouse for their first winter and plant them out the in the following spring or early summer, after the last expected frosts[164]. The seed stores for at least 3 years[K]. Cuttings of softish to half-ripe wood, 8cm long with a heel or at a node, June/August in a frame. Roots are formed within 3 weeks[78]. High percentage[78]. Cuttings of almost mature wood, 8 - 12cm with a heel or at a node, September/October in a frame. High percentage[78]. Lift and pot up in the spring, plant out when a good root system has formed[78]. Layering in spring.

nwatta Industrial Crop: Hydrocarbon Management: Coppice Regional CropRequires a sunny position in a welldrained light sandy soil[11, 182], growing well in poor soils[238]. Withstands drought once it is established[11, 190]. Plants are fairly wind resistant [166, K], tolerating maritime exposure[188]. Resents root disturbance[11]. Plants are hardy to about -10c[184], but they require protection in severe winters[11]. Plants are somewhat hardier when grown in poor soils[182]. Individual flowers only last one day but there is a long succession of them[11, 200]. Labdanum dislikes pruning, especially as it gets older and so any formative work should be restricted to removing dead, straggly or damaged growths[238]. The plant also resents root disturbance[200]. Plants should be pot grown and then planted out in their final positions whilst still small. Sometimes cultivated for its gum, which is known as 'Labdanum', this is exuded in such quantity in hot weather that the plant becomes very sticky[4, 61]. The leaves have glandular hairs which produce an aromatic gum. The sweet balsamic smell is most apparent in the summer in the early morning[245]. A very ornamental plant, it is very free-flowering and fast growing [49]. There are a number of named forms developed for their ornamental value[182]. An excellent nurse plant for sheltering young seedlings[49]. This species is notably resistant to honey fungus[88, 200]. The flowers are very attractive to bees[108]. Hybridizes freely with other members of this genus[200].

#### 7.2.331 Schisandra repanda

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Schisandra repanda is a deciduous Climber growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: TeaFruit - raw or cooked[105, 183]. Used in preserves or to make a tea[177, 183]

nrakta E. Asia - Japan, Korea. ksacta Woods all over Japan[58].

propta Seed - best sown in the autumn in a cold frame[200, 238]. Pre-soak stored seed for 12 hours in warm water and sow in a greenhouse in the spring[238]. Germination can be slow and erratic. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first 2 years. Plant them out into their permanent positions in early summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame. Overwinter in the greenhouse and plant out in late spring[11, 78]. Good percentage[78]. Layering of long shoots in the autumn[200].

nwatta Prefers a rich well-drained moisture retentive soil[11, 200]. Prefers a slightly acid soil but tolerates some alkalinity if plenty of organic matter is added to the soil[200]. Requires some protection from the most intense sunlight[200]. Plants are intolerant of drought[K]. This species has not been properly evaluated for hardiness in Britain but it will probably succeed outdoors in most parts of the country[11], especially if given the protection of a woodland or a wall[K]. The young growth in spring can be damaged by late frosts. Dioecious. Male and female plants must be grown if seed is required.

### 7.2.332 Ephedra gerardiana

Ma Huang, Gerard jointfir 6 tlin 9 cyuc 2 kcak 0 tcan 4 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ephedra gerardiana is an evergreen Shrub growing to 0.6 m (2ft) by 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 146]. A sweet flavour[158]. The fruit is about 7mm in diameter[200].

tcanta FuelThe wood is very close grained[158]. Too small for commercial exploitation, though it is used locally for fuel[146]. A good ground cover plant for dry soils[188]. Plants should be spaced about 60cm apart each way[208].

dwatta Antiasthmatic Antirheumatic Cardiofonic Diaporetic Diuretic Febrifuge Tonic Vasodilator VD VulneraryMembers of this genus contain various medicinally active alkaloids (but notably ephedrine) and they are widely used in preparations for the treatment of asthma and catarrh[238]. Ephedrine acts promptly to reduce swellings of the mucous membranes and has antispasmodic properties, thus making it valuable in the treatment of asthma[4]. This species concins between 0.28 and 2.79 alkaloids[240]. The whole plant can be used at much lower concentrations than the isolated constituents - unlike using the isolated ephedrine, using the whole plant rarely gives rise to side-effects[254]. The plant also has antiviral effects, particularly against influenza[238].

### 7.2.300 Aquilegia shockleyi

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aquilegia shockleyi is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw. Rich in nectar, they are sweet and delightful[172], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K].

tcanta Parasiticide Parasiticide The seed is used as a parasiticide to rid the hair of lice[172].

dwatta Antispasmodic Diaphoretic Parasiticide Parasiticide Resolvent SalveAntispasmodic, diaphoretic, parasiticide, resolvent, salve[172].

nrakta South-western N. America - California and Nevada. ksacta Moist places in dry woodlands and shrublands at elevations of 1200 - 2700 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sunny position[1]. Intolerant of heavy clay[200]. Most species are short-lived, dying out after 2 - 3 years, though they usually produce seed prolifically[200]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

### 7.2.301 Cudrania tricuspidata

Silkworm Thorn, Storehousebush 6 tlin 9 cyuc 2 kcak 2 tcan 2 dwat 6 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cudrania tricuspidata is a deciduous Tree growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - fresh or preserved[1, 22, 61]. Somewhat like a mul-berry[183]. The firm fruit is relatively tasteless, when soft-ripe it is sub-acid to sweet and some forms can be quite delicious[46, 105, 109, 151, 183]. It contains lots of large seeds[151]. The fruit is about 25mm in diameter[200]. Leaves - a famine food[179].

tcanta Dye Fibre WoodA yellow dye is obtained from the wood[178]. The bark fibers are used for making paper[266]. Wood - finely grained. Used for utensils[178].

dwatta Antiperiodic Galactogogue Malaria Ophthalmic Women's complaintsAn infusion of the wood is used to treat sore or weak eyes[178, 218]. The inner bark and the wood are used in the treatment of malaria, debility and menor-rhagia[178, 218]. The root is galactogogue and is also used in the treatment of amenorrhoea[218]. The plant is used to

eliminate blood stasis and stimulate the circulation in cancer of the alimentary system, blood and lungs[218].

nrakta E. Asia - China, Japan and Korea. ksacta Rocky slopes and roadsides in W. China[109]. Sunny forest margins and mountain slopes at elevations of 500 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[188]. Sow stored seed in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[18, K]. Cuttings of mature wood, November in a sandy soil in a frame[1].

nwatta Prefers a warm well-drained fertile loam[1, 188]. Requires a sunny position[188]. A very hardy plant[1]. The leaves are a food source for silk-worms[1, 11]. Probably only the male tree is in cultivation in Britain, though at least one selected female form is being grown in N. America[183]. Both male and female plants normally need to be grown if fruit or seed is required but male trees occasionally produce a few small fruits[183]. The plant is heat tolerant in zones 9 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. A sprouting standard sending up shoots from the base [1-2]

### 7.2.302 Ophrys fusca

Brown Bee Orchid

6 tlin 9 cvuc 2 kcak 0 tcan 2 dwat 0.4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ophrys fusca is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Üses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe - Mediterranean. ksacta Rocky, grassy and bushy places.

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200].

It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Plants are best grown in the shade[188]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

### 7.2.303 Lithocarpus densiflorus

Tanbark Oak

 $6 \ {\rm lin} \ 9 \ {\rm cyuc} \ 2 \ {\rm kcak} \ 0 \ {\rm tcan} \ 1 \ {\rm dwat} \ 10 \ {\rm m} \ {\rm hkuc}$ hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Lithocarpus densiflorus is an evergreen Tree growing to 10 m (32ft) by 10 m (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed -cooked[94, 95]. The seed was a staple food for several native North American Indian tribes[257]. It contains bitter-tasting tannins and there are various ways of removing them. The fastest is by soaking the ground-up seed in hot water - if the water is changed at least once the tannins should be removed within 12 hours. Traditionally, the seeds were placed in a cloth bag and either buried in swampy ground or suspended in a running stream for a few months. Once the tannins have been removed, the seed is then dried, ground into a powder and can be used as a porridge or can be mixed with cereal flours in baking bread etc[183, 257]. It has a pleasant taste after it has been leached[161]. The seed is up to 25mm long and wide[82, 229]. The seed is valued for its oil[161].

tcanta Dye Fuel Oil Preservative Tannin WoodThe bark is exceedingly rich in tannin, yielding up to 29%[11, 82, 123, 171]. It has been used as a brown dye and also to preserve rope that is being used in water[257, K]. Wood - hard, strong, close grained, brittle. It is not commercially important and is used mainly for fuel[82, 229].

dwatta Astringent Odontalgic SkinThe bark is very astringent. An infusion is used as a wash for face sores[257].

The infusion can also be held in the mouth to tighten loose teeth[257].

nrakta South-western N. America - Oregon and California. ksacta Woody slopes below 1500 metres[71] on fertile mountain slopes[229]. It is found on a variety of soil types, but requires a humid atmosphere if it is to thrive[82, 229].

propta The seed is best sown as soon as it is ripe in the autumn in a cold frame[200]. It needs to be protected from mice, squirrels and other seed eaters. The seed has a short viability but can be stored for a few months if kept cool and slightly damp - the salad compartment of a fridge is a good storage place. Germination takes place in the winter or early spring. When they are large enough to handle, prick the seedlings out into individual pots. If the plants are 15cm or more tall by the summer they can be planted out into their permanent positions. Give them a good weed-excluding mulch and some protection from the cold for their first couple of years outdoors. If growth is not sufficient then grow them on in the greenhouse for their first winter and plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Prefers a deep fertile soil with medium drainage[200]. Perfectly hardy at Kew[11], trees produced seed at Kew in the very hot summer of 1989[K]. A slow-growing tree in the wild, living up to 300 - 350 years old[229]. Plants usually flower in the spring and sometimes again in the autumn[188]. The seeds take two seasons to ripen[229]. Prolific crops are usually produced every other year in the wild[229].

### 7.2.304 Aciphylla colensoi

Wild Spaniard

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.9 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Aciphylla colensoi is an evergreen Perennial growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: GumRoot - cooked. Aromatic[173]. The plant yields a resin that is used as a chewing gum[173]. Shoots[173]. No further details.

nrakta New Zealand. ksacta Montane to sub-alpine altitudes in North and South Islands between latitudes 38 and 43° 30′ south[44].

propta Seed - best sown in a greenhouse as soon as it is ripe[200]. Stored seed should be sown in a greenhouse in late winter or early spring. Germination can be very slow. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter before planting them out in late spring or early summer, after the last expected frosts.

nwatta Requires a perfectly drained gritty soil in full sun[233]. Prefers a climate with rather damp air[233]. Plants are hardy to about -10°c and are succeeding outdoors in a mild garden in N. Ireland[233]. Dioecious. Female plants sometimes have a few male flowers but usually male and female plants must be grown if seed is required[200].

### 7.2.305 Castanopsis cuspidata

Japanese Chinquapin 6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 25 m hkuc hmim cyutli tcup hwicli jlutnyik hpa7tli flatprik hpa7tmwatli

drutta Castanopsis cuspidata is an evergreen Tree growing to 25 m (82ft) by 10 m (32ft). See above for USDA hardness. It is hardy to UK zone 7. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind, midges. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral

attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves Root SeedpodEdible Uses: Root - cooked. Boiled and eaten like parsnip[183]. Young shoots - raw or cooked. Added to salads or boiled as a potherb[183]. They are usually blanched before use[183]. A mucilaginous texture. The young pod-like fruits can be eaten when cooked[183].

dwatta PoulticeThe plant has been used in the treatment of colds[257]. A poultice of the roots or the leaves has been used in the treatment of sores and swellings[257].

nrakta North-western N. America. ksacta Dry open soils, meadows and roadsides[204].

propta Seed - sow in situ from late spring to early summer.

nwatta Prefers a dryish well-drained sandy loam and full sun. Heavy clay soils may induce winter rots. Succeeds on poor soils. The flowers open in the evening, they are richly scented and are very attractive to moths. The seeds are a good food source for birds, especially finches. Plants usually mutate freely. This species is very closely related to, and perhaps no more than a part of, O. biennis[204]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

### 7.2.327 Digitaria sanguinalis

Crab Grass, Hairy crabgrass

6 tlin 9 cyuc 2 kcak 2 tcan 1 dwat 0.5 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Digitaria sanguinalis is a ANNUAL growing to 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There is a report that the leaves might be cyanogenic[218].

kcakta Edible Parts: SeedEdible Uses: Seed - ground up and used as a flour[2, 57, 105]. It has excellent keeping qualities[74] and makes a fine white flour that can be used for semolina[74, 115].

tcanta Fodder PaperA fibre obtained from the plant is used in making paper[74]. Animals: Fodder/animal feed, For-

dwatta Emetic Ophthalmic VDA decoction of the plant is used in the treatment of gonorrhoea[218]. A folk remedy for cataracts and debility, it is also said to be emetic[178, 218].

nrakta Cosmopolitan. A rare casual in Britain[17]. ks-acta Arable ground and waste places in Britain[17].

propta Seed - best sown in situ in the spring[162]. Only just cover the seed.

nwatta Prefers a sandy soil[50]. Requires a warm sheltered position[162]. This species is occasionally cultivated, especially in Poland, for its edible seed. Special Features: Invasive.

#### 7.2.328 Lycoris squamigera

Resurrection Lily, Hardy Amaryllis, Magic Lily, Autumn Lycoris, Naked Lady

6 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.7 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lycoris squamigera is a BULB growing to 0.7 m (2ft 4in) by 0.2 m (0ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The bulb contains toxins and must be leached before it is used for food[105].

kcakta Edible Parts: RootEdible Uses: Bulb - cooked. It is used as a source of starch[105, 177]. The bulb is 4cm in diameter[200]. Caution is advised, see the notes above on toxicity.

nrakta E. Asia - Japan. ksacta Edges of cultivated fields[200].

propta The seed is best sown as soon as it is ripe in a greenhouse and should germinate in the spring[200]. Sow the seed thinly so that it does not need to be disturbed for its first year of growth. Give an occasional liquid feed during the growing season to ensure the plants do not become nutrient deficient. Pot up the small bulbs when the plants become dormant, placing 2 bulbs in each pot. Grow them on for another 2 years in the greenhouse before planting them out when they are dormant. Division of offsets in the dormant season[200].

nwatta Landscape Uses:Border, Container, Foundation. Massing, Rock garden, Seashore, Specimen, Requires a deep well-drained sandy soil rich in organic matter in full sun[200]. The bulb should be planted quite shallowly so that it can ripen well after flowering[245]. Hardy to at least -15°c, the leaves are produced in early spring and persist until late summer[200]. Plants need a warm period in late summer in order to ripen the bulbs and induce flowering in the following year [188]. A very ornamental species, each bulb producing a number of flowering stems in mid to late summer[245]. The flowers are very sweetly scented, the scent pervading the whole garden[245]. Plants are attractive to slugs and need to be protected from them[200]. Very sensitive to root disturbance, the bulbs can take some years to become well established[200]. Special Features:Not North American native, Naturalizing, Suitable for cut flowers, Fragrant flowers, Attractive flowers or blooms.

### 7.2.329 Duchesnea chrysantha

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Duchesnea chrysantha is a PERENNIAL growing to  $0.1\,\mathrm{m}$  (0ft 4in) by  $1\,\mathrm{m}$  (3ft 3in). See above for USDA hardness. It is hardy to UK zone 7. It is in flower from May to October, and the seeds ripen from July to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[105]. The fruit is about 10mm in diameter[200] with the appearance and texture of a strawberry but very little flavour[K]. Leaves and young plant - cooked[105].

nrakta E. Asia - China, Japan, Korea, Manchuria. ksacta Sunny grassy places in lowland all over Japan[58]

propta Seed - sow spring in a sunny position in a greenhouse. Germination usually takes place within 1 - 6 weeks or more at 15°c. A period of cold stratification may speed up germination. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division of runners in spring or late summer. Very easy, they can be planted out straight into their permanent positions.

nwatta Prefers a moist but well-drained soil in a sunny position[175]. Grows well in a rock garden[1]. This species is hardy to about -15°c. Plants can be invasive, spreading freely by means of runners[187]. This species is sometimes considered to be no more than a form of D. indica[74].

### 7.2.330 Cistus ladanifer

Labdanum, Common gum cistus

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 1.5 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cistus ladanifer is an evergreen Shrub growing to 1.5 m (5ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year,

active ingredient than P. peltatum[211]. The roots contain several important anti-cancer lignans, including podophyllin and berberine[218]. The roots are also antirheumatic[218]. The root is harvested in the autumn and either dried for later use or the resin is extracted[238]. This plant is highly poisonous and should only be used under the supervision of a qualified practitioner[238]. It should not be prescribed for pregnant women[238].

nrakta E. Asia - China, ksacta Deciduous and mixed forests, often in wet areas beneath Rhododendrons and conifers, at 2.750 - 3350 metres. Also open stony alpine pastures amongst dwarf scrub at 3350 - 3950 metres.

propta Seed - best sown as soon as it is ripe in a cold frame. Sow stored seed in a cold frame in early spring. The seed germinates in 1 - 4 months at 15°c. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a shady part of the greenhouse for at least 2 growing seasons. Plant them out into their permanent positions in the winter when the plants are dormant. Division in March/April[111].

nwatta Prefers a moist peaty soil and filtered light or shade[4, 111]. Grows well in a moist open woodland[28, 31] and also succeeds under beech trees in a deep moist leafy soil[130]. Plants are fairly hardy, but the new growth in spring is frost tender[233]. Plants in this genus have excited quite a lot of interest for the compounds found in their roots which have been shown to have anti-cancer activity[124]. There are various research projects under way (as of 1990)[124]. This species is closely related to P. hexandrum[200]. he plant takes some years to become established[124] but is very long lived in a suitable habitat[130].

### 7.2.324 Codonopsis ussuriensis

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Codonopsis ussuriensis is a PERENNIAL growing to 0.3 m (1ft) by 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to October, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[46, 61, 105]. Plants produce a stout, globose tuber[275]. The ones we grew were quite thin, but they have a reasonable flavour with a slight sweetness[K].

nrakta E. Asia - China, Japan. ksacta Woods in lowland and mountain areas[58], especially on sandy soils[74]. In more or less wet, sunny meadows at low elevations in Japan[275].

propta Seed - surface sow in spring to early summer in an ericaceous compost in a greenhouse. Do not allow the compost to dry out. The seed usually germinates in 1 - 6 weeks at 20°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in a greenhouse for their first winter. Plant out in late spring or early summer and protect them from slugs until the plants are well established[K]. Division in spring, with care, since the plant resents root disturbance[200]. We have found it best to take small divisions that are teased out from the sides of the main clump so as to cause the least possible disturbance to the plants and to avoid having to dig up the clump. These small divisions need to be potted up and placed in light shade in a greenhouse until they are rooting well. They can be planted out into their permanent positions in the summer if they are large enough, otherwise in the fol-

nwatta Prefers a well-drained fertile light soil in full sun or semi shade[1, 200]. Only succeeds in full sun if the soil remains moist during the growing season[200]. Prefers a slightly acid soil[164]l. Dormant plants are hardy to about -20°c[187]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This plant is considered to be a part of C. lanceolata by many botanists[200]. Plants resent root disturbance and should be

planted out into their permanent position as soon as possible[164]. Plants are very susceptible to the ravages of slugs. The young shoots in spring are particularly at risk, though older growth is also eaten[K].

### 7.2.325 Petasites palmatus

Sweet Butterbur, Golden Palms Coltsfoot, Sweet Coltsfoot,

6 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.4 m hkuc

pcimhmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta Petasites palmatus is a PERENNIAL growing to 0.4 m (1ft 4in) by 1 m (3ft 3in) at a fast rate. It is in flower from February to April, and the seeds ripen in April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Flowers StemEdible Uses: SaltYoung flower stalks, used before the flower buds appear, are boiled until tender and seasoned with salt[172, 177, 183]. Flower buds - cooked[183]. Leafstalks - peeled and eaten raw[105, 177, 183, 257]. The ash of the plant is used as a salt substitute[46, 61, 95, 102, 183]. To prepare the salt, the stems and leaves are rolled up into balls whilst still green, and after being carefully dried they are placed on top of a very small fire on a rock and burned[213].

dwatta Pectoral Salve TBThe roots have been used in treating the first stages of grippe and consumption[257]. The dried and grated roots have been applied as a dressing on boils, swellings and running sores[257]. An infusion of the crushed roots has been used as a wash for sore eyes[257]. A syrup for treating coughs and lung complaints has been made from the roots of this species combined with mullein(Verbascum sp.) and plum root (Prunus sp.)[257].

nrakta N. America - Newfoundland to Massachusetts, west to Alaska and south to California, ksacta Low woods. glades and damp clearings[43]. Swamps and along the sides of streams[235].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe or in early spring. Only just cover the seed and do not allow the compost to dry out. When they are large enough to handle. prick the seedlings out into individual pots and plant them out in the summer. Division succeeds at almost any time of the year. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Landscape Uses:Seashore, Woodland garden. Succeeds in ordinary garden soil[1], but prefers a deep fertile humus-rich soil that is permanently moist but not stagnant, succeeding in shade, semi-shade or full sun[200]. Requires a moist shady position[187]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Plants are hardy to about -20°c[187]. A very invasive plant, too rampant for anything other than the wild garden[187, 200]. Dioecious, male and female plants must be grown if seed is required. Special Features: Attractive foliage. North American native, Invasive, Wetlands plant,

### 7.2.326 Oenothera elata hookeri

Hooker's Evening Primrose 6 tlin 9 cyuc 2 kcak 2 tcan 1 dwat 0.8 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Oenothera elata hookeri is a BIEN-NIAL/PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies), bees. The plant is self-fertile. It is noted for

soils. It can grow in semi-shade (light woodland). It prefers rocks[100], usually on calcareous soils[7].

kcakta Edible Parts: SeedEdible Uses: Seed - cooked[2, 46, 63, 105, 177]. The cotyledon of the nut is eaten boiled or roasted[183].

nrakta E. Asia - China, Japan. ksacta Woods and ravines, especially near the sea in western China[109].

propta Seed - requires a period of cold stratification and is best sown as soon as it is ripe in a cold frame[138]. The seed has a short viability and should not be allowed to dry out. It can be stored for a few months if kept cool and moist (putting it in a plastic bag that is placed in the salad compartment of a fridge works well). Stored seed should be soaked in warm water for 24 - 48 hours prior to sowing [138]. Germination usually takes place within 1 - 3 months at 15°c[138]. As soon as they are large enough to handle, prick out the seedlings into individual pots and plant them out in mid summer if possible, otherwise grow them on in a cold frame for their first winter and plant them out in late spring. Give the young plants some protection from cold for their first few winters outdoors.

nwatta Prefers a good deep medium to stiff loam[1]. Requires a sheltered position in semi-shade and a lime-free soil[138]. Although cold hardy in Britain, this species really requires a warm continental climate if it is to prosper and it does not do well in the maritime climate of this country[200]. It succeeds in the London area but does not attain its full size there[11]. It grows well in S.W. England[11]. The catkins have an unpleasant hawthorn-like smell to attract midges for their pollination[245].

### 7.2.306 Santolina chamaecyparissus

Cotton Lavender

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Santolina chamaecyparissus is an evergreen Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The bruised leaves have been known to cause a severe rash on sensitive skins[182].

kcakta Edible Parts: Edible Uses: CondimentThe aromatic leaves are used as a flavouring for broths, sauces, grain dishes etc[15, 183].

tcanta Disinfectant Dve Essential Hedge Hedge Potpourri RepellentPlants can be grown as a low formal hedge and used as an edging plant[200]. The plant is very tolerant of shearing[200]. In less exposed areas the plants can be trimmed in the autumn, otherwise they need to be cut by early April if they are to be allowed to flower[245]. Plants can also be grown for ground cover[190]. They are best spaced about 60cm apart each way[208]. The leaves are strewn amongst clothes to repel moths etc[4, 15, 18, 20, 100]. The growing plant repels various insect pests, especially cabbage moths[201]. The dried leaves are used in pot-pourri[238]. An essential oil from the leaves is used in perfumery[4], the oil is also obtained from the flowers[168]

dwatta Antispasmodic Disinfectant Emmenagogue Stings VermifugeThe leaves and flowering tops are antispasmodic, disinfectant, emmenagogue, stimulant and vermifuge[4, 7, 11, 201]. Cotton lavender is rarely used medicinally[238], though it is sometimes used internally as a vermifuge for children and to treat poor digestion and menstrual problems[4, 238]. When finely ground and applied to insect stings or bites, the plant will immediately ease the pain[7]. Applied to surface wounds, it will hasten the healing process by encouraging the formation of scar tissue[7]. The leaves and flowering stems are harvested in the summer and dried for later use[238].

nrakta Europe - Mediterranean. Occasionally naturalized in Britain[17]. ksacta Dry ground, stony banks and

propta Seed - sow spring in a greenhouse. Does not require pre-treatment[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe side shoots, 5 - 8 cm long with a heel, July/August in a frame. Roots within 2 weeks. High percentage[78]. The heeled cuttings can also be placed direct into the open garden in early July and should be well-rooted by the winter[245]. Division in spring or autumn[111]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame. planting them out once they are well established in the sum-

nwatta Landscape Uses:Border, Foundation, Ground cover, Massing, Rock garden, Seashore. An easy and undemanding plant that does not require a rich soil, though it strongly dislikes wet conditions around the roots[1, 11, 15, 200]. Prefers a light sandy fairly poor soil on a sunny slope[200]. Prefers a chalky soil[190]. Established plants are drought tolerant[190]. They succeed in a hot dry position[190]. Hardy to about -15°c when in a well-drained soil. A very wind hardy plant, it succeeds on the top of Cornish drystone walls[49]. A very ornamental plant[1], there are several named varieties[245]. Cotton lavender tolerates shearing so long as this is not done at times of low resistance (winter?)[200]. Plants can be cut back hard in spring to maintain their form[200, 208], though this will prevent them flowering[208]. A good companion plant for roses[201]. Flowers are produced on two year old wood[182]. The leaves are very aromatic[190]. The bruised leaves are pleasantly pungent, though the flowers have an unpleasant smell[245]. The form S. chamaecyparissus nana has a more pungent aroma than the type[245]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage. Fragrant foliage, Not North American native, Suitable for dried

### 7.2.307 Aquilegia buergeriana

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Aguilegia buergeriana is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been seen for this species, it belongs to a family that contains a number of mildly toxic species. It is therefore wise to exercise some caution. The flowers are probably perfectly safe to eat.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - raw. Rich in nectar, they have a sweet taste[172, 183], they make a very attractive addition to mixed salads and can also be used as a thirst-quenching munch in the garden[K]. Leaves - cooked[177]. Some caution is advised - see the notes above on toxicity

tcanta ParasiticideThe seed is used as a parasiticide to rid the hair of lice[172].

nrakta E. Asia - C. and S. Japan. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be slow to germinate[200]. Stored seed can be sown in late winter in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter. Plant out in late spring or early summer. Division in spring[200].

nwatta Succeeds in ordinary garden soil, preferring a moist but not wet soil and a sunny position[1]. Intolerant of heavy clay[200]. Most species are short-lived, dying out after 2 - 3 years, though they usually produce seed prolifically[200]. However, they are very apt to hybridize with other members of the genus and so it becomes difficult to keep a species true to type if more than one is grown in the garden[200]. Plants seem to be immune to the predations of

rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 7.2.308 Ephedra viridis

Mormon Tea, Brigham Tea, Long Leaf Ephedra, Mountain Joint Fir, Mormon Tea, Ephedra

6 tlin 11 cyuc 2 kcak 0 tcan 3 dwat 1.8 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ephedra viridis is an evergreen Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 9. It is in leaf all year, in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Fruit SeedEdible Uses: TeaFruit - raw. A sweet flavour. Seed - cooked. A bitter flavour, it is roasted and ground into a powder and used to make a bread or mush[183]. A delicious tea is made by steeping the green or dried twigs in boiling water[183, 257]. The flavour is said to be improved if the stems are roasted first[183].

tcanta DyeThe twigs, boiled with alum, produce a light tan dye[257]

dwatta Blood purifier Diuretic Kidney Poultice Stomachic Tonic VDThis plant has a wide reputation as a cure for syphilis[216]. A strong decoction of the stems was drunk and a poultice of the pulverized or boiled stems applied to the sores[257]. The stems are blood purifier, diuretic and tonic[257]. An infusion has been used in the treatment of coughs and colds, anaemia, rheumatism, stomach ulcers and other disorders, kidney problems[257]. The dried, powdered stems are used as a dressing on sores and burns[257]. The stems of most members of this genus contain the alkaloid ephedrine and are valuable in the treatment of asthma and many other complaints of the respiratory system[K]. The whole plant can be used at much lower concentrations than the isolated constituents - unlike using the isolated ephedrine, using the whole plant rarely gives rise to sideeffects[254]. Ephedra does not cure asthma but in many cases it is very effective in treating the symptoms and thus making life somewhat easier for the sufferer. The stems can be used fresh or dried and are usually made into a tea, though they can also be eaten raw[K]. The young stems are best if eating them raw, though older stems can be used if a tea is made[K]. The stems can be harvested at any time of the year and are dried for later use[238].

nrakta South-western N. America - California to Colorado and Arizona. ksacta Dry rocky slopes, gravel terraces and canyon walls, often on limestone, at elevations of 800 - 2500 metres[270].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse [200]. It can also be sown in spring in a greenhouse in a sandy compost[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse. Plant out in the spring or early summer after the last expected frosts and give some protection in their first winter[K]. Division in spring or autumn[238]. Layering.

mwatta Landscape Uses:Erosion control, Ground cover, Massing, Rock garden. Requires a well-drained loamy soil and a sunny position[11]. Established plants are drought resistant and are also lime tolerant[200]. This species is not very hardy in Britain, it succeeds well in a cold greenhouse but is often killed outdoors by a combination of cold and wet conditions[200]. Dioecious, male and female plants must be grown if fruit and seed is required.Special Features: Attractive foliage. North American native.

### 7.2.309 Kadsura japonica

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 3.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli nyanhjen hjonli drutta Kadsura japonica is an evergreen Climber growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from June to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruit is up to 6mm long[219].

dwatta Antidiarrhoeal Stomachic TonicA decoction of the dried fruits is bechic, stomachic and tonic[218].

nrakta E. Asia - southern China, central and southern Japan. ksacta Climbs trees in woodlands[58]. Forests and slopes at elevaions of 500 - 2000 metres in Fujian and Taiwan Provinces, China[266].

propta Seed - best sown when it is ripe in the autumn in cold frame[200]. Prick out the seedlings into individual pats when they are large enough to handle and grow them on for at least their first winter in a greenhouse. Plant out in early summer and give some protection for their first winter outdoors. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame. Overwinter in the greenhouse and plant out in late spring[11, 78]. Good percentage[78]. Layering of long shoots in the autumn[200].

nwatta Succeeds in any fertile garden soil[182]. Requires a sheltered position in a moderately fertile well-drained neutral to acid soil[200]. Prefers a position in semi-shade[219]. This species is not very hardy in Britain, though it succeeds when grown against a sunny wall in the milder areas of the country[182]. The flowers emit a soft sweet perfume[245]. Flowers are produced on the current year's growth[219]. Plants do not really require pruning[219]. Dioecious, male and female plants must be grown if fruit and seed is required[182].

### 7.2.310 Cyperus longus

Galingale

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1.2 m hkuc

htut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cyperus longus is an evergreen Perennial growing to 1.2 m (4ft) by 2 m (6ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: RootEdible Uses: CondimentTuber - used as a spice in soups, pies and sweets[5, 183].

tcanta Basketry Essential Paper WeavingThe leaves are used in basketry and for weaving hats, matting etc[100]. The root and stem have the scent of violets and are used in perfumery[4, 46, 61, 245]. The aroma becomes more pronounced when the root has been dried and left to age[245]. A fibre obtained from the plant is used in paper making[100].

dwatta Aromatic TonicThe root is an aromatic tonic[4]. It was at one time considered to be a good stomachic and useful in the first stages of dropsy, but it has now fallen into disuse[4, 238].

nrakta Britain and the Mediterranean region north to Lake Geneva. ksacta By water in ditches and marshy

propta Seed - surface sow in the spring and keep the compost moist[164]. The seed usually germinates in 2 - 6 weeks at 18°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow on for their first winter in a greenhouse and plant them out in late spring after the last expected frosts. Division in spring or autumn. Division is simple at almost any time of the year, so long as the roots are not allowed to become dry. Plant them out straight into their permanent positions.

nwatta Prefers a moist sandy loam[95, 117]. Succeeds in any good garden soil so long as it does not dry out[162], it also grows well in up to 30cm of water[200]. Plants are hardy

does not appeal to most people who have tried it[ K ]. Once in the mouth, it takes a lot of chewing before it is ready to be swallowed[ K ]. The leaves are used for making cakes[ 283 ]. This report could refer to the plants use as a poultice[ K ]. They are also used as a dye to make black rice cake. They are also used as a dye to make black rice cake.

tcanta Fibre Fodder PaperAgroforestry Uses: Planted to prevent erosion in gullies[ 331 ]. Other Uses A fibre is obtained from the inner bark of the stem - of excellent quality, it is highly water-resistant and has a greater tensile strength than cotton[ 418 ]. It is used for textiles, linen etc and is said to be moth-proof[ 1 , 46 , 57 , 61 , 74 , 171 ]. It is best harvested as the female flowers open[ 169 ]. The outer bark is removed and then the fibrous inner bark is taken off and boiled before being woven into thread[ 178 ]. The fibres are the longest known in the plant realm.[61, 171] The tensile strength is 7 times that of silk and 8 times that of cotton, this is improved on wetting the fibre [61]. The fibre is also used for making paper[ 189 ]. The leaves are removed from the stems, the stems are steamed and the fibres stripped off. The fibres are cooked for 2 hours with lye, fresh material might require longer cooking, and they are then beaten in a Hollander beater[ 189 ] before being made into paper.

dwatta Antiphlogistic Astringent Demulcent Diuretic Febrifuge Haemostatic Poultice Resolvent Vulnerary Women's complaintsAntiphlogistic, demulcent, diuretic, febrifuge, haemostatic and vulnerary. Used to prevent miscarriages and promote the drainage of pus [147, 178]. The leaves are astringent and resolvent [218, 240]. They are used in the treatment of fluxes and wounds [218]. The root contains the flavonoid rutin [283]. It is antiabortifacient, antibacterial, cooling, demulcent, diuretic, resolvent and uterosedative [218, 283]. It is used in the treatment of threatened abortions, colic of pregnancy, haemorrhoids, leucorrhoea, impetigo etc [283]. The fresh root is pounded into a mush and used as a poultice [283].

nrakta E. Asia - China to the Himalayas of Bhutan, Sikkim and Nepal. ksacta Rocky places to 1200 metres[109]. A very common plant in China, growing in thickets, roadsides, edges of forests in mountains at elevations of 200 - 1700 metres[266].

propta Seed - sow in pots and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and plant them out when at least 20cm tall. Division. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best planted in a nursery until they are growing away well. Layering. Basal cuttings. Harvest new shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade until they are rooting well.

Fodder Management: Hay Minor Global Crop Staple Crop: ProteinA plant of the sub-tropics to the tropics, also succeeding in warm temperate areas. The plant can be grown between latitudes 6 - 45°N and 9 - 38°S. It is adapted to a relative air humidity about 80%. Both excessive rainfall and drought affects the quality of the fibre. Relatively flat areas, not subject to flooding as well as gentle sloping lands, not subject to erosion are suitable for ramie production. It is found at elevations up to 1,300 metres. It grows best in areas where annual daytime temperatures are within the range 17 - 27°c, but can tolerate 10 - 34°c[ 418 ]. It prefers a mean annual rainfall in the range 1,500 - 2,500mm, but tolerates 1.000 - 4.000mm[ 418 ]. Requires a rich warm sandy soil that is very well drained 1 . 57 . 123 . 200 l. Succeeds in a wide range of soils so long as they are fertile[ 418 ]. Intolerant of wet soils[ 200 ]. This is a very greedy plant that can soon impoverish a soil, it requires a lot of feeding if it is to perform well[ 123 ]. All plant remains, after the fibre has been removed, should be returned to the soil 123]. Prefers a pH in the range 5.4 - 6.5, tolerating 4.8 -7.5[418]. Boehmeria nivea is an extremely variable species that is widespread over large areas of subtropical and tropical Asia. Its complex species includes several infraspecific taxa, four varieties of which are found in China[ 266 ]. The sub-species B. Nivea tenacissima. (Gaud.)Miguel., which produces the fibre 'Rhea' is a native of Malaysia and is not hardy in Britain[ 200 ]. Yields are from 375 to 900 kilos of fibre (per acre?)[ 123 ]. Two to four harvests per year are possible depending upon the climate, it is harvested as the stems turn brown 123 ]. Yields of green plants may in temperate regions vary between 15 - 20 tonnes/ha and in tropical

areas 8 - 10 tonnes/ha. Yields of about 1400 kg fibre/ha have been reported[ 418 ]. There are an increase in yields in the 2nd and 3rd year[ 418 ]. Stems can be harvested 2 - 3 times per year in temperate areas, 4 - 5 times in subtropical areas and in the tropics up to 6 crops can be produced annually[ 418 ]. The crop is normally replanted after 7 - 10 years, but may persist for 20 years[ 418 ]. The plant tends to take up whatever minerals are present in the soil. This could cause problems for example high uptake of molybdenum can lead to conditioned copper deficiency[ 289 ]. Found In: Africa, Asia, Australia, Bangladesh, Brazil, China\*, East Africa, Fiji, Haiti, Hawaii, India, Indochina, Indonesia, Japan, Laos, Malaysia, Mozambique, Norfolk Island, Pacific, Philippines, Rwanda, SE Asia, South America, Taiwan, USA, Vietnam.

### 7.2.322 Erysimum hieraciifolium

European wallflower,

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Erysimum hieraciifolium is a BIEN-NIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: LeavesEdible Uses: Tender young shoots and leaves - cooked as a vegetable[272].

nrakta Central and northern Europe to eastern Asia in Siberia, the Himalayas, China and Mongolia. ksacta Open damp grasslands at elevations of 1600 - 3500 metres in Nepal[272].

propta Seed - sow spring or late summer in situ. Germination should take place within 3 weeks.

nwatta Prefers a position in full sun in a circumneutral soil[200]. Succeeds in ordinary garden soils, tolerating poor and dry soils[200]. Plants are short-lived perennials and are often biennial[200]. A good nectar source for butterflies[200].

### 7.2.323 Podophyllum aurantiocaule

6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc

I'm in this state with they are to this well.

nwatta Fodder: Bank Industrial Crop: Fiber Management. Ecimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis ler Management: Hay Minor Global Crop Staple Crop: hpa7tmwatli dyatxre7t hjonli

drutta Podophyllum aurantiocaule is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to June, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista We have seen no reports of toxicity for this species but all parts of the plant, except the fully ripe fruit, are almost certainly poisonous [K].

kcakta Edible Parts: FruitEdible Uses: We have no reports for this species but the following report is for the closely related P. hexandrum. Fruit - raw. It must only be eaten when it is fully ripe[1, 2, 61, 105]. Juicy but insipid[130]. The fruit is about 5cm long[200].

dwatta Antiphlogistic Cancer Cholagogue Cytostatic Depurative PurgativeThe plant is antiphlogistic and depurative[147]. The following report is for the related P. hexandrum. It quite probably also applies to this species. The whole plant, but especially the root, is cholagogue, cytostatic and purgative. The plant contains podophyllin, which has an antimyotic effect (it interferes with cell division and can thus prevent the growth of cells). It is, therefore, a possible treatment for cancer, and has been used especially in the treatment of ovarian cancer[46, 51, 57, 64, 65, 124, 244]. However, alopecia is said to be a common side-effect of this treatment[244]. This species contains about twice the quantity of

A decoction of the leaves is used as a gargle in treating inflammation of the vocal chords[240]. The root is anthelmintic and astringent[240]. A decoction of the root is used in the treatment of internal parasited[272].

nrakta E. Asia - China, Japan, Korea. ksacta Woods[11]. Forest margins, mountain slopes, fallow land and scrub in valleys in limestone areas at elevations of 500 - 2000 metres[266].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside [78, 113, 200]. Bury the cuttings to threequarters of their depth. Layering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. This species is closely related to M. indica, and is seen as conspecific by some botanists[266]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

#### 7.2.319 Physalis virginiana

Virginia Ground Cherry 6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Physalis virginiana is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where many of the members have poisonous leaves and stems, though the full ripe fruits are usually edible[19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 105, 170]. The fruit is best after it has been touched by a frost[257]. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calvx is toxic and should not be eaten

dwatta Cancer MiscellanyExtracts from the plant have shown anticancer activity[218]. An infusion of the whole plant has been used in the treatment of dizziness[257].

nrakta Eastern N. America - Ontario to Manitoba, Connecticut, Florida, Louisiana and Texas, ksacta Dry sandy or rocky woods, openings and clearings[43]. Rich soils in open woods and prairies[170].

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away well. Diurnal temperature fluctuations assist germination[170]. Division in spring[111]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in early summer[111]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots

and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any well-drained soil in full sun or light shade[200]. This plant has been growing successfully with us in Cornwall since 1990, though it is not setting

### 7.2.320 Levmus condensatus

Giant Wild Rve

6 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 2 m hkuc

htut cyutli haatkyuctcup hwicli hyishrasilutnyik hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hionli

drutta Leymus condensatus is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed cooked[22, 46, 105, 161]. It can be ground into a flour and used to make bread[61, 95, 177]. The seed is rather small and rather difficult to extract[K].

tcanta Brush Thatching WeavingThe leaves are used for making mats, rope, paper etc. The stems are used for thatching roofs etc[257]. The roots can be tied together and used as a hair comb[257].

dwatta OphthalmicA decoction or infusion of the leaves has been used as a wash for sore eyes[257]. The dried leaves have been used to scrape pimples from the underside of the evelid[257].

nrakta Western N. America - Alberta to British Columbia, south to Nebraska, Arizona and California. ksacta Dunes by the coast, dry plains and slopes[43]. Also found in damp alkaline soils near streams[95].

propta Seed - sow mid spring in situ and only just cover the seed[162]. Germination should take place within 2 weeks. If the supply of seed is limited, it can also be sown in mid spring in a cold frame. Only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and plant them out in summer[K] Division in spring or summer[162]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils, preferring a sandy soil and a sunny position[1, 162]. Established plants are drought resistant[61]. Plants are tolerant of saline and alkaline soils[61]. A very variable species[1], it is possibly suitable for cultivation as a perennial cereal[95].

#### 7.2.321 Boehmeria nivea

Ramie, Chinese Grass, Chinese Silk Plant 6 tlin 9 cvuc 2 kcak 5 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli kyuctcup hwicli hras hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Boehmeria nivea is an evergreen Perennial growing to 1.8 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers

pcista Although members of the nettle family, plants in this genus do not have stinging hairs[235].

kcakta Edible Parts: Leaves RootEdible Uses: Edible portion: Root, Leaves, Seeds - oil. Root - peeled and boiled. A pleasant, sweet taste[ 179 ]. We can detect very little flavour, but the root has a very strange mucilaginous texture that to about -15°c[200]. A very ornamental plant[1], though it basic (mildly alkaline) soils. It can grow in semi-shade (light can spread freely at the roots when well-suited[233]. Galingale was one of the favourite spices of the medieval kitchen and was an ingredient of 'pokerounce', a kind of medieval cinnamon toast[183]. It is rarely used at present. Both the root and the stem have a sweet moss-like perfume, resembling that of the violet but not so pure. The aroma becomes more fragrant with age[245].

### 7.2.311 Chrysolepis chrysophylla

Golden Chinguapin, Giant chinguapin 6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 20 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Chrysolepis chrysophylla is an evergreen Tree growing to 20 m (65ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind, midges. Suitable for: light (sandy) and medium (loamy) soils and prefers welldrained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[22, 46]. Very sweet and much appreciated[63, 71, 82, 105, 183]. The seed can also be dried, ground into a powder and used as a thickening in soups, mixed with cereals when making bread etc[257]. The seed is about 1cm long and has a hard shell[183].

tcanta WoodWood - fine-grained, light, soft, not strong Occasionally used for making ploughs and other agricultural implements, and also as a fuel[46, 61, 82, 229].

nrakta South-western N. America - Washington to Oregon and California. ksacta Forested slopes near the coast in California[71]. Found in many soil types ranging from dry and rocky to deep rich soils[229].

propta Seed - best sown in a cold frame as soon as it is ripe, the seed must be protected from mice etc[200]. The seed has a short viability and should not be allowed to dry out. If stored overwinter it should be kept cool and moist. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors.

nwatta Requires a lime-free soil[1]. Prefers a sheltered semi-shaded position and a light deep moist soil[1, 11]. A very ornamental tree[183], it is slow to moderate growing and can live 400 - 500 years in the wild[229]. One report says that this species only succeeds in Oceanic and Mediterranean climates[200]. This species has a very wide natural range in N. America, seeds should be tried from various provenances to find more suitable selections for Britain[11]. Another report says that the plant is only found in a small area of California and Oregon, but that it grows on a wide range of soil types[229]. There are trees 16 metres tall in Surrey and Buckinghamshire[11], it also fruits in Cornwall[59] and fruits well in addition to self-sowing at Edinburgh botanical gardens[11]. Flowers are produced on the current years growth, the seed taking two summers to mature[229]. The catkins have an unpleasant hawthornlike smell to attract midges for their pollination[245]. This species resists chestnut blight[200].

### 7.2.312 Chusquea guila

Argentinian guila

6 tlin 9 cvuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chusquea quila is an evergreen Bamboo growing to 5 m (16ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and

woodland). It prefers moist soil and can tolerate drought.

kcakta Edible Parts: StemEdible Uses: Young shoots cooked[25, 177].

tcanta Musical WoodThe canes are used in making musical instruments, plain furniture and fencing[139].

nrakta S. America - Argentina, Chile. ksacta Not known propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Very difficult[200]. Take divisions with at least four canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings.

nwatta Prefers a damp humus rich soil[200]. Prefers an open loam of reasonable quality, doing well on peat[11]. Likes plenty of moisture in the growing season[11]. Established plants are drought tolerant[25, 162, 195]. They reguire a position sheltered from cold north and east winds[11]. 200]. A very hardy plant[25, 162], tolerating temperatures down to about -15°c[200]. Another report says that the plant is probably only hardy in the milder areas of the country[1]. It succeeds outdoors at Edinburgh Botanical Gardens[195] and is growing well at Kew[K]. This species is found further south in the world than any other species of bamboo, it grows in Chile as far south as latitude 47° south[195]. The rootstock is caespitose, new shoots are produced from late April and can grow 15cm overnight[25]. Plants take 2 - 3 years to settle down after being moved but are then guite fast growing[162]. Another report says that they are slow growing[188]. This species is notably resistant to honey fungus[200]. Plants flower and produce seed annually in the wild without dving as a result of the flowering[162]. Plants of the cultivar 'Tenuis' have been observed to be flowering in 1994, this is the first record of this species flowering in the northern hemisphere[214].

#### 7.2.313 Paederia foetida

Skunk Vine

6 tlin 12 cyuc 2 kcak 2 tcan 4 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli dvat hionli

drutta Paederia foetida is a CLIMBER growing to 4 m (13ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. The flowers are pollinated by Bees, Butterflies. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Leaves StemEdible Uses: Leaves raw or cooked[301]. Although they have a strong flavour, the leaves are sometimes mixed with grated coconut and spices, and then eaten raw as a side-dish with rice[301, 310]. The minced leaves are steamed and eaten; they can be added to soups; or are mixed with various vegetables and spices, then wrapped in a banana leaf and cooked over a fire[301]. Any offensive smell disappears as the leaves are cooked[301]. The leaves are valued more for their medicinal virtues than for their flavour![K]. The sweet stem juice is sucked in Taiwan[177 . 183 ].

tcanta Other Uses The stem yields a strong and silky fibre, but it is not commercially exploited[310]. An ethanolic extract of the leaves and stem has been shown to be significantly toxic against the aphid Myzus persicae infesting cabbage in India[310]

dwatta DysenteryThe leaves are widely used in Asia and South-East Asia, where they are especially valued for treating digestive problems[310]. Considerable research has been carried out into the medicinal benefits of the plants, with several active compounds having been recorded[310]. Several iridoid glucosides such as asperuloside, scandoside

and paederoside have been isolated from the aerial parts of the plant[310]. These glucosides have displayed antitumor activity with paederoside displaying the highest degree of antitumor-promoting activity[310]. Scandoside has been shown to promote the growth of lettuce seedlings. Paederoside showed a similar inhibitory activity to that of asperuloside and daecetyl-asperulosidic acid in a plant growth inhibition test and in an antimicroorganism activity test[310]. The bruised aerial parts of the plant have the fetid odour of indole (methyl-mercaptan). Damage to the tissue releases an enzyme which splits off this sulphur-containing group from paederoside, and is therefore responsible for the unpleasant odour. The most abundant sulphur-containing compound was dimethyl disulphide[310]. The presence of alkaloids and an essential oil have also been recorded[310] ]. Monoterpenes such as linalol constitute the major components in the oil[310]. In older investigations, decoctions of the plant showed significant anti-inflammatory action against arthritis[310]. The decoction also exhibited marked activity against degenerative osteo-arthritis[310]. The water soluble fraction of the aerial parts displayed antiinflammatory activity in oedema[310]. It failed to exhibit any analgesic or antipyretic action and showed no ulcerogenic potential[310]. An ethanolic extract of the leaves has shown anticancer activity against human epidermoid carcinoma of the nasopharynx[310]. A methanol extract of the leaves has shown hepatoprotective potential, being effective in reversing 6 out of 12 common biochemical (enzymatic) parameters assessed[310]. Another study has shown that the plant has antidiarrhoeal activity, acting by inhibiting intestinal motility - thus supporting its use in traditional medicine[360]. The leaves are anodyne, antirheumatic, antivinous, astringent, carminative, depurative, diuretic, restorative and vermifuge[147, 218, 310]. They are commonly used for the treatment of intestinal complaints such as abdominal pain, colic, cramps, flatulence and dysentery; and are also used for treating rheumatism and gout[147, 218, 310]. The leaves are also used to treat infertility and paralysis[218]. The leaves and stems are also used as a diuretic for inflammation of the urethra[310 ]. For treating intestinal problems, the fresh leaves are pounded, water added, and the filtered infusion is drunk regularly till convalescence[310]. The plant is considered to have great restorative powers, and the leaves may thus be mixed with food, boiled and eaten - in India, they are often boiled in soup to lessen their smell[310 1. Applied externally, the leaves are used to treat swellings and bruises in general, and are mashed then applied for earache, ulcerations of the nose and swollen eyes[272, 310]. They are used as a poultice for treating a swollen belly, distension, herpes or ringworm; and are used in antirheumatic baths[310]. They are applied to the abdomen as a diuretic, and also as a solvent for vesical stones[310]. The juice of the leaves is considered astringent, and is used to treat diarrhoea in children[310]. The bark and the root are considered to be emetic[310]. The juice of the root is prescribed in cases of indigestion, piles, inflammation of the spleen, and pain in the chest and liver[272, 310]. It may help to eliminate poisons collected in the system[310]. In some parts of India, the fruit is used to blacken teeth, and it is also considered a medicine to prevent and treat toothache[310, 360].

nrakta E. Asia - China, Japan, Korea, Indian subcontinent, Myanmar, Thailand, Cambodia, Laos, Vietnam, Malaysia, Indonesia, Philippines. ksacta A ruderal in thickets and woodland, also along forest edges, in secondary evergreen to deciduous forest and clearings in primary forest[310]. Also grows in montane vegetation up to 3,000 m, on steep, forested slopes, or on sandy or rocky sea coasts[310].

propta Seed - despite its weediness, the plant germinates rather slowly, with tetraploids germinating quicker than hexaploids, in 5 - 22 days, or in 17 - 24 days, respectively[310]. Layering. Sometimes, shoots produce adventitious roots when they come in contact with the soil, and can thus be propagated[310]

nwatta Found in a range of environments from the warm temperate zone to the tropics. It is tolerant of at least some frost[413]. Succeeds in any fertile soil so long as it is well drained[182, 219]. Plants have a wide ranging adaptability to different levels of light, types of soil, and salt conditions[413]. Requires a sunny sheltered position[219]. A very variable plant[58]. The plant has escaped from cultivation and become naturalised in many areas[310]. It has become a serious weed of young sugarcane[305]. The vines

climb over shrubs and trees, weighing them down and impeding regeneration[413]. They also invade pastureland and are troublesome along roads and on power lines[413]. The seeds may be dispersed by birds and the plant is also spread by the transport of rooted fragments[413]. The plant can be found flowering and fruiting throughout the year in tropical and subtropical conditions; in other localities, it flowers during the rainy season, and fruits early in the dry season[310]. Individual flowers are short-lived, open early in the morning and fall off after 2 days; entire inflorescences, however, bear flowers for a long period of time[310]. Flowering Time: Mid Summer Late Summer/Early Fall. Bloom Color: Red White/Near White.

### 7.2.314 Artemisia tripartita

Threetip Sage Brush, Wyoming threetip sagebrush 6 tlin 9 cyuc 2 koak 0 tcan 1 dwat 1.8 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Artemisia tripartita is a SHRUB growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves[61]. No further details are given. Seed[46, 61, 105, 161, 257]. No further details are given, but the seed is very small and fiddly to use[K].

tcanta TinderThe bark is used as a tinder when making fires[257].

dwatta Diaphoretic VulneraryAn infusion of the roots, or a decoction of the leaves and branches, is used in the treatment of colds, sore throats, tonsillitis, headaches etc[257]. An infusion of the plant is used as a wash for wounds caused by the removal of corns[257].

nrakta North-western N. America. ksacta Dry plains and hills, often in somewhat moister or more favoured sites or at slightly higher elevations than A. tridentata to which it is akin[60].

propta Seed - surface sow from late winter to early summer in a greenhouse in a very free-draining soil, but do not allow it to dry out. The seed usually germinates in 1 - 2 weeks in a warm greenhouse[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter, planting them out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame. Very slow to root[11] Division in spring or autumn. Lavering[164].

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Succeds in most soils including those of low fertility[164]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Established plants are very drought tolerant[200]. Plants resprout freely after a fire[60, 164]. The sub-species A. tripartita rupicola is a dwarf form growing only 15cm tall, whilst A. tripartita tripartita grows to 1.8 metres[164]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 7.2.315 Cichorium spinosum

1180

6tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cichorium spinosum is a BIENNIAL/PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil.

Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Leaves - boiled[148].

nrakta Europe - Mediterranean. ksacta Seashores in Greece[148].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Succeeds in any moderately fertile well-drained soil[200]. Prefers a medium to light sandy or gravelly soil that is rich in humus[1]. Prefers a sunny position[200] but with light shade in the summer to prevent plants running to seed.

#### 7.2.316 Vaccinium arboreum

Farkleberry

6 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium arboreum is an evergreen Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Dry and slightly astringent but with a pleasant flavour[82]. Dry and insipid according to another report[183] whilst another says that it is dry, sweet and mealy[227] and yet another says that it is bitter and inedible[200]. The fruit is about 6mm in diameter[2001.

tcanta Rootstock Tannin WoodSaid to be an excellent rootstock for 'Rabbiteye' blueberries (V. ashei)[183]. Tannin is obtained from the bark and root[82, 227]. Wood - heavy, hard, very close grained. It weighs 48lb per cubic foot. Used for making tool handles and other small articles [82, 227].

dwatta Astringent DysenteryThe berries, root-bark and leaves are very astringent and have been used internally in the treatment of diarrhoea, dysentery etc[4, 82, 229]. The infusion is valuable in treating sore throats, chronic ophthalmia leucorrhoea etc[4]

nrakta South-eastern N. America - Virginia to Florida, west to Texas. ksacta Moist sandy soils by ponds and streams[82]. Usually found in most shady slightly alkaline soils along stream banks, bluffs, hammocks and in open woods[229].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants are deciduous when growing in cold climates[11]. Plants in this genus are notably resistant to honey fungus[200].

### 7.2.317 Arisaema costatum

6 tlin 9 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli dvat hionli

drutta Arisaema costatum is a PERENNIAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

koakta Édible Parts: RootÉdible Uses: Root - cooked. It is boiled, dried and then ground into a powder[2, 177]. The tuber is 3 - 5cm in diameter[266]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - Himalayas in C. and E. Nepal. ksacta Wet cool woodlands and cliffs, often forming large colonies. Shrubberies, 2000 - 2600 metres[51]. Grasslands in forest areas at elevations of 2300-2400 metres[266].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame [134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1-6 months at  $15\,^{\circ}\text{c}[134]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Prefers a cool peaty soil in the bog, woodland garden or a sheltered border in semi-shade[200]. Prefers a loamy or peaty soil[1] and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too exposed[1, 200]. Plants are nearly hardy in Britain, they normally succeed outdoors in the milder areas of the country[1]. Tubers should be planted about 15cm deep[233]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants meld protection from slugs[200]. This species has very large leaves, to 40cm long[200]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year.

#### 7.2.318 Morus australis

Korean Mulberry, Aino Mulberry 6 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 7.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Morus australis is a deciduous Tree growing to 7.5 m (24ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June, and the seeds ripen from July to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[3, 272]. Sweet and juicy[183] but insipid[1, 11]. The fruit is about 15mm in diameter[200].

tcanta FibreThe bark fibers are used for making pa-

dwatta Anthelmintic Aromatic Astringent Febrifuge Laxative PurgativeThe fruit is aromatic, cooling and laxative[240]. Its use allays thirst and it is of help in the treatment of fevers[240]. The bark is anthelmintic and purgative[240]. A paste of the bark is used in the treatment of qinqivitis[272].

finely grated root was applied externally to relieve rheumatic pains, ulcers and scrofulous tumours[244]. It was also used internally to treat melancholy, convulsions and mania[244]. When taken internally in large doses, however, it is said to excite delirium and madness[4]. The root should be used with caution, and only under the supervision of a qualified practitioner[21, 238]. See the notes above on toxicity. The leaves are harmless and cooling. They have been used for ointments and other external applications to ulcers etc[4].

nrakta South-eastern Europe. ksacta Open woodland, deserted fields and stony places[21, 89].

propta Seed - best sown in a cold frame in the autumn[188]. The seed can also be sown in spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Root cuttings in winter[200]. Division. This can be rather difficult since the plants resent root disturbance.

nwatta Prefers a deep humus-rich light soil and a sheltered position in full sun[238]. It also tolerates some shade[200]. Prefers a circumneutral soil[200] and dislikes chalk or gravel[4]. Plants are liable to rot in wet or illdraining soils[4]. Plants are hardy to about -15°c[187]. The roots are somewhat carrot-shaped and can be up to 1.2 metres long[4]. Plants are intolerant of root disturbance and should be put out into their permanent positions as soon as possible [188]. The root often divides into two and is vaguely suggestive of the human body. In the past it was frequently made into amulets which were believed to bring good fortune, cure sterility etc[244]. There is a superstition that if a person pulls up this root they will be condemned to hell[244]. Therefore in the past people have tied the roots to the bodies of animals and then used these animals in order to pull the roots out of the soil

## 7.2.486 Athyrium yokoscense

6tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc pcimhmim cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Athyrium yokoscense is a FERN growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist or wet soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: LeavesEdible Uses: Very young fronds (croziers) - boiled[177]. Some caution is advised. See the notes above on toxicity.

nrakta E. Asia - China, Japan, Korea. ksacta Woods in lowland and mountains all over Japan[58]. Thin deciduous woods and thickets[74].

propta Spores' surface sow in a pot of sterile compost in a shady part of the greenhouse and keep moist, this is most easily done by putting the pot in a plastic bag. Pot up small clumps of the plants when they are large enough to handle and keep them moist until they are established. Plant out in late spring of the following year. Division in spring as plants come into growth. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta An easily grown plant, it is calcifuge and prefers an acid soil with a pH from 4.5 to 6.5, but it tolerates alkaline soils if plenty of leaf mould is added[200]. Grows well in heavy clay soils. Prefers a moist sheltered site with moderately high atmospheric humidity[200]. Succeeds in a semishaded boq-garden or in damp woodland, also in garden bor-

ders in full or part shade[200]. This species is very variable, partly according to altitudes and habitats[275]. Plants growing on sunny rocks and in high mountains look like Athyrium rupestre and may be distinguished as var. alpicola[275]. Lowland plants with deeply tripinnatifid leaves may be called var. dilatatum[275]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 7.2.487 Swertia bimaculata

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Swertia bimaculata is a ANNUAL/BIENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[105, 177, 179].

nrakta E. Asia - China, Japan, Himalayas. ksacta Wet grassy places in lowland and mountains all over Japan[58]. Beside streams, swamp, meadows, scrub and forests at elevations of 200 - 3000 metres in China.

propta Seed - sow spring in a cold frame at 10°c or less[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta We have no details for this species but suggest growing it in a moist well-drained soil in a sunny position.

#### 7.2.488 Sedum lineare

Needle stonecrop

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sedum lineare is an evergreen Perennial growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85]. Another report says that the plant is slightly poisonous[218].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[179]. Some caution is advised[218].

dwatta PoulticeThe fresh plant is crushed and applied externally to burns and scalds[218].

nrakta E. Asia - S.E. China, C. and S. Japan. ksacta Low mountains, rocks on grassy slopes and plains[266].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are drought tolerant[200]. Succeeds on a wall[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]

least one named variety[183]. There are many named varieties selected for their ornamental value[11]. The flowers are richly scented[245]. Hybridizes freely with other members of this genus[80]. Plants in this genus are notably susceptible to honey fungus[200].

#### 7.2.370 Eleutherococcus innovans

Taka-No-Tsume

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc

htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Eleutherococcus innovans is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked. A famine food, it is only used in times of scarcity[177].

nrakta E. Asia - Japan. ksacta Common in hills and mountains all over Japan [58, 275].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame or greenhouse[200]. Sow stored seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Root cuttings in late winter in a greenhouse[200]. Division of suckers in the dormant season[200].

nwatta Prefers a humus-rich well-drained soil in full sun[200]. Tolerates poor soils and atmospheric pollution[200]. Requires shelter from cold north and east winds[200]. Plants are hardy to between -10 and -15°c[200].

#### 7.2.371 Ilex vomitoria

Yaupon Holly

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta flex vomitoria is an evergreen Shrub growing to 6 m (19ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274]. The fruit is poisonous[177].

kcakta Edible Parts: Edible Uses: Condiment TeaA mildly stimulating beverage containing caffeine is made from the dried and roasted leaves[43, 171, 183]. The tea is stimulating and intoxicating[161]. The leaves are first steeped in cold and then in boiling water[183]. They are also used to flavour ice cream and soft drinks[183].

tcanta Hedge Hedge WoodThis species is occasionally used for hedging in the southern states of America[82]. Wood - hard, heavy, strong, close grained. It weighs 46lb per cubic foot. Too small for commercial exploitation, the wood is used locally for turnery, inlay work, woodenware etc[82, 149, 227, 229].

dwatta EmeticA decoction of the leaves is emetic[4, 11, 171]. The plant was used ritually by several N. American Indian tribes. The leaves were toasted over a fire and then boiled for several hours. The resulting thick black liquid

was then drunk and this was followed by immediate vomiting[213]. This was often used a a purification rite prior to hunting[213].

nrakta South-eastern N. America - Virginia to Florida, west to Texas and Arkansas. ksacta Sandy woods and clearings[43]. Low moist woods, especially near the coast[149]. Often forming dense thickets along streams and pond margins and shallow swamp lands[229].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years[78].

mwatta Succeeds in most soils so long as they are not water-logged[200]. This species is not fully hardy in Britain, the plants are incapable of withstanding our hardest winters[11]. A slow-growing species in the wild, often forming dense thickets from root suckers[229]. The leaves remain on the plant for 2 - 3 years, falling just before the appearance of new leaves in the spring[82]. Flowers are produced on the current year's growth[229]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Dioecious. Male and female plants must be grown if seed is required.

### 7.2.372 Salix appendiculata

wis hpa7tmwatli nyanhjen hjonli

6 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 6 m hkuc htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatprikl-

drutta Salix appendiculata is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: Inner bark LeavesEdible Uses: Inner bark - raw or cooked. It can be dried, ground into a powder and then added to cereal flour for use in making bread etc. A very bitter flavour, it is a famine food that is only used when all else fails[172]. Young shoots - not very palatable[172].

tcanta Soil reclamationA pioneer plant for difficult sites[200]. It is often found in the wild as a pioneer on land-slides etc, especially on calcareous formations[11]. Dynamic accumulator.

dwatta Anodyne FebrifugeThe fresh bark of all members of this genus contains salicin[226], which probably decomposes into salicylic acid (closely related to aspirin) in the human body[213]. This is used as an anodyne and febrifuge[226].

nrakta C. Europe - Balkans. ksacta A pioneer of difficult sites. including landslides on calcareous formations[11].

propta Seed - must be surface sown as soon as it is ripe in late spring. It has a very short viability, perhaps as little as a few days. Cuttings of mature wood of the current year's growth, November to February in a sheltered outdoor bed or planted straight into their permanent position and given a good weed-suppressing mulch. Very easy, Plant into

their permanent positions in the autumn. Cuttings of halfripe wood, June to August in a frame. Very easy.

nwatta Succeeds in most soils, including wet, ill-drained or intermittently flooded soils[1, 11], but prefers a damp, heavy soil in a sunny position[200]. Hybridizes freely with other members of this genus[200]. Although the flowers are produced in catkins early in the year, they are pollinated by bees and other insects rather than by the wind[11]. Plants in this genus are notably susceptible to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 7.2.373 Mimulus moschatus

Musk Monkey Flower, Muskflower 6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Mimulus moschatus is a PERENNIAL growing to 0.3 m (1ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Young plant - boiled and used for food[257]. nrakta Western N. America - British Columbia to Montana and California. Naturalized in Britain[17]. ksacta Naturalized in wet places in England and Eastern Ireland[17].

propta Seed - sow spring in a greenhouse and only lightly cover the seed[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed it can also be sown in situ in late spring after the last expected frosts[200]. Division in spring[200]. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Cuttings of softwood, 5cm long in spring or summer[200].

watta Prefers rather moist places such as damp borders, margins of streams and boggy spots[1, 111]. Grows well in heavy clay soils. Thrives in full sun so long as the soil does not dry out[200], otherwise it is best grown in partial shade[187]. Grows well in shallow water, but it can be invasive[200]. Hardy to at least -15°c[200]. There are some named varieties, selected for their ornamental value[200]. All parts of the plant have a musky scent, though the form naturalized in Britain, and most cultivars, appear to be scentless[17, 200].

### 7.2.374 Coprosma propingua

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Coprosma propinqua is an evergreen Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from February to March, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw or cooked[173]. Sweet, but with little flavour[225]. The pale to deep violet-blue fruit is about 8mm wide[200, 225]. The roasted seed is an excellent coffee substitute[153].

tcanta Dye Hedge HedgeTolerant of pruning, it makes a good dense hedging plant[225]. A yellow dye is obtained from the wood, it does not require a mordant[153].

nrakta New Zealand. ksacta Damp places[11]. Gravelly places throughout New Zealand[225].

1202

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[K]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. An easily grown plant, it succeeds in most soils[225]. Somewhat intolerant of frost, this species is only likely to succeed outdoors in the milder areas of Britain[11, 200]. Another report says that it is fully hardy in Britain[225]. It flowers freely in Britain, fruiting heavily if pollinated[225]. A polymorphic species, it hybridizes freely with other members of this genus[200, 225]. Plants are tolerant of heavy clipping or pruning[225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

### 7.2.375 Artemisia maritima

Sea Wormwood

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Artemisia maritima is a deciduous Shrub growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure

pcista The following notes are from a report on the closely related A. absinthum, they quite possibly also apply to this species. The plant is poisonous if used in large quantities[20, 61]. Even small quantities have been known to cause nervous disorders, convulsions, insomnia etc[222]. Just the scent of the plant has been known to cause headaches and nervousness in some people[169].

kcakta Edible Parts: Edible Uses: CondimentThe leaves are occasionally used as a flavouring[183]. Some caution is advised, see the notes above on toxicity.

tcanta Repellent StrewingThe growing shoots are said to repel insects and mice[6, 18, 20], they have also been used as a strewing herb[4, 14]. An infusion is said to discourage slugs and insects[14, 18].

dwatta Anthelmintic Antiseptic Antispasmodic Carminative Cholagogue Emmenagogue Febrifuge Stimulant Stomachic Tonic VermifugeSea wormwood is not much used in herbal medicine, though it is often used domestically. Its medicinal virtues are similar to wormwood, A. absinthum, though milder in their action. It is used mainly as a tonic to the digestive system, in treating intermittent fevers and as a vermifuge[4]. The leaves and flowering shoots are anthelmintic, antiseptic, antispasmodic, carminative, cholagogue, emmenagogue, febrifuge, stimulant, stomachic, tonic and vermifuge[4, 145]. The plant is harvested as it comes into flower and is dried for later use[4]. The unexpanded floral heads contain the vermicide 'santonin'[218].

nrakta Much of Europe, including Britain, east to central Asia. ksacta Drier parts of salt marshes[17] in sand and shingle[190].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame. Division in spring or autumn[200].

nwatta Succeeds in any soil but prefers a poor dry soil with a warm aspect[37]. Easily grown in a well-drained cir-

### 7.2.483 Sedum rupestre

Crooked Yellow Stonecrop 6 tlin 9 cyuc 1 kcak 2 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum rupestre is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset 62.851.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[4, 52, 115, 183]. A slightly astringent sour taste makes this plant a useful addition to a green tossed salad and it can also be added to soups or used as a vegetable[9, 183]. Used in salads. it has a fine relish[2].

tcanta Agroforestry Uses: A good ground cover plant for a sunny position[188]. The somewhat open growth habit makes it suitable for growing with larger bulbs such as some lilies[K]. Place starter plants 20 - 30cm apart in order to obtain rapid massing as a ground cover[352]. The plant is used on 'green roof' and 'green wall' systems in Korea. These systems are incorporated into the structure of the building, providing habitats for wildlife as well as insulating the building and helping to improve the environment. The cultivar 'Blue Spruce' has been specifically mentioned [1240]. 1241]

nrakta C. W. and S. Europe. Naturalized in Britain[17]. ksacta Walls, shingle and warm grassy places on sandy soils[4, 9]. Avoids acid soils.

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil[200]. Requires a sunny position[188, 200]. The plant flowers best when grown in a sunny position, though it also succeeds in semi-shade[219]. Established plants are very drought tolerant[200], they grow well in dry soils and can also be grown in a crevice on a wall[200, 219]. This species is hardy to about -15°c[200]. A mat forming plant, it spreads rapidly and it is not suitable for the rockery[83]. All members of this genus are said to have edible leaves, though those species, such as this one, that have vellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

### 7.2.484 Geranium viscosissimum

Sticky Geranium, Sticky purple geranium 6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geranium viscosissimum is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - added to salads or used as a garnish[172, 183]. Leaves - raw or cooked. Not choice[172].

dwatta Astringent Salve StypticThe whole plant is astringent, salve and styptic[176]. An infusion of the leaves, plus a sweat bath with the leaves, is used as a treatment for colds[257]. It is used as a gargle in the treatment of sore throats[176]. An infusion of the leaves or the roots is used as a wash for sore eyes[257]. A poultice of the leaves or roots has been applied to cuts, sores etc[257].

nrakta Western N. America - British Columbia to N. California, east to Alberta.. ksacta Open woods and meadows[187]. Plentiful in medium-dry to moist or even wet soils of open woods, roadsides, creek banks and meadows to an altitude of 2,700 metres[212].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any good soil in sun or partial shade[187]. Plants are hardy to about -25°c[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. This species is closely related to G. nervo-sum[200].

## 7.2.485 Mandragora officinarum

Mandrake

1239

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.1 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Mandragora officinarum is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf from March to July, in flower from March to April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista All parts of the plant are poisonous[19, 21]. Only slightly so according to one report[89]. Not recommended as a herbal medicine [301]. Toxicity signs include: skin reddening, dry mouth, tachycardia, arrhythmias, pupil dilation [301]

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A delicacy[89]. The fruit is about the size of a small apple, with a strong apple-like scent[4]. Caution is advised in the use of this fruit, it is quite possibly poisonous[X].

dwatta Cathartic Emetic Hallucinogenic NarcoticMandrake has a long history of medicinal use, though superstion has played a large part in the uses it has been applied to. It is rarely prescribed in modern herbalism[238], though it contains hyoscine which is the standard pre-operative medication given to soothe patients and reduce bronchial secretions[244]. It is also used to treat travel sickness[244]. The fresh or dried root contains highly poisonous alkaloids and is cathartic, strongly emetic, hallucinogenic and narcotic[4, 21, 46, 192, 244]. In sufficient quantities it induces a state of oblivion and was used as an anaesthetic for operations in early surgery[238]. It was much used in the past for its anodyne and soporific properties[4]. In the past, juice from the

drutta Inula britannica chinensis is a PERENNIAL growing to  $0.6\,\mathrm{m}$  (2ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[179]. An emergency food, it is only used when better foods are not available[177].

dwatta Alterative Carminative Cholagogue Deobstruent Expectorant Laxative Nervine Stomachic Tonic VulneraryXuan Fu Hua is used in Chinese herbalism as a mildly warming expectorant remedy and it is especially suitable where phlegm has accumulated in the chest[254]. It has been used as an adulterant of arnica (Arnica montana)[4]. The flowers are more commonly used, but the leaves are also used, generally for less serious conditions[254]. The leaf is discutient and vulnerary[218]. The flowers are alterative, antibacterial, carminative, cholagogue, deobstruent, depurative, diuretic, expectorant, laxative, nervine, stomachic, tonic and vulnerary[147, 176, 178, 218, 279]. They are used internally in the treatment of bronchial complaints with profuse phlegm, nausea and vomiting, hiccups and flatulence[176, 238]. The flowers have an antibacterial action, but this can be destroyed by proteins in the body[176]. The plant is harvested when in flower and can be dried for later use[254]. The root is discutient, resolvent and vulnerary[218]. The plant has been mentioned as a possible treatment for cancer of the oesophagus[218].

nrakta E. Asia - China and Japan. ksacta Wet places in lowlands, especially by rivers, all over Japan[58].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying a sowing in situ in the spring or the autumn. Division in spring or autumn[111].

nwatta Succeeds in a sunny position in any moderately fertile well-drained soil[200]. Grows well in heavy clay soils. Plants are hardy to at least -15°c[238]. This sub-species is the form that is most used medicinally, it is cultivated as a medicinal plant in China[178].

### 7.2.480 Coprosma pumila

 $6\ tlin\ 9\ cyuc\ 1\ kcak\ 0\ tcan\ 0\ dwat\ 0.1\ m\ hkuc$ hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Coprosma pumila is an evergreen Shrub growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw or cooked. Sweet, but with little flavour[225]. The orangered fleshy fruit is about 7mm in diameter, though forms with fruits up to 13mm have been seen[225]. The roasted seed is an excellent coffee substitute[153].

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153].

nrakta Australia, New Zealand. ksacta Higher montane to sub-alpine grassland, North, South and Stewart Islands[44]

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[KI]. Sow stored seed in spring in a cold frame[Z0]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Prefers a are drought tolerant[190].

permanent moist and peaty soil, but it is not an easy plant to grow in Britain[225]. Somewhat intolerant of frost, this species is only likely to succeed outdoors in the milder areas of Britain[200]. Another report says that it is fully hardy in Britain[225]. Closely related to C. atropurpurea and often confused with that species[225]. It is a very variable plant, hybridizing freely with other members of this genus[200, 225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required. There is some confusion over the correct name of this species, it could be a part of C. petriei[200].

### 7.2.481 Carthamus lanatus

Distaff Thistle

6 tlin 10 cyuc 1 kcak 1 tcan 1 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Carthamus lanatus is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta An edible oil is obtained from the seed[105, 183].

tcanta An oil is obtained from the seed[240], though the report gives no more details[K].

dwatta The plant is anthelmintic, diaphoretic and febrifuge [240].

nrakta S. Europe. A casual in Britain[17]. ksacta Amongst rocks, in dry hills and uncultivated ground[89].

propta Seed - sow spring in gentle heat in a greenhouse. Germination usually takes place within 2- 4 weeks at  $15^{\circ}c[138]$ . When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in late spring or early summer. The seed can also be sown in situ in April/May[138] but plants may not then mature their seed.

nwatta Succeeds in ordinary garden soil[1]. Requires a position in full sun[138]. This species is a potentially serious pest plant in N. America[274].

### 7.2.482 Echinops spinosissimus

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.8 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Echinops spinosissimus is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: GumYields a gum that is used for chewing [46, 61, 177].

nrakta Europe - Mediterranean. ksacta Fields and rocky blaces[89].

propta Seed - sow early spring in a cold frame[111]. The seed usually germinates in 3 - 9 weeks at 25°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seedbed in mid spring and is then planted out into its permanent position in late summer or the autumn[111]. Division in autumn[111]. Root cuttings in the winter[200].

nwatta Succeeds in a sunny position in any well drained soil of low or medium fertility[175, 200]. Established plants are drought tolerant[190].

cumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Tolerates a pH in the range 6.0 to 7.6. Dislikes shade. Established plants are very drought tolerant[190, 200]. Tolerates maritime exposure[190]. The whole plant has a sweet aromatic smell[245]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 7.2.376 Chimaphila maculata

Spotted Wintergreen, Striped prince's pine, Pipsissewa 6 tlin 7 cyuc 1 kcak 2 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Chimaphila maculata is an evergreen Shrub growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaThe leaves are used as a snack, being nibbled for their refreshing qualities[183, 257]. In Mexico the herb is used as a catalyst in the preparation of 'tesguino', an alcoholic beverage produced from sprouted maize[183].

to tanta The plants stoloniferous root system, and dwarf spreading habit make it a god ground cover, though it is a difficult plant to establish and grow well[245].

dwatta Analgesic Antibacterial Antiscrophulatic Astringent Cancer Diaphoretic Diuretic Febrifuge Rubefacient Skin Stimulant Tonic UrinaryThe plant is analgesic, antibacterial, astringent, diaphoretic, diuretic, febrifuge, rubefacient, stimulant and tonic[4, 207, 222, 257]. The plant has an antiseptic influence on the urinary system and is sometimes used in the treatment of cystitis[4]. An infusion of the plant has been drunk in the treatment of rheumatism and colds[257]. Apoultice of the root has been used to treat pain[257] whilst the plant has also been used as a wash on ulcers, scrofula and cancers[257]. All parts of the plant can be used, though only the leaves are officinal[4]. The plant is loaded with the biologically active compounds arbutin, sitosterol and ursolic acid[222]. Arbutin hydrolyzes to the toxic urinary antiseptic hydroquinone[222].

nrakta Eastern N. America - Illinois to Michigan and Ontario, south to Texas and Georgia. ksacta Rich woods[222]. Dry woods[235].

propta Seed - very difficult to germinate, see the notes in cultivation details. It is best sown on moist sphagnum peat. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Rather difficult because the plant is very sensitive to root disturbance. It is best attempted in the spring as the plant comes into growth[200]. Cuttings of softwood, June in a frame. Use some soil from around an established plant[14].

nwatta Landscape Uses:Ground cover, Woodland garden. Requires a light moist but well-drained lime-free soil and shade from direct sunlight[1]. This species is difficult to propagate and grow in cultivation, mainly because it has certain mycorrhizal associations in the wild and these are necessary if the plant is to thrive [200]. It is best to use some soil collected from around an established plant when sowing seed or planting out into a new position[200]. The plant has wide-spreading fibrous feeding roots and will often die or fail to increase in size if these are disturbed. The flowers are deliciously scented[245]. Special Features: North American native. The plant is heat tolerant in zones 8 through 5. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no

heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 7.2.377 Gunnera magellanica

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Gunnera magellanica is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: One report says that the fruit might be edible[177]. The fruit is about 5mm in diameter[200].

tcanta A carpeting plant that roots as it spreads, it is suitable for ground cover when spaced about 45cm apart each way[208].

nrakta S. America - S.W. Argentina, S. Chile and the Falkland Islands. ksacta Damp grassy places[187]. Moist sheltered places from sea-level to 1000 metres[69].

propta Seed - best sown as soon as it is ripe in the autumn in a sandy mix in a cold frame[200]. The seed can also be sown in the spring[188]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division as new growth commences in the spring[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Requires a damp humus rich soil in a sunny position or semi-shade[1, 200]. Prefers a cool moist position[208]. Plants are hardy to at least -10°c[187]. The plant has a creeping root and spreads to form extensive patches[187]. The top part of the inflorescence is male, the bottom is female and the middle is hermaphrodite acording to one report whilst another says that the flowers are unisexual without saying if the two sexes are on the same plant[200]. Male and female flowers are on separate plants[188]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 7.2.378 Hibiscus moscheutos

Swamp Rose Mallow, Crimsoneyed rosemallow, Wild Cotton, Common Rosemallow, Eastern Rosemallow, Swamp 6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Hibiscus moscheutos is a PERENNIAL growing to 2.5 m (8ft) by 2 m (6ft) la ta medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Although there are no reports of edibility for this species, most of the plants in this family have edible leaves and flowers [K]. The flowers are about 15cm in diameter [233],

though in some cultivars they are up to 25cm in diameter[260]. They have a mild flavour and somewhat mucilaginous texture with a slight bitterness in the aftertaste[K]. The leaves are rather bland and are also mucilaginous, but have a slight hairiness to them which detracts a little from the pleasure of eating them[K].

dwatta Demulcent Dysentery Emollient UrinaryThe leaves and roots abound in mucilage[222]. Like many other plants in this family, they are demulcent and emollient and are used in the treatment of dysentery, lung ailments and urinary ailments[222]. an infusion of the dried stalks has been used in the treatment of inflammation of the bladder[257].

nrakta Southern N. America - Massachusetts to Michigan, south to Alabama, Georgia and Florida, ksacta Saline marshes and the shores of lakes[260].

propta Seed - sow early spring in a greenhouse. Germination is usually rapid. Prick out the seedlings when they are large enough to handle and plant them out into their permanent positions in early summer. Some reports say that the seed can be sown in situ outside and that it gives a good rate of germination[78, 80, 113].

nwatta Landscape Uses:Border, Container, Foundation, Specimen. Prefers a well-drained humus rich fertile soil in a sheltered position in full sun[200]. Well-suited to a waterside planting[200]. One report says that the plants are hardy in zone 5 (tolerating winter temperatures down to about -25°c), this same report also says that the plant succeeds outdoors in Britain only in those areas where winter temperatures do not fall below about -5°c[200]. Another report says that it needs to be grown in a warm garden in the warmer areas of Britain[233]. Plants of the cultivar 'Southern Belle' have been seen growing outdoors at Kew Gardens, they are situated on a south-east facing wall of the Temperate House and have been there for at least 3 years as of 2000[K]. A very ornamental plant[1], there are many named varieties[200]. Special Features: North American native, Wetlands plant, Attracts butterflies

### 7.2.379 Clematis apiifolia

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Clematis apiifolia is a deciduous Climber growing to 5 m (16ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, some if not all members of this genus are mildly poisonous. The toxic principle is dissipated by heat or by drying[65].

kcakta Edible Parts: LeavesEdible Uses: TeaYoung shoots - cooked and used as a vegetable[105, 177, 183]. Caution is advised, see the notes above on toxicity. The dried leaves are a tea substitute[105, 177]. The roasted leaves are used according to another report[183].

dwatta Carminative Digestive DysenteryAn infusion of the stems is used in the treatment of colic, dysentery, dyspepsia and sweating[218]. The plant is carminative and digestive[218]. It is also used in the treatment of dysentery[218].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets in lowland and foothills, C. and S. Japan[58]. Forests, grassy slopes and along the sides of streams at elevations of 100 - 2300 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame [164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible [164]. A period of cold stratification is beneficial [164]. The seed germinates in 1-9 months or more at  $20^{\circ}{\rm c}[164].$  Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for the first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade and its shoots growing up to the light[164]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[11]. Succeeds in acid as well as alkaline soils[200]. A twining plant[182], it is fast-growing and is possibly best in the wild garden[202]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object it is touching[212]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. Plants in this genus are notably resistant to honey fungus[200]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes [54].

## 7.2.380 Pyracantha crenato

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Pyracantha crenato-serrata is an evergreen Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to July, and the seeds ripen from September to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit[177]. A famine food, it is only used when all else fails[177]. The fruit is about 5mm in diameter[266].

dwatta Febrifuge PoulticeA decoction of the leaves and/or the fruit is used in the treatment of fevers[147, 218]. The fresh leaves are crushed and applied externally to boils and abscesses[147, 218].

nrakta E. Asia - N. China. ksacta Hillsides, roadsides and waste places[147]. Thickets, streamsides and roadsides at elevations of 500 - 2800 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Remove all the fruit flesh since this can inhibit germination[200]. Stored seed requires 3 months cold stratification, sow it as early in the year as possible in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of almost mature wood, 5 - 10cm with a heel, mid-August in a cold frame[78]. Pot up in October or the following spring[78].

nwatta Prefers a good well-drained, moisture retentive loamy soil[1, 200]. Succeeds in any soil that is warm and not very heavy[11]. Another report says that it grows well in heavy clay soils. Succeeds in sun or part shade, though it does not fruit so well in a shady position[200]. Tolerates atmospheric pollution and reasonable exposure[200]. Susceptible to scab and fireblight[11], especially when grown on acid sandy soils[182]. Intolerant of root disturbance except

pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves raw[257].

tcanta Dye Hair ParasiticideYellow and green dyes are obtained from the flowering heads and pods[168]. Aromatic. A decoction of the roots has been used as a hair shampoo to kill lice[257].

dwatta Antispasmodic Blood purifier Demulcent Expectorant Parasiticide Sedative StomachicThe leaves and flowering tops are antiphlogistic, antispasmodic, balsamic, demulcent, expectorant, sedative, stomachic and a vascular tonic[4, 7, 21, 46, 61, 207, 213]. Blood purifier[4]. The plant is applied externally as a compress on inflamed or irritated areas of the skin[7, 257]. Used internally, it slows down the heartbeat and reduces the stimulation of the nerve endings in the air passages that causes coughing -it is therefore extremely effective as a calming agent in the treatment of asthma[7]. The fluid extract is prepared by placing the freshly gathered leaves and flowers in a small quantity of simmering water for about 15 minutes[213]. The plant is used to treat people affected by poison-ivy[213].

nrakta South-western N. America. ksacta By the coast[21] in sunny well-drained situations[200]. Thrives in dry areas and salty plains[7].

propta Seed - sow autumn or spring in a cool greenhouse and only just cover the seed. Prick out the plants into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer.

nwatta Succeeds in any well-drained soil in full sun[200]. Does well on dry sandy banks and in poor soils[200]. Plants tend to concentrate selenium in the leaves and stems, this is especially noticeable on soils that are relatively rich in that element[21]. Some authorities class this species as a synonym of G. camporum.

### 7.2.477 Eschscholzia californica

Californian Poppy

6 tlin 11 cyuc 1 kcak 2 tcan 3 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eschscholzia californica is a PERENNIAL growing to 0.3 m (1ft) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista No records of toxicity have been seen but this species belongs to a family that contains many poisonous plants. Some caution is therefore advised.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[46, 61, 161]. This plant is in a family that contains many poisonous plants so some caution is advised in using it.

tcanta Perennial groundcover for zone 2 firebreaks. The US government has created a system of firebreaks for areas prone to wildfires, theses are separated into concentric zones surrounding buildings. Zone 2 is the second away from the house. These low-level groundcovers provide little fuel.

dwatta Anodyne Antianxiety Antidepressant Antispasmodic Diaphoretic Diuretic Galactofuge OdontalgicThe Californian poppy is a bitter sedative herb that acts as a diuretic, relieves pain, relaxes spasms and promotes perspiration[238]. The whole plant is harvested when in flower and dried for use in tinctures and infusions[238]. It is taken internally in the treatment of nervous tension, anxiety, insomnia and incontinence (especially in children)[238]. The watery sap is mildly narcotic and has been used to relieve toothache[238]. It is similar in its effect to the opium poppy (Papaver somniferum) but is much milder in its action and does not depress the central nervous system[238]. Another

report says that it has a markedly different effect upon the central nervous system, that it is not a narcotic but tends to normalize psychological function[254]. Its gently antispasmodic, sedative and analgesic actions make it a valuable herbal medicine for treating physical and psychological problems in children[254]. It may also prove beneficial in attempts to overcome bedwetting, difficulty in sleeping and nervous tension and anxiety[254]. An extract of the root is used as a wash on the breasts to suppress the flow of milk in lactating females[207, 257].

nrakta Western N. America - Washington to California and Nevada. A frequent garden escape in Britain. ksacta Grassy open places to 2000 metres in California[71].

propta Seed - sow in mid spring or late summer to early autumn in a sunny border outdoors and only just cover the seed[200]. Autumn sown plants may require protection from frosts in cold winters[200]. The seed usually germinates in 2-3 weeks.

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden. Prefers a poor sandy soil and a sunny position[108, 200] but is easily grown in an ordinary garden soil[1]. Succeeds in a hot dry position. Plants grow well in maritime climates[200]. A very ornamental plant, it is commonly grown in the flower garden and there are many named varieties[200]. This plant is the state flower of California[207]. Although a perennial it is usually quite shortlived and is more often grown as an annual in this country[187, 238]. It can tolerate temperatures down to about -10°c, however, and often survives mild winters[187]. If the dead flowers are removed before they set seed the plant will continue flowering for a longer period[188]. A polymorphic species[71]. Plants resent root disturbance and should be sown in situ[200]. The flowers are very attractive to bees[108]. They close during wet or overcast weather[238]. Plants often self-sow if the soil is disturbed by some means such as hoeing[200]. Special Features: Attractive foliage. North American native, Naturalizing, Suitable for cut flowers, Extended bloom season in Zones 9A and above. Heat Zone: 9-2

### 7.2.478 Micromeria iuliana

Savo

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Micromeria juliana is a deciduous Shrub growing to  $0.3 \,\mathrm{m}$  (1ft) by  $0.3 \,\mathrm{m}$  (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentLeaves are used as a food flavouring[183], a substitute for savory (Satureia spn.).

dwatta Diuretic KidneyUsed in the treatment of kidney and bladder ailments[148].

nrakta Europe - Mediterranean. ksacta Rocky places and other dry open habitats[45, 50].

propta Seed - sow spring in a greenhouse[188]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood with a heel, July/August in a frame[188].

nwatta Prefers an open position in a well-drained soil[1]. Succeeds in poor soils[200]. Requires a sunny position[188].

### 7.2.479 Inula britannica chinensis

Xuan Fu Hua

6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

best planted about 45cm apart each way[208]. Strong growing bulbs such as some lilies will grow happily through this ground cover[K]. The plant can grow in very low moisture levels and has been used as a green covering on roofs[372]. Green roofs are incorporated into the structure of the building, providing habitats for wildlife as well as insulating the building and helping to improve the environment. The subspecies minima and the cultivars 'Athorum' and 'Coral Carpet' have been specifically mentioned in this respect.

dwatta Antiinflammatory PoulticeThe leaves and stems are applied externally as a poultice to inflammations and are especially recommended for treating painful haemorrhoids[4, 244].

nrakta Europe. Long naturalized in Britain. ksacta Rocks, walls, cobbled paths etc, in dry sunny situations on acid or calcareous soils[4, 17].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Alpine garden, Border, Container, Ground cover, Rock garden, Specimen. A very easily grown plant, it succeeds in most soils[188] but prefers a fertile well-drained soil[200]. Established plants are drought tolerant[190, 200], they grow well in dry soils and succeed on a wall[190]. Requires a sunny position[188]. Plants spread rapidly and aggressively at the roots[190]. If clearing the plant from an area it is quite important to try and remove every part of the plant since even a leaf or a small part of the stem, if left on the ground, can form roots and develop into a new plant[200]. This species has white flowers. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]. Special Features: Attractive foliage, Not North American native, Invasive. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-

### 7.2.474 Paeonia japonica

Yama-Shakuyaku

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

wis hpa7tmwatli fyifxre7t hjonli

drutta Paeonía japonica is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Flowers[177]. No further details are given. Young leaves - cooked[177]. Root - chewed[177].

dwatta Analgesic Antibacterial Antiinflammatory Antispasmodic Diuretic Febrifuge SedativeThe root is analgesic, antibacterial, anti-inflammatory, antispasmodic, diuretic, febrifuge and sedative[174]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - Japan. ksacta Thickets and open deciduous woods in mountains, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250]. nwatta Requires a deep rich soil, preferably neutral or

slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Closely related to P. obovata, this species is not easily cultivated in Britain and tends to be a poor doer here[200]. Plants offered under this name in British nurseries are often P. suffruticosa 'Japanese' [200]. Some botanists now treat this plant as no more than a form of P. lactiflora[250]. A very long-lived plant, specimens can survive in the garden for at least 50 years[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually selffertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 -5 years to flower from seed[200]. They generally breed true from seed[1].

#### 7.2.475 Navarretia squarrosa

Skunk Weed, Skunkbush

6 tlin 9 cyuc 1 kcak 2 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-

priklwis hpa7tmwatli xre7t hjonli

drutta Navarretia squarrosa is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - parched, ground into a powder and eaten dry[94]. It is very small and fiddly to use[K].

tcanta Dynamic accumulator.

nrakta Western N. America. ksacta Dry flats and fields in mixed woods below 800 metres in California[71].

propta Seed - sow early spring in situ[200].

nwatta Requires a very sunny position in a very well-drained dry to moist light or medium fertile soil[200].

#### 7.2.476 Grindelia robusta

Great Valley Gumweed

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Grindelia robusta is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is

when young[11]. A good bee plant[108]. Birds are particularly attracted to the fruit of this plant[182]. Closely related to P. atalantioides and P. rogersiana[11, 200].

### 7.2.381 Weigela hortensis

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Weigela hortensis is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves - cooked[105, 177]. A famine food, they are only used when all else fails. A tea is made from the leaves[177].

nrakta E. Asia - C. and N. Japan. ksacta Common on sunny hills and mountains at elevations of 20 - 1800 metres[275].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame as soon as it is ripe if this is possible, otherwise in late winter or early spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Softwood basal cuttings, 10 - 12cm long, in a sandy soil in a cold frame in early summer[200]. Cuttings of half-ripe wood, 8 - 10 cm with a heel, July/August in a frame[200]. Cuttings of mature wood of the current seasons growth. 20 cm long, November in a sheltered outdoor nursery bed[200].

nwatta An easily grown plant, succeeding in most fertile soils[11, 200]. Prefers a moist well-drained soil in sun or partial shade[200]. Tolerates atmospheric pollution[200]. Plants are very floriferous and can exhaust themselves, literally flowering themselves to death. The flowers are borne in the leaf nodes of the previous years growth and any pruning is therefore best done as soon as the plant has finished flowering[182]. The flowers have a soft sweet perfume[245]. Closely related to W. japonica[11]. Plants in this genus are notably resistant to honey fungus[200].

#### 7.2.382 Ilex crenata

Japanese Holly, Box Leaved Holly 6 tlin 8 cyuc 1 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ilex crenata is an evergreen Shrub growing to 5 m (16ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 177]. No further details are given, but some caution is advised[K].The fruit is about 5mm in diameter[200].

tcanta Hedge HedgeVery amenable to trimming, this species is often grown as a hedge in N. America and Japan. It can also be used in topiary[182].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets, woods and wet places in lowland and mountains all over Japan[58].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Landscape Uses:Border, Espalier, Foundation, Hedge, Massing, Seashore, Superior hedge. Succeeds in most soils so long as they are not water-logged[200]. Prefers a moist loamy soil[1]. Fairly slow growing. Plants are hardy to about -20°c[184]. A number of named varieties have been selected for their ornamental value[182]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Any transplanting is best done in May or, preferably, in September. Dioecious. Male and female plants must be grown if fruit and seed is required. Special Features:Not North American native, Inconspicuous flowers or blooms.

### 7.2.383 Buxus sempervirens

Box, Common box, American Boxwood 6 tlin 8 cyuc 1 kcak 0 tcan 2 dwat 5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Buxus sempervirens is an evergreen Shrub growing to 5 m (16ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in leaf all year, in flower from April to May, and the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees, flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista All parts of the plant are poisonous, especially the leaves and bark[200].

kcakta Edible Parts: Edible Uses: CondimentThe leaves have been used in France as a substitute for hops (Humulus lupulus) in making beer[7]. They cannot be very wholesome, and would probably prove to be injurious[2].

tcanta Dye Hedge Hedge WoodBox makes an excellent hedge from 45cm to 4.5 metres tall according to the variety grown[11, 29]. It is quite slow growing but very tolerant of cutting and is often used in topiary, where the hedge is trimmed into different forms for ornamental effect[182]. The leaves and sawdust, boiled in lye, have been used to dye hair an auburn colour[4]. Wood - hard, close grained, heavy. Although the wood is rather small, it is highly valued on account of its hardness - it is twice as hard as oak (Quercus species][4, 268]. It is used for engraving, printing blocks, bowls, combs etc[4, 7, 11, 46, 100, 115, 178]. The root especially is much liked by turners and cabinet makers[7].

dwatta Alterative Antiperiodic Antirheumatic Cathartic Cholagogue Diaphoretic Epilepsy Febrifuge Homeopathy Leprosy Malaria Narcotic Odontalgic Oxytoxic Sedative Tonic VermifugeAlthough it has been used medicinally in the past as a sedative and to treat syphilis, box is very rarely used in modern herbalism[268]. The leaves and the bark are alterative, antirheumatic, cathartic, cholagogue, diaphoretic, febrifuge, oxytocic and vermifuge[4, 7, 9, 21, 178]. The leaves have been used as a quinine substitute in the treatment of malaria[7]. The leaves are harvested in the spring,

before the plant comes into flower, and they are dried for later use[238]. The bark can be harvested at any time of the year and is dried for use in decoctions[238]. Use this remedy with caution and preferably only under the supervision of a qualified practitioner. The plant has not been fully tested for its toxic side effects[7, 21]. The wood is diaphoretic, in full dose it is narcotic and sedative, in overdose it is convulsant and emetico-cathartic[4]. A tincture of the wood has been used as a bitter tonic and antiperiodic, it has also had a reputation for curing leprosy[4]. A volatile oil distilled from the wood has been prescribed in cases of epilepsy[4]. An essential oil obtained from the plant is used in dentistry[7]. A homeopathic remedy is made from the plant[7]. It is extensively used in the treatment of rheumatism[7].

nrakta Europe, including Britain, south and east from France and Germany to N. Africa and Albania. ksacta Beechwood and scrub, usually on chalk and limestone[17].

propta Seed - stratification is not necessary but can lead to more regular germination[113]. The seed is best sown in a cold frame as soon as it is ripe[138]. Sow stored seed as early in the year as possible in a cold frame. It usually germinates in 1 - 3 months at 15°c but stored seed can take longer[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of short side shoots with a heel, September in a frame[200]. High percentage[78]. Rather slow to root[K]. Nodal cuttings in spring in a frame. Fairly easy[200].

nwatta Landscape Uses: Container, Foundation, Screen, Woodland garden. Succeeds in almost any soil that is welldrained[11, 200], preferring light shade and chalky soils[9, 11. 28. 31]. Succeeds in dry shade[188]. Tolerates a pH range from 5.5 to 7.4[200]. A very hardy plant, tolerating temperatures down to at least -23°c, though it prefers milder winters[238]. A very polymorphic species, it is a very ornamental but slow growing plant[11] and there are many named varieties developed for their ornamental value[182] This species is notably resistant to honey fungus[88, 200]. A good bee plant[108]. Plants are very tolerant of being trimmed, they can be cut right back to the base if required and will usually resprout freely[11, 29]. The foliage is pungently scented, especially when wet[245]. Special Features: Attractive foliage, Not North American native, All or parts of this plant are poisonous. Inconspicuous flowers or blooms.

### 7.2.384 Tamarix anglica

English Tree

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hionli

drutta Tamarix anglica is a deciduous Shrub growing to 5 m (16ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy clay soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: MannaEdible Uses: A manna is produced by the plants in response to insect damage to the stems[2, 105]. It is sweet and mucilaginous[105].

tcanta Fuel Hedge Hedge Soil stabilization WoodVery tolerant of maritime exposure, it makes a good shelter hedge in coastal gardens[7, 11, 49, 75]. Dislikes being trimmed[75]. The extensive root system of this plant makes it suitable for use in erosion control in sandy soils[149]. Wood fairly hard, not strong, close grained, takes a high polish. Used for general construction, poles, turnery[61, 149]. It makes a good fuel, burning well even when green due to the wax content of the wood[74].

dwatta Astringent DiureticAstringent, diuretic[7]. nrakta Western Europe in Britain, W. France, N.W. Spain and Portugal. ksacta Damp ground near the coast.

propta Seed - sow spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the

greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy[200]. Cuttings of mature wood of the current seasons growth, 15 - 25cm long, planted outdoors in late autumn in a nursery bed or straight into their permanent position. High percentage[11, 200].

nwatta An easily grown plant, succeeding in most soils and tolerant of saline conditions[11]. Grows well in heavy clay soils as well as in sands and even shingle[182]. Usually found near the coast, it succeeds inland if given a fairly good deep loam and a sunny position[11, 200]. Tolerant of maritime winds and dry soils when grown near the coast[11], plants require a moister soil and shelter from cold drying winds when they are grown inland in non-saline soils because they use the soil salts that are found in saline soils to help them reduce transpiration[200]. Growth can be restricted by cutting back the plants in spring, hedges are also best trimmed at this time[188]. This species is very closely related to T. gallica and is considered to be no more than a part of that species by many botanists[11, 200]. Plants in this genus are notably resistant to honey fungus[200].

#### 7.2.385 Cornus australis

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cornus australis is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, the following report refers to the closely related C. sanguinea. Contrary to some reports, the fruit is not poisonous, but the leaves can cause skin irritations to sensitive people[65].

kcakta Edible Parts: Fruit Oil OilEdible Uses: Oil OilThis species has the same uses as the closely related C. sanguinea[74]. These uses are listed below. Fruit - raw or cooked[105]. A bitter flavour, it can also have an emetic effect on the body[1, 7, 11]. It is not worthwhile[115]. The fruit is about 5mm in diameter[200]. An oil is obtained from the seed[2], it is edible when refined[75].

tcanta Basketry Charcoal Dye Fuel Hedge Hedge Oil Oil WoodThis species has the same uses as the closely related C. sanguinea[74]. These uses are listed below:- The seed contains 45% of a non-drying oil[74], it is used in soap making and lighting[7, 13, 100, 115, 177]. A non-drying oil is also obtained from the pericarp, it is used for lighting[74]. The pericarp contains 19 - 35% oil[74]. A greenish-blue dye is obtained from the fruit[13, 74]. The young stems are very flexible and are used in basketry[7, 13, 74, 100]. Woodtough, hard. Used for small items such as tool handles, turnery etc[11, 61, 115]. A good quality charcoal is obtained from the wood[115], the wood also makes an excellent fuel[115].

nrakta S.E. Europe to W. Asia. ksacta Limestone slopes in woodland in Turkey[93].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

female, but both sexes can be found on the same plant) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Poisonous[65, 76]. Most members of this genus are toxic to grazing animals and are usually avoided by them[222]. The seed also contains toxins[222].

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and young plants - cooked[2, 105, 177]. They must be thoroughly boiled and then washed[179]. Caution is advised, the plant is probably poisonous[218]. Seed - raw or cooked[212]. It can be used as a pinole[257]. The seed can be ground into a powder and mixed with flour for making bread, cakes etc[105, 257]. The seed contains about 36.7% protein, 38.6% fat, 5.2% ash[179]. It also contains a glycoside[179] and is probably poisonous.

tcanta Dye Essential Repellent TanninThe dried leaves are a source of tannin[145]. A yellow dye is obtained from the leaves[178]. The seed powder has been used as a blue body paint[257]. The dried plant repels weevils from stored wheat grain[178]. The seed contains an essential oil[272].

dwatta Anodyne Antibacterial Antifungal Antiperiodic Antirheumatic Antispasmodic Antitussive Appetizer Cytotoxic Diaphoretic Diuretic Emollient Febrifuge Hypoglycaemic Laxative Leprosy Malaria Sedative StomachicThe leaves and root are anodyne, antirheumatic, appetizer, diaphoretic, diuretic, emollient, laxative and sedative[61, 147, 178, 222]. The plant is considered to be useful in treating long-standing cases of malaria[240] and is used as an adulterant for Datura stramonium[61]. An infusion of the plant has been used in the treatment of rheumatism, diseased kidneys and tuberculosis[257]. It has also been used as a liniment on the armpits to reduce perspiration[257]. The fruits contain a number of medically active compounds including glycosides and phytosterols[279]. They are anodyne, antibacterial, antifungal, antimalarial, antirheumatic, antispasmodic, antitussive, cytotxic, hypoglycaemic and stomachic[238, 279]. They are used internally in the treatment of allergic rhinitis, sinusitis, catarrh, rheumatism, rheumatoid arthritis, constipation, diarrhoea, lumbago, leprosy and pruritis[238, 257]. They are also used externally to treat pruritis[238]. The fruits are harvested when ripe and dried for later use[238]. The root is a bitter tonic and febrifuge[240]. It has historically been used in the treatment of scrofulous tumours[222]. A decoction of the root has been used in the treatment of high fevers and to help a woman expel the afterbirth[257]. A decoction of the seeds has been used in the treatment of bladder complaints[257]. A poultice of the powdered seed has been applied as a salve on open sores[257].

nrakta A cosmopolitan plant, a locally established casual in Britain[17]. ksacta River banks, lake shores, cultivated ground and pastures[50].

propta Seed - sow spring or autumn in situ[238]. The seed requires plenty of moisture in order to germinate.

nwatta Requires a sunny position, succeeding in most soils. Prefers a poor dry soil[238]. Hardy to about - 15°c[238]. Plants often self sow and in some parts of the world have become noxious weeds[238].

### 7.2.472 Polypodium glycyrrhiza

Licorice Fern

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Polypodium glycyrrhiza is a FERN growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. The seeds ripen from November to March. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large

quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: RootEdible Uses: Root - raw or cooked[257] The root is sweetly liquorice-flavoured but is thin and fibrous and virtually inedible[200]. The root was commonly chewed for its very pleasant flavour by many native North American Indian tribes[256, 257]. It was often used as an appetiser, especially for children who would not eat[256]. Apart from its used as a pleasantly flavoured chew, it was seen as a famine food and was only used when there was a shortage of better foods[177, 257].

dwatta Alterative Carminative Haemostatic PectoralLiquorice fern was employed medicinally by several native North American Indian tribes who used it especially as a treatment for a variety of chest complaints[257]. It is little, if at all, used in modern herbalism. The rhizomes are alterative, carminative, haemostatic and pectoral[257]. The raw rhizomes have been eaten, or an infusion has been used, in the treatment of coughs and colds, chest pains, shortness of breath and VD[257]. The roots have been chewed, and the juice swallowed, as a treatment for sore throats and the spitting or vomiting of blood[257]. A tea of the pounded boiled rhizomes, mixed with fir needles, has been used to treat measles[213]. Coughs have been treated by chewing and slowly swallowing the juice of the roasted rhizome[213]. The roots have been used in the treatment of colds and sore throats[256].

nrakta Western N. America - Alaska to California. ksacta Rocks, mossy tree trunks, logs etc, below 600 metres in coniferous and mixed forests in California[71]. Cliffs and rocky slopes along coasts, often epiphytic, on a variety of substrates[270].

propta Spores - best sown as soon as ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division in spring[200].

nwatta Tolerates short periods of drought and direct sunlight, but it prefers bright filtered light[200]. Plants can be grown on a drystone wall[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. There are several named varieties selected for their ornamental value[200]. Polypodium glycyrrhiza hybridizes with P. calirhiza and with P. hesperium to produce sterile triploids with misshapen spores[270]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

### 7.2.473 Sedum album

Small Houseleek, White stonecrop, Sedum, Stonecrop 6 tiin 8 cyuc 1 kcak 3 tcan 1 dwat 0.1 m hkuc htut cyutli hgatkyuctcup hwicii hyishrasjlutnyik hpa7tli flatpriklwis hpa7tlmwatli fvifxre7t hionli

drutta Sedum album is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 46, 52, 100]. Usually eaten as a pickle[4], though it can also be added to salads or cooked with other leafy vegetables[244].

tcanta Agroforestry Uses: The plant spreads aggressively and can be used for ground cover in a sunny position amongst plants tall enough not to be overrun by it. It is

male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - cooked[105, 177]. Root - cooked[105, 177].

nrakta E. Asia - C. and S. Japan. ksacta Woods in the mountains [58].

propta Seed - best surface sown as soon as it is ripe in a greenhouse [200]. Do not allow the compost to dry out. Germination usually takes place within 1 - 2 months at  $18^{\circ}$ c[175]. Surface sow stored seed in early spring. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. When large enough, plant them out in early autumn or in spring. Division in spring[188].

nwatta Requires a cool rich well-drained peaty soil with shelter from the wind[1, 175]. Intolerant of drought[1]. Requires shade, at least from the morning sun, in spring and autumn[175]. A slow-growing plant[188], it does well in a rock garden[188].

### 7.2.468 Chamaedaphne calyculata

Leather Leaf

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Chamaedaphne calyculata is an evergreen Shrub growing to 0.8 m (2ft 7in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista A toxin, called 'andromedotoxin' can be released from the plant if it is infused in boiling water[183]. See notes below regarding use of the plant for tea.

kcakta Edible Parts: Edible Uses: TeaAn aromatic tealike beverage is brewed from the fresh or dried leaves[161, 177, 183, 257]. Some reports say that boiling or steeping can extract a harmful toxin 'andromedotoxin' and it is recommended that the leaves are put in a jar of water and left in a sunny position to brew in order to make 'sun-tea'[183].

dwatta Antiphlogistic FebrifugeA poultice of the leaves has been applied to inflammations[257]. An infusion of the leaves has been used to treat fevers[257].

nrakta Europe, Asia, N. America. ksacta Peaty swales, bogs, pine barrens, pond margins etc[43].

propta Seed - sow February in a lime-free compost in a greenhouse and only just cover the seed[78]. Do not allow the compost to dry out and keep the pot in a shady position. Germination is usually fair, taking 1 - 12 months at 15°c, though 4 weeks cold stratification may reduce this time[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts[164]. Cuttings of almost ripe side-shoots, 4 - 5cm long with a heel, August in a frame. A variable degree of success[78]. It can help to prune the plants lightly after flowering in order to encourage vigorous growth from which to take the cuttings[78]. Layering in August. Takes 18 months. High percentage[78].

nwatta Thrives in a moist well-drained lime-free soil in sun or semi-shade[1, 200]. Best if given some protection from the midday sun[1]. Plants are hardy to about 25°c[184]. There are some named forms, selected for their ornamental value. 'Nana' is a dwarf compact form that is good for shady areas[183]. The flowers have a delicate refreshing scent[245].

### 7.2.469 Lysimachia fortunei

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli drutta Lysimachia fortunei is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.4 m (1ft 4in). See above for USDA hardness. It is hardy to UK zone 7. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: LeavesEdible Uses: CondimentThe young plant is edible[177, 179]. No more details are given. The leaves are also used as a condiment[46, 61, 177].

nrakta E. Asia - China, Japan. ksacta Wet margins of rivers and ponds in the lowland of C. and S. Japan[58]. Wet areas, ditches, banks of rice paddies and roadsides from sea level to 1500 metres[266].

propta Seed - sow autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, succeeding in a moist loamy soil[1]. Judging by its native habitat, it should succeed in shallow water. Grows well in heavy clay soils. Most species in this genus seem to be immune to the predations of rabbits[233].

#### 7.2.470 Ranunculus californicus

California Buttercup

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ranunculus californicus is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although no specific record of toxicity has been found for this plant, many if not all members of this genus are poisonous. These toxins can be destroyed by heat or by drying[4, 10, 13, 19, 62, 65]. Many if not all plants in this genus also have a strongly acrid juice that can cause blistering to the skin[65, 183].

kcakta Edible Parts: SeedEdible Uses: Seed cooked[257]. It is usually ground into a powder and can then be used as a mush with water, a flavouring in soups, or mixed with cereals when making bread etc[105, 161, 257].

nrakta South-western N. America - Oregon to S. California.. ksacta Grassy bluffs by the coast[60]. Grassland and open woodland from sea level to 2000 metres[270].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a moist loamy soil[1]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

### 7.2.471 Xanthium strumarium

Cocklebur, Rough cocklebur, Canada cocklebur 6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.8 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Xanthium strumarium is a ANNUAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to October, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. This species is closely related to C. sanguinea[11]. Plants in this genus are notably resistant to honey fungus[200].

#### 7.2.386 Cocculus orbiculatus

Queen coralbead

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Cocculus orbiculatus is a deciduous Climber growing to 4 m (13ft 1m). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in August, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - cooked. An emergency food, it is used when all else fails[177]. One report says that the root might be edible[177].

tcanta Basketry InsecticideThe bleached tendrils are used as an ornamental infill in basket making[46, 61]. The plant contains cocculoidine which has insecticidal activity[218].

dwatta Anodyne Antiasthmatic Antiphlogistic Antirheumatic Carminative Depurative Diuretic VermifugeThe root is anodyne, antiphlogistic, antirheumatic, carminative, depurative, diuretic and vermifuge[147, 176, 218]. It is used in the treatment of rheumatic arthritis, oedema and oliguria[176]. It has also shown antibacterial and anti-amoebic activity[176]. A decoction of the stems is used in the treatment of asthma, bronchitis and paralysis[218].

nrakta E. Asia - China, Japan. ksacta Sides of streams, to 1000 metres in W. China[109]. Sparse forests, bushes, village sides and forest edges in most regions of China[266].

propta Seed - we have no details for this species but suggest sowing the seed as soon as it is ripe in a greenhouse. Sow stored seed as soon as possible in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer, after the last expected frosts. Root cuttings in December in a greenhouse[200]. Division in the dormant season. Cuttings of half-ripe wood, July/August in a frame[200].

nwatta Easily cultivated in an ordinary garden soil[1], it prefers a well-drained moisture retentive fertile soil in full sun or semi-shade[200]. Plants only fruit well when grown in full sun[219]. This species is hardy to about -10°c[200]. Plants climb by means of twining around supports[219]. They do not normally require pruning[219]. Closely related to C. carolinus[200].

#### 7.2.387 Cornus poliophylla

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cornus poliophylla is a deciduous Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The following notes are for C. macrophylla, they quite probably also apply to this closely related species[K]. Fruit - raw or cooked[2, 105, 146, 158, 200, 218]. The fruit is about 6mm in diameter[200].

tcanta WoodThe following notes are for C. macrophylla, they quite probably also apply to this closely related

species[K]. Wood - hard, close grained, warps badly[158]. It makes a good charcoal[146, 158].

dwatta Anodyne Astringent Dysentery TonicThe following notes are for C. macrophylla, they quite probably also apply to this closely related species[K]. Anodyne, astringent, tonic[178]. The wood is anodyne and a uterosedative[218]. The stem bark is used in the treatment of dysentery[218].

nrakta E. Asia - W. China. ksacta Dense and sparse forests, open hillsides at elevations of 1100 - 3200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 1131. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. This species is closely related to C. monbeigii[11, 200]. Plants in this genus are notably resistant to honey fungus[200].

### 7.2.388 Pyracantha coccinea

Firethorn, Scarlet firethorn, Pyracantha, Firethorn 6 tlin 9 cyuc 1 kcak 3 tcan 0 dwat 4 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Pyracantha coccinea is an evergreen Shrub growing to 4 m (13ft) by 4 m (13ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: FruitEdible Uses: Fruit - cooked Used for making jellies, marmalade and sauces[15, 183].

tcanta Hedge HedgeLandscape Uses: Erosion control, Espalier, Massing, Seashore. Tolerant of trimming and of reasonable exposure, it can be grown as a hedge[49, 200]. It forms a very spiny barrier[200].

nrakta S. Europe. Occasionally found more or less naturalized in Britain[17]. ksacta Woods and hedges[89].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Remove all the fruit flesh since this can inhibit germination[200]. Stored seed requires 3 months cold stratification, sow it as early in the year as possible in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the

10cm with a heel, mid-August in a cold frame[78]. Pot up in October or the following spring[78].

nwatta Prefers a good well-drained, moisture-retentive loamy soil[1, 200]. Succeeds in any soil that is warm and not very heavy[11]. Another report says that it grows well in heavy clay soils. Succeeds on chalky soils[108]. Succeeds in sun or part shade[200] and also on a shady wall[28, 49], though it does not fruit so well in a shady position[200]. Tolerates atmospheric pollution and reasonable exposure[200]. A very ornamental plant[1], there are a number of named varieties[11, 200]. Susceptible to scab and fireblight[11], especially when grown on acid sandy soils[182]. This species, especially the cultivar 'Lelandii', is notably resistant to honey fungus[200]. Intolerant of root disturbance except when young[11]. A good bee plant[108]. Birds are particularly attracted to the fruit of this plant[200]. Special Features: Not North American native, Attractive flowers or blooms.

### 7.2.389 Euonymus japonicus

Japanese Spindle Tree, Box-leaf Euonymus, Evergreen Euonymus, Japanese Euonymus

6 tlin 9 cvuc 1 kcak 0 tcan 1 dwat 4.5 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Euonymus japonicus is an evergreen Shrub growing to 4.5 m (14ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The seed is probably poisonous, other parts of the plant may also be poisonous[65].

kcakta Edible Parts: LeavesEdible Uses: ColouringYoung leaves - boiled[2, 177, 183]. The old leaves are powdered and used to colour food[105, 177, 183]. These reports should be treated with some caution due to the report of toxicity - see above.

tcanta Hedge Hedge LatexRoots and stems yield up to 7% gutta-percha, a non elastic rubber used as an electrical insulator and in making plastics etc[61, 74, 103]. Can be grown as a hedge, it is very tolerant of trimming and succeeds in severe maritime exposure[11, 75, 200].

dwatta Antirheumatic Diuretic Tonic Women's complaintsThe stem bark is antirheumatic, diuretic and tonic[218]. The leaf is used in cases of difficult delivery[218]. nrakta E. Asia - Japan. Locally naturalized in S. Eu-

rope. ksacta Slopes in thickets and woods, especially near the sea[58]

propta Seed - best sown as soon as it is ripe in a cold frame[121]. Stored seed requires 3 months cold stratification, so should be sown as early in the year as possible in a cold frame[113]. Seed can take 18 months to germinate[74]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 7cm long taken at a node or with a heel, July/August in a frame. Very easy[200]. Cuttings of mature wood, October in a frame78, 1131. Cuttings will root readily at any time of the year if given bottom heat[1]. Root cuttings in winter.

nwatta Landscape Uses:Border, Container, Foundation, Hedge, Massing, Screen, Specimen, Woodland garden. Thriving in almost any soil, including chalk and sandy soils, it is particularly suited to dry shaded areas[200]. Grows well in heavy clay soils. Shade tolerant but does not fruit well in such a position[11]. Prefers a well-drained loamy soil[11]. Plants are very tolerant of maritime exposure, succeeding even when grown on the sea shore[166], but they can be killed by cold drying winds[75, 184]. A very ornamental plant[1], there are a number of named varieties[184]. It is only hardy in S. England[11] tolerating temperatures down to about -10°c[184]. Plants are more likely to succumb to the cold if they are regularly trimmed (this exposes young growth

last expected frosts. Cuttings of almost mature wood, 5 - to the cold), this regular trimming also leads to mildew especially when plants are growing in very dry ground[182]. The Japanese spindle tree is cultivated in Russia and Spain for the latex contained in the root. It is best grown in a dry soil and an open position when being grown for its latex[61, 74]. Plants are often slow to get established. Plants can be susceptible to attacks by caterpillars[182] and are often damaged during the flowering season[11]. They are also a host of the sugar beet fly[49]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, Naturalizing, Inconspicuous flowers or blooms.

#### 7.2.390 Pyracantha angustifolia

Narrowleaf firethorn, Pyracantha 6 tlin 10 cyuc 1 kcak 3 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Pyracantha angustifolia is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even

kcakta Edible Parts: FruitEdible Uses: Fruit[15]. No more details are given but the fruit is unlikely to be that inspiring, particularly when it is said that this is the least interesting fruit of the genus for birds![K]. The fruit is about 5 6mm in diameter[266].

tcanta ShelterbeltLandscape Uses: Erosion control, Espalier, Massing, Seashore. A fairly wind-tolerant shrub, it can be used in shelterbelt plantings[200].

nrakta E. Asia - S.W. China. ksacta Thickets on slopes. at roadsides at elevations of 1600 - 3000 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Remove all the fruit flesh since this can inhibit germination[200]. Stored seed requires 3 months cold stratification, sow it as early in the year as possible in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of almost mature wood, 5 -10cm with a heel, mid-August in a cold frame[78]. Pot up in October or the following spring[78].

nwatta Prefers a good well-drained, moisture-retentive loamy soil[1, 200]. Succeeds in any soil that is warm and not very heavy[11]. Another report says that it grows well in heavy clay soils. Succeeds on chalky soils[108]. Succeeds in sun or part shade, though it does not fruit so well in a shady position[200]. Tolerates atmospheric pollution and reasonable exposure[200]. Plants are not reliably hardy in the colder areas of Britain[219]. Susceptible to scab and fireblight[11], especially when grown on acid sandy soils[182]. Birds are less attracted to the fruit of this species than they are to other members of the genus[182]. Special Features: Not North American native, Attractive flowers or blooms.

hardy to UK zone 7. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root cooked[105, 177].

nrakta E. Asia - Himalayas from Pakistan to S.E. Tibet. ksacta Open slopes in dry areas[51]. Stony slopes of mountain streams, pebbles, clayey, stony and sometimes sandy mountain slopes[74].

propta Seed - sow in an outdoor seedbed in April/May. The seed usually germinates in 1 - 4 weeks at 15°c[175]. If seed is in short supply then we would recommend sowing it in a pot in a cold frame, potting it up as soon as it is large enough to handle and growing it on in the frame for the first winter, planting out in late spring. Division in spring or autumn[200]. Basal cuttings in April/May[1, 200]. Harvest the shoots when they are about 10 - 15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Grows best in a sunny position in a fertile welldrained soil according to some reports[200, 245] whilst other reports say that it prefers a cool position and some shade[1] 175]. Prefers some shelter and a moist but not wet soil[175].

### 7.2.464 Conradina verticillata

Cumberland Rosemary

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc

htut cyutli tcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli

drutta Conradina verticillata is a deciduous Shrub growing to 0.3 m (1ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) soils and prefers welldrained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe leaves have a strong pleasant scent, reminiscent of rosemary, and are used as a rosemary substitute as a flavouring in cooking[183].

nrakta South-eastern N. America - Tennessee. ksacta Not known

propta Seed - sow spring in a greenhouse[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer, after the last expected frosts. Cuttings of new shoots in spring in a frame[200].

nwatta Requires a light soil and a very sunny position[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. This is an endangered species in the wild[183].

### 7.2.465 Carex kobomugi

Japanese sedge

6 tlin 8 cyuc 1 kcak 2 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Carex kobomugi is a PERENNIAL growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 6. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Root SeedEdible Uses: Root cooked[172]. Seed[172]. An emergency food, used when all else fails[177]. The seed is very small and would be fiddly to

tcanta Environmental Uses: Land reclamation; Landscape improvement; Soil conservation. Possible benefits in using C. kobomugi for dune stabilization in its native range. but there are considerable doubts raised about its relative effectiveness compared to native species outside of this range.

nrakta E. Asia - Japan, Korea, Manchuria. ksacta Sand dunes along the seacoast all over Japan[58].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in most parts of this country. It is likely to tolerate maritime exposure[K]. The following notes are based on the general needs of the genus. Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### **7.2.466** Iberis amara

Rocket Candytuft, Annual candytuft 6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.3 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Iberis amara is a ANNUAL growing to 0.3 m (1ft) by 0.2 m (Oft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe seeds are sometimes used as a source of mustard[61, 177, 183]. Pungency of mustard develops when cold water is added to the ground-up seed - an enzyme (myrosin) acts on a glycoside (sinigrin) to produce a sulphur compound. The reaction takes 10 - 15 minutes. Mixing with hot water or vinegar, or adding salt, inhibits the enzyme and produces a mild bitter mustard[238].

dwatta Antiarrhythmic Antiasthmatic Antirheumatic Antiscorbutic HomeopathyLittle used in modern herbalism. rocket candytuft is a bitter-tasting tonic, aiding digestion and relieving wind and bloating[254]. It is traditionally taken to treat gout, rheumatism and arthritis[254]. All parts of the plant are antirheumatic and antiscorbutic[61]. The seeds are considered very useful in the treatment of asthma, bronchitis and dropsy[4, 240]. The plant is gathered in the summer and can be dried for later use[254]. The seeds are harvested when fully ripe[254]. A common homeopathic remedy is made from the seeds[4].

nrakta Western and southern Europe, including Britain, to N. Africa, ksacta Dry calcareous soils on hillsides and in cornfields[17].

propta Seed - sow spring in situ for summer flowering or late summer in situ for a spring flowering[200]. The seed germinates within 3 weeks.

nwatta Easily grown in a good, well-drained ordinary garden soil in a sunny position[1]. Prefers a calcareous soil but tolerates mildly acid soils[1]. Succeeds in poor soils[200] and on dry walls[1]. A very ornamental plant[1]. A fast growing plant[188], do not grow the plants too close together[1]. The flowers are sweetly scented[245].

#### 7.2.467 Deinanthe bifida

6 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Deinanthe bifida is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September. The species is hermaphrodite (has both

pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista This plant should not be used during pregnancy prior to the commencement of labour[165]. Excessive doses may cause high blood pressure and symptoms similar to nicotine poisoning. Overdose may cause nausea, vomiting, incoordination and narrowing of blood vessels to the heart muscles. Powdered root can have an irritant effect on nucous membranes [301]. Contraindicated in patients with ischaemic heart disease (angina and heart attacks) and in patients with high blood pressure [301].

kcakta Edible Parts: Edible Uses: CoffeeThe roasted seed is a coffee substitute[4, 102, 105, 177]. The seeds are about the size of large peas, but are not produced in abundance[232].

dwatta Anthelmintic Antispasmodic Birthing aid Diaphoretic Diuretic Emmenagogue Oxytoxic SedativePapoose root is a traditional herb of many North American Indian tribes and was used extensively by them to facilitate child birth[207]. Modern herbalists still consider it to be a woman's herb and it is commonly used to treat various gynaecological conditions[254]. An acrid, bitter, warming herb, it stimulates the uterus, reduces inflammation, expels intestinal worms and has diuretic effects[238]. The root is anthelmintic, antispasmodic, diaphoretic, diuretic, emmenagoque, oxytocic and sedative[4, 21, 46, 165, 207]. An infusion of the root in warm water is taken for about 2 weeks before the expected birth date in order to ease the birth[207, 213]. This infusion can also be used as an emmenagogue and a uterine stimulant[213]. Papoose root should therefore be used with some caution by women who are in an earlier stage of pregnancy since it can induce a miscarriage or early deliverv[222]. The plant is also taken internally in the treatment of pelvic inflammatory disease, rheumatism and gout[238]. It should not be prescribed for people with hypertension and heart diseases[238]. The powdered root can have an irritant action on the mucous membranes, therefore any use of this plant is best under the supervision of a qualified practitioner[238, 268]. The roots are normally harvested in the autumn, because they are at their richest at this time[213], and are dried for later use. The root is harvested in early spring as new growth is beginning and is used to make a homeopathic remedy[232]. It is used especially in childbirth and in some forms of rheumatism[232].

nrakta Eastern N. America - New Brunswick to South Carolina, Arkansas, North Dakota and Manitoba. ksacta Rich moist soils in swamps, by streams[4, 21] and in woods[43].

propta Seed - best sown as soon as it is ripe in a shady part of a cold frame[200]. If stored seed is used, it should be sown as soon as it is received. Germination can be erratic. Prick out the seedlings as soon as they are large enough to handle and grow them on in a shady part of a greenhouse or cold frame for at least their first winter. Plant them out into their permanent positions during autumn or early winter. Division in spring or just after flowering[200]. Plants are slow to increase[187].

nwatta Easily grown in a damp light humus-rich woodland soil preferring a position in deep shade[1, 200]. One report says that it is best in a peat garden. Plants are hardy to at least -20°c[187]. The plant only produces one large leaf each year[233]. The seeds rupture the ovary before they are fully ripe and continue to expand naked, they are bright blue when fully ripe[130].

#### 7.2.461 Cardamine trifolia

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Cardamine trifolia is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to June, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: We have no information on this species but the leaves are almost certainly edible either raw or cooked[K].

tcanta An excellent ground cover for woodland or under shrubs[208]. Plants should be spaced about 30cm apart each way[208].

nrakta C. and S. Europe. An occasional garden escape in Britain. ksacta Moist shady woods, especially on calcareous substrata[17].

propta Seed - sow spring in a cold frame. Germination usually takes place within 1 - 3 weeks at 15°c[175]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse or cold frame for the first two years, planting them out when dormant in late summer. Division in early spring or after the plant dies down in the summer. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in most soils so long as they are not dry[1]. Prefers a moist humus rich soil in shade or semi-shade[200]. A mat-forming stoloniferous species[200].

#### 7.2.462 Sedum sarmentosum

stringy stonecrop

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.1 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum sarmentosum is an evergreen Perennial growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Young leaves and stems - raw or cooked[105, 177]. Used as a veg-

dwatta Used medicinally[266]. No further information is given[266].

nrakta E. Asia - China, Japan, Korea. ksacta Shady places and rocks on slopes below elevations of 1600 metres in China[266].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are drought tolerant[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

# 7.2.463 Dracocephalum heterophyllum

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Dracocephalum heterophyllum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is

### 7.2.391 Coprosma rugosa

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Coprosma rugosa is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from January to February, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw or cooked. Freely produced in Britain, it is sweet but with little flavour[225]. The fruit is white or blue and about 8mm long x 6mm wide[200, 225]. The roasted seed is an excellent coffee substitute[153].

tcanta Dye Hedge Hedge Tolerant of heavy trimming, the plant makes a good hedge [225]. A yellow dye is obtained from the wood it does not require a mordant [153]

nrakta New Zealand. ksacta Lowland to montane and lower sub-alpine grassland, shrubland and forest margins in North and South Islands[44].

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[K]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Succeeds in most soils[225]. Somewhat intolerant of frost, this species is only likely to succeed outdoors in the mildest areas of Britain[200]. Another report says that it is quite hardy in Britain[225]. Hybridizes freely with other members of this genus[200, 225]. Plants are tolerant of heavy clipping or pruning[225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

### 7.2.392 Alangium platanifolium

Alangium

6 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Alangium platanifolium is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177].

tcanta InsecticideThe leaves and the bark of the root are used as an insecticide[178]. The leaves and stem bark according to another report[218].

dwatta AntirheumaticThe root is used in the treatment of rheumatism and other bone diseases[218].

nrakta E. Asia - China, Japan. ksacta Woodland thickets, 1200 - 2100 metres in W. China[109].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse in the spring. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out in early summer and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood, July/August in sand in

a frame[200]. Users feedback: I collected the seeds in late summer, stored them at a dark and dry location and followed a normal stratification procedure from November till January (November and January at around 2 °C, December at around -12 °C, all in my fridge). Germination appears to start at the earliest after three weeks, how long it usually takes I will know in a couple of weeks (it's just one early bird that broke through the surface today).

Luckily, no trickery is required: it's sufficient to clean them up, soak them in water before and after stratification and pop them into the moist soil. OW

nwatta Succeeds in any moderately fertile well-drained soil[200]. Requires full sun and a sheltered position[182, 200]. A fairly hardy plant[1], but it does not succeed outdoors at Kew, the soft pithy shoots being cut back by winter cold[11]. It grows well in Gloucestershire[11, 182]. This species is closely related to A. chinense[200].

### 7.2.393 Sasamorpha borealis

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sasamorpha borealis is an evergreen Bamboo growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. It is used as a cereal[177]. The seed is only produced at intervals of several years.

nrakta E. Asia - China, Japan, Korea. ksacta Woodlands and damp hollows all over Japan[58, 200].

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°c. Stored seed is best sown as soon as it is received. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 -6 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse until large enough to plant out, which could be a few years. Plants only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200].

nwatta Requires a good humus rich loam with ample moisture in the growing season[200]. Prefers partial shade, growing well in thin woodland. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rhizome is gently running. This species is liable to be mistaken for Pseudosasa iaponica[200].

### 7.2.394 Artemisia annua

Qing Hao, Sweet sagewort 6 tlin 9 cyuc 1 kcak 2 tcan 4 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Artemisia annua is a ANNUAL growing to 3 m (9ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil

and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Skin contact with the plant can cause dermatitis or other allergic reactions in some people[222]. The pollen is extremely allergenic[269].

kcakta Edible Parts: Edible Uses: CondimentAn essential oil in the leaves is used as a flavouring in spirits such as vermouth[269].

tcanta Essential Herbicide MiscellanyThe plant is used in China as a medium for growing Aspergillus which is used in brewing wine. The substances mentioned above in the medicinal uses, used in the treatment of malaria, also show marked herbicidal activity[222]. The plant yields 0.3% essential oil[240]. This has an agreeable, refreshing and slightly balsamic odour and has been used in perfumery[240].

dwatta Antibacterial Antiperiodic Antiseptic Carminative Digestive Febrifuge Malaria MiscellanyQing Ho, better known in the West as sweet wormwood, is a traditional Chinese herbal medicine. An aromatic anti-bacterial plant, recent research has shown that it destroys malarial parasites, lowers fevers and checks bleeding[238, 254, 279]. It is often used in the Tropics as an affordable and effective antimalarial[254]. The leaves are antiperiodic, antiseptic, digestive, febrifuge[176, 178]. An infusion of the leaves is used internally to treat fevers, colds, diarrhoea etc[222, 254]. Externally, the leaves are poulticed onto nose bleeds, boils and abscesses[222, 238]. The leaves are harvested in the summer, before the plant comes into flower, and are dried for later use[254]. The plant contains artemisinin, this substance has proved to be a dramatically effective anti-malarial against multi-drug resistant Plasmodium spp[218, 238, 254, 269]. Clinical trials have shown it to be 90% effective and more successful than standard drugs[254]. In a trial of 2000 patients, all were cured of the disease[218]. The seeds are used in the treatment of flatulence, indigestion and night sweats[222].

nrakta S. E. Europe to W. Asia. ksacta Occurs naturally as part of a steppe vegetation in the northern parts of Chahar and Suiyuan provinces in China, at 1000 to 1500 m above sea level[269].

propta Seed - sow spring in a cold frame and plant out in late spring or early summer. Alternatively, the seed can be sown late spring in situ.

nwatta An easily grown plant, succeeding in a welldrained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. A fast-growing annual plant, it is tall but neat in habit with a handsome fragrant foliage and is useful for filling gaps at the back of a border[238]. It has become a weed of waste places in many areas of the world[43]. The plant is extremely vigorous and essentially disease and pest free[269]. Qing Hao is a determinate short-day plant. Nonjuvenile plants are very responsive to photoperiodic stimulus and flower about two weeks after induction. The critical photoperiod seems to be about 13.5 hours, but there are likely to be photoperiod x temperature interactions. In Lafayette Indiana, USA (40°21'N) plants flower in early September with mature seeds produced in October. The plant is not adapted to the tropics because flowering will be induced when the plants are very small[269]. Most collections of artemisia derive from natural stands with highly variable artemisinin content, some as low of 0.01%. Selections from Chinese origin vary from 0.05 to 0.21%. Swiss researcher N. Delabays reports a clonal selection derived from Chinese material which produces 1.1% artemisin but is very late flowering; proprietary hybrids have been obtained with somewhat lower content but flower earlier[269]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 7.2.395 Vaccinium sprengelii

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium sprengelii is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and

medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw or cooked[177]. The fruit is about 5mm in diameter[200]. Leaves[177]. No more details are given.

nrakta E. Asia - China to the Himalayas. ksacta Woods, streamsides and thickets, 1300 - 1600 metres in W. Hupeh[109]. Mixed forests, pine forests and thickets at elevations of 2300 - 2700, occasionally to 3200 metres[266].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free sol, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. A polymorphic species[109], it is closely related to V. duclouxii[182]. Plants are deciduous in cold climates[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 7.2.396 Ilex coriacea

Large Gallberry

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta llex coriacea is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May, and the seeds ripen in October. The species is diocious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

kcakta Edible Parts: FruitEdible Uses: Fruit[43]. No more details are given but I would have some doubts on the wholesomeness of the fruit[K]. The fruit is about 6 - 10mm in diameter[200].

nrakta South-eastern N. America - Florida to Louisiana, north to S.E. Virginia. ksacta Low wet areas such as swamps, bays, river floodplains, and by the sides of streams and ponds[229]. Sandy woods and swamps[43].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not

### 7.2.457 Corydalis incisa

Incised fumewort

6 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Corydalis incisa is a ANNUAL/BIENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pft: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Although no specific mention has been seen for this species, there is a report that Corydalis species are potentially toxic in moderate doses[222].

kcakta Edible Parts: LeavesEdible Uses: Young plant-cooked in spring[177, 178, 179]. Slightly deleterious[178].

dwatta MiscellanyThe dried and powdered flowers are used in the treatment of rectal collapse[218]. An aqueous decoction of the plant is used in the treatment of abscesses[218]. Used in China and Japan in folk medicine to treat inflammation, headaches, skin diseases, and other ailments [1-7].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets and bamboo forests in lowland and foothills all over Japan[58]. Grows in marshes[178]

propta Seed - best sown as soon as it is ripe, the seed rapidly loses viability if it is allowed to become dry[129]. Surface sow and keep moist, it usually germinates in 1-3 months at 15°c[164]. Germinates in spring according to another report[129]. Two months warm, then a cold stratification improves the germination of stored seed[134, 164]. Seedlings only produce one leaf in their first year of growth[175] and are very prone to damping off[129]. This species is a biennial and probably germinates more easily than the perennial species.

nwatta Can be invasive outside its natural range. Corydalis incisa is an annual or biennial, spring-ephemeral herb. Seeds germinate in the spring and develop small rosettes. which wither during the summer. They emerge again as rosettes throughout the winter and produce compact flowering racemes the following spring [1-7]. In its native range in Asia, C. incisa occurs along stream valleys, irrigation channels, and forest margins; in wastelands, roadsides, and forestlands; and on rock walls. In the United States, it grows in mesic and alluvial forest habitats. Under horticultural conditions, C. incisa prefers cooler exposures [1-7]. The known distribution globally has Plant Hardiness Zones 6-10, areas with 20-100+ inches of annual precipitation, and the following Köppen-Geiger climate classes: humid subtropical, marine west coast, humid continental with warm summers, and humid continental with cool summers. There is no evidence that C. incisa occurs in Mediterranean climates. It is potentially suitable because the plants usually are dormant during the summer when conditions are driest in Mediterranean climates [1-7]. The following notes are based on the general needs of the genus. Prefers a moist, well-drained rather light soil, thriving in semi-shade[1]. Grows well in a woodland garden or peat bed. Plants seem to be immune to the predations of rabbits[233]

#### 7.2.458 Solidago spectabilis

Nevada Goldenrod

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Solidago spectabilis is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed[46, 61, 105, 161, 257]. No more details are given.

tcanta DyeMustard, orange and brown dyes can be obtained from the whole plant [168].

dwatta AntisepticThe leaves and flowering stems are antiseptic. An infusion of the dried powdered herb can be

nrakta South-eastern N. America. ksacta Alkaline meadows or bogs to 2200 metres[72].

propta Seed - sow spring in a cold frame. Only just cover the seed and do not allow the compost to become dry. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in pots. Plant them out into their permanent positions in spring or early summer. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer

nwatta Succeeds in any moderately fertile moisture retentive soil in sun or semi-shade[200]. Grows well in heavy clay soils. A rather greedy plant, it is apt to impoverish the soil[1]. There is some confusion over the correct identity of this plant. According to [200] it is a native of Western N. America and grows 50cm tall. According to [72] it is a native of South-eastern N. America and grows 120cm tall. [105] lists this species as a synonym of S. odora. It is quite possible that two species are involved, one of which is a synonym for S. odora. The plant attracts various beneficial insects such as ladybirds, lacewings and hoverflies to the garden, these insects will help to control insect pests in the garden[201, 238].

### 7.2.459 Salvia lanata

6tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia lanata is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Stem Edible Uses: Stems are peeled and eaten [2, 177].

dwatta Astringent Dysentery Emetic PoulticeThe roots are used in the treatment of colds and coughs[240]. The seed is emetic[240]. It is used in the treatment of dysentery, haemorrhoids, colic and, externally, boils[240]. A poultice of the leaves is used as a dressing for wounds and is also applied to itchy skin[240].

nrakta E. Asia - Himalayas from Nepal to N.W. Pakistan. ksacta Open slopes in drier areas, 1500 - 3000 metres[51].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[2001]

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Plants can be killed by excessive winter wet[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 7.2.460 Caulophyllum thalictroides

Papoose Root, Blue cohosh

6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.5 m hkuc

pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Caulophyllum thalictroides is a PERENNIAL growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in April, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable

### 7.2.454 Goodyera oblongifolia

Western Rattlesnake Plantain

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Goodyera oblongifolia is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: GumAn exudation from the plant is used as a chewing gum[105, 161, 177].

dwatta Poultice TonicAn infusion of the plants has been used as a tonic[257]. A poultice of the softened leaves has been applied to cuts and sores[257]. An infusion of the leaves has been used in the bath water for treating stiff muscles[257]

nrakta N. America - Quebec to British Columbia, New Hampshire, Michigan, Arizona and California. ksacta Deep leaf litter and shade of moist or dry coniferous or mixed woods, in East infrequent in cedar swamps, in s Rocky Mountains confined to high elevation spruce-fir forests; 0 - 3400 m[43, 230, 270].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division is best carried out in the spring[230]. Each division should have a leading point and two, or preferably three, joints of the rhizome[230]. More propagating material can be obtained by cutting halfway through the rhizome during the previous growing season at the point where you wish to divide[230]. This will stimulate the production of growth buds at the point of division[230].

nwatta Requires a somewhat shady site and a well-drained compost of peat, leafmold and sand[1]. Does well in the woodland garden[42, 230]. This species is not very hardy in Britain, it is suitable for cultivation in a cool greenhouse or, perhaps, for a select position outdoors[1]. It is closely related to the British native species G. repens[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230].

### 7.2.455 Bergenia ciliata

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bergenia ciliata is an evergreen Perennial growing to 0.3 m (1ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta The flowers are boiled and then pickled[272]. tcanta TanninThe root contains 14 - 16% tannin[272]. A good ground cover plant[188], forming a slowly spreading clump[208, 233].

dwatta Lithontripic Ophthalmic Poultice Tonic UrinaryA juce or powder of the whole plant is used to treat urinary troubles in Nepal[272]. The juice of the leaves is used as drops to relieve earaches[272]. The root is used as a tonic in the treatment of fevers, diarrhoea and pulmonary affections[218, 240, 243]. The root juice is used to treat coughs and colds, haemorrhoids, asthma and urinary problems[272]. Externally, the root is bruised and applied as a poultice to boils and ophthalmia, it is also considered helpful in relieving backache[243, 272]. The root of this plant has a high reputation in indigenous systems of medicine for dissolving stones in the kidneys[240].

nrakta E. Asia - Himalayas from Afghanistan to E. Tibet. ksacta On moist rocks and under forest shade, 1900 - 2600 metres in Kashmir[145].

propta Seed - surface sow in a greenhouse. Make sure that the compost does not dry out. Two weeks cold stratification can speed up germination which usually takes 1 - 6 months at 15°c[134]. Fresh seed, sown as soon as it is ripe in late spring is liable to germinate better than stored seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in late spring after flowering[188] or in autumn[200]. Very easy, larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Succeeds in full sun or light shade in most soils[200] but prefers a deep fertile soil that does not dry out fully[134]. Grows well in heavy clay soils. Plants are at their best in a medium-heavy soil[208]. Succeeds in shade or semi-shade-[187]. The leaf colour is best when plants are grown in a poor soil in a sunny position[188]. Dislikes cold winds[197]. The plant is hardy to about -20°c, but the flowers and young leaves are rather sensitive to frost[187] so it is best to choose a position with shade from the early morning sun. This species is only hardy in sheltered gardens of south and west Britain[208]. If the leaves are cut back by frost then they are soon replaced by fresh leaves in the spring[188]. The roots of this plant are commonly collected from the wild for medicinal purposes. Overcollection in many areas of its range are a cause for conservation concern[272]. Plants seem to be immune to the predations of rabbits [233]. The different species of this genus will hybridise freely when grown near each other[233].

#### 7.2.456 Geranium thunbergii

Thunberg's geranium

1230

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Geranium thunbergii is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaYoung leaves[183]. No further details are given. Old leaves, when the plant is at the peak of its growth, are used as a tea substitute[183].

dwatta AstringentThe whole plant is astringent[105].

nrakta E. Asia - China, Japan, Korea. ksacta Grassy places in lowland areas all over Japan[58].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils that are not water-logged[200]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. This species is closely related to I. glabra[43]. Flowers are produced on the current year's growth[229]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

### 7.2.397 Lindera umbellata

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli nyanhjen hjonli

drutta Lindera umbellata is a deciduous Shrub growing to 3 m (9ft 10im). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: OilEdible Uses: Condiment OilThe decoction is poured over rice or millet and eaten[105, 177]. We have no more details

tcanta OilAn oil obtained from the seed is used for lighting[61].

nrakta E. Asia - China, Japan. ksacta Scrub at up to 3000 metres in W. China[184].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse. The seed has a short viability and should not be allowed to dry out[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in early sumer. Cuttings of half-ripe wood, July in a frame[200]. Layer-

ing. nwatta Requires a lime-free rather moist soil[200]. Prefers partial shade or dappled sunlight in a fertile moisture-retentive soil enriched with leafmould[200]. Succeeds in full sun or semi-shade[182, 184]. Hardy to about -15°c[184]. Plants can be pruned right back to the base if required, though any drastic pruning is best spread over several seasons[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious, male and female plants

### 7.2.398 Illicium floridanum

must be grown if seed is required.

Aniseed Tree, Florida anisetree, Purple Anise, Star Anise, Florida anise

6 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Illicium floridanum is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, at least one other member of the genus has a fruit that is poisonous in quantity[19, 177].

kcakta Edible Parts: Edible Uses: CondimentSaid to be used as a spice[105, 177, 183]. No further details are given, but the leaves have a strong aroma of aniseed[245].

nrakta South-eastern Ň. America - Florida to Louisiana. ksacta Lowland wet areas, often in sandy soils along streams, swamps and at the head of bays[229], in light woodland and thickets[2001.

propta Seed - it does not require pre-treatment and can be sown in early spring in a greenhouse[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts, and give some protection from the cold over the winter for the first year or two. Layering in early spring. Takes 18 months[78]. Cuttings of half-ripe wood, August in a frame[113]. Pot up the cuttings when they start to root and grow them on in the greenhouse for their first winter, planting out after the last expected frosts. Suckers are sometimes produced at some distance from the parent plant. These suckers can be potted up in early spring, then grown on for a year before planting them out into their permanent positions.

nwatta Landscape Uses:Border, Foundation, Pest tolerant, Massing, Screen, Specimen, Woodland garden. Prefers a light, moist well-drained loam and a sheltered position[1, 111 Prefers a humus-rich lime-free soil[182, 200]. A plant of woodland shade in its native habitat, in the less sunny British climate it succeeds in sun or semi-shade[200, 260]. This species is not very cold-hardy, it tolerates temperatures down to between -5 and -10°c, only succeeding outdoors in the mildest areas of Britain[1, 11, 166]. A slow-growing tree[229], the whole plant is very aromatic[182]. The bruised leaves have a strong scent of aniseed, whilst the flowers have a powerful spicy odour[245]. Suckers can spring up at some distance from the parent plant[260]. Special Features:Attracts birds, Attractive foliage, North American native, Fragrant foliage, Wetlands plant, Suitable for cut flowers. Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping plant, forming a colony from shoots away from the crown but with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

### 7.2.399 Gunnera tinctoria

Gunnera, Chilean gunnera

1211

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gunnera tinctoria is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young leaf stalks - peeled and cooked as a vegetable or eaten raw[2, 177, 183]. Acid and refreshing[139].

tcanta Dye Roofing TanninA black dye is obtained from the root[139]. The root contains 9% tannin[46, 139]. Leaves are used as a roof covering[139].

dwatta AstringentThe whole plant is astringent[139]. nrakta S. America - Chile. ksacta Moist soils by lakes and rivers of the Central Provinces[139].

propta Seed - best sown as soon as it is ripe in the autumn in a sandy mix in a cold frame. The seed can also

be sown in a shady position in a greenhouse in the spring. Germination usually takes place within 2 - 8 weeks at 15°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division as new growth commences in the spring. The clumps can be planted out direct into their nermanent positions

nwatta Requires a damp humus rich soil in a sunny position or semi-shade, sheltered from strong winds. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. The rootstock is rather tender, surviving to -10°c and requiring some protection away from the milder parts of Britain. This can be achieved by piling either bracken or the plants dying leaves around the crown[187]. The top part of the inflorescence is male, the bottom is female and the middle is hermaphrodite. A very ornamental plant with huge leaves, it forms a slowly spreading dense clump[187]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 7.2.400 Rheum officinale

Chinese Rhubarb

6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli ilutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rheum officinale is a PERENNIAL growing to 2 m (6ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific mention has been seen for this species, the leaves of some if not all members of this genus contain significant quantities of oxalic acid and should not be eaten in any quantity. Oxalic acid can lock up certain minerals in the body, especially calcium, leading to nutritional deficiency. The content of oxalic acid will be reduced if the plant is cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: StemEdible Uses: RutinLeaf stem - cooked or raw[177, 178]. Rather medicinal[105]. One report says that the plant contains 1.3% rutin[240]. It does not specify which part of the plant, though it is likely to be the leaves[K]

tcanta Plants can be grown for ground cover when spaced about 1.8 metres apart each way[208].

dwatta Anticholesterolemic Antiseptic Antispasmodic Antitumor Aperient Astringent Cholagoque Diuretic Stomachic Tonic Rhubarb has a long and proven history of herbal usage, its main effect being a positive and balancing effect upon the whole digestive system. It is one of the most widely used herbs in Chinese medicine[218, 238]. The root is anticholesterolemic, antiseptic, antispasmodic, antitumor, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic and tonic[4, 147, 171, 176, 218, 238]. The roots contain anthraquinones, which have a purgative effect, and also tannins and bitters, which have an opposite astringent effect[244]. When taken in small doses, it acts as an astringent tonic to the digestive system, whilst larger doses act as a mild laxative[232, 244]. The root is taken internally in the treatment of chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems and skin eruptions due to an accumulation of toxins[238]. This remedy is not prescribed for pregnant or lactating women, nor for patients with intestinal obstruction[238]. Externally, the root is used in the treatment of burns[238]. The roots are harvested in October from plants that are at least six years old, they are then dried for later use[4]. A homeopathic remedy is prepared from the dried root[232]. This is used especially in the treatment of diarrhoea in teething children[232].

nrakta E. Asia - Tibet. ksacta Hills and forest understories at elevations of 1200 - 4000 metres in western China[266]

propta Seed - best sown in autumn in a shaded cold frame[200]. The seed can also be sown in spring in a cold frame. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in the spring. Division in early spring or autumn[1, 111]. Divide up the rootstock with a sharp spade or knife, making sure that there is at least one growth bud on each division. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a deep, fertile, moderately heavy, humus rich, moisture retentive, well-drained soil in sun or semishade[200]. Grows well in heavy clay soils. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Hardy to about -20°c[200]. A very ornamental plant[1], it is closely related to R. australe[200]. Hybridizes freely with other members of this genus[200]. Cultivated as a medicinal plant in China[61]. Plants at the Cambridge Botanical Gardens in September 1993 were growing well in the shade of a woodland garden, though they were not succeeding when planted closely to the trees[K]. Plants in this genus seem to be immune to the predations of rabbits[233].

#### 7.2.401 Nandina domestica

Sacred Bamboo, Heavenly Bamboo 6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 2.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Nandina domestica is an evergreen Shrub growing to 2.5 m (8ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The fruit is poisonous[147].All parts of the plant contain toxic substances, including hydrocyanic acid and nandenine[218].

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit[2]. No further details are given, but another report says that the fruit is poisonous[147]. The fruit is about 10mm in diameter[200]. Young leaves - boiled[177]. The water must be changed at least once during the cooking[105].

tcanta Hedge HedgePlants are used for hedging in warm temperate zones[200].

dwatta Antirheumatic Antitussive Astringent Febrifuge Stomachic TonicThe roots and stems are antitussive, astringent, febrifuge, stomachic and tonic[147, 174]. A decoction is used in the treatment of fever in influenza, acute bronchitis, whooping cough, indigestion, acute gastro-enteritis, tooth abscess, pain in the bones and muscles and traumatic injuries[147]. It is especially useful in the treatment of children's coughs[174]. There is a danger that an overdose can cause respiratory paralysis[174]. A decoction of the leaves is tonic[218]. The fruit is febrifuge and tonic[218]. Another report says that it is toxic, so great care should be employed if using it[147]. The root is antirheumatic[218]. Young shoots contain high concentrations of laetrile - up to 20% on a zero moisture basis[218].

nrakta E. Asia - China, Japan and India, ksacta Ravines and valleys in mountains and warmer parts of C. and S. Tapan[58].

propta Seed - best sown as soon as it is ripe in a greenhouse[113]. Stored seed should be sown as early in the year as possible in a greenhouse. Germination is often poor[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 - 15cm long, July/August in a frame[78]. Pot up in the autumn and

will make harvesting any quantity of seed very fiddly and time 7.2.452 Sedum spurium

nrakta Europe, Western N. America, Naturalized on the Farne Islands, N.E. Britain[200]. ksacta Dry open slopes and flats, often in disturbed soil[60]

propta Seed - sow late spring in situ[200].

nwatta Succeeds in ordinary garden soil in full sun[1,

### 7.2.451 Rhododendron anthopogon

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Rhododendron anthopogon is an evergreen Shrub growing to 0.6 m (2ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been seen for this species, it belongs to a genus where many members have poisonous leaves. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities[183].

kcakta Edible Parts: Edible Uses: TeaThe flowers are used as a tea substitute[272].

tcanta IncenseThe dried leaves are used as incense[272].

dwatta Antitussive Diaphoretic Digestive Febrifuge TonicThe stems and leaves of the sub-species R. anthopogon hypenanthum are used in Tibetan herbalism[241]. They have a sweet, bitter and astringent taste and they promote heat[241]. They are antitussive, diaphoretic and digestive and are used to treat lack of appetite, coughing and various skin disorders[241]. In Nepal, the leaves are boiled and the vapour inhaled to treat coughs and colds[272]. The flowers of the sub-species R. anthopogon hypenanthum are also used in Tibetan medicine, having a sweet taste and neutral potency[241]. They are antitussive, febrifuge and tonic, being used in the treatment of inflammations, lung disorders and general weakening of the body[241]. They are also used when water and locality are not agreeable due to a change of environment[241].

nrakta E. Asia - W. China to the Himalayas. ksacta Moist open slopes, hillsides, ledges of cliffs and in thickets at elevations of 3000 - 4500, occasionally to 5000 metres[266].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in a most humus-rich lime-free soils except those of a dry arid nature or those that are heavy or clayey[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires[200]. A pH between 4.5 and 5.5 is ideal[1]. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants. herbaceous plants and heathers[200]. Plants form a root ball and are very tolerant of being transplanted, even when guite large, so long as the root ball is kept intact[2001. The whole plant is strongly aromatic with a slightly acrid odour, especially when crushed[11]. Plants in this genus are notably susceptible to honey fungus[200].

Caucasian Stonecrop

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum spurium is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. The leaves are thick and juicy but somewhat astringent and with a slight bitterness[K].

tcanta Can be used as a ground cover plant in a sunny position[197, 208]. It requires weeding for the first year or so[197].

nrakta E. Europe - Caucasus. A garden escape in Britain[50], ksacta Rocks in moist regions in the middle and upper alpine zones[83].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made. it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are drought tolerant[200]. Tolerates poor soils. Hardy to about -5°c[200]. A mat-forming plant, it is very invasive[83]. The flowers of this species are white or pink[200]. All members of this genus are said to have edible leaves, though those species that have vellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

### 7.2.453 Arthromeris wallichiana

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc pcimhmim cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arthromeris wallichiana is a FERN growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist

kcakta Edible Parts: LeavesEdible Uses: Tender young fronds - cooked. Used as a vegetable[272].

dwatta AntisepticThe root is antiseptic. A paste of the roots is applied as a poultice to wounds and boils[272].

nrakta E. Asia - Nepal to China. ksacta Shady places on mossy tree trunks, thick branches and rocks, at elevations of 1300 - 2800 metres in Nepal[272].

propta Spores - best sown as soon as ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Pot on small clumps of plantlets as soon as they are large enough to handle and keep humid until they are well established. Do not plant outside until the ferns are at least 2 years old and then only in a very well sheltered position. Division in spring[200].

nwatta Tolerates short periods of drought and direct sunlight, but it prefers bright filtered light[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

Closely related to P. capitata, but this species is more tolerant of winter cold and wet conditions[200].

# 7.2.448 Meconopsis aculeata

 $6\ tlin\ 9\ cyuc\ 1\ kcak\ 0\ tcan\ 2\ dwat\ 0.6\ m\ hkuc$ hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Meconopsis aculeata is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The whole plant, but especially the root, is considered to be poisonous, it contains narcotic principles[211, 240].

kcakta Edible Parts: LeavesEdible Uses: The plant is said to be edible[145] but no further details are known, not even which part of the plant can be eaten.

dwatta Analgesic Febrifuge NarcoticThe root contains narcotic principles[211, 240]. The entire plant is used in Tibetan medicine, where it is considered to have a bitter taste and a cooling potency[241]. Analgesic and febrifuge, it is used to help heal broken bones, to treat inflammation from fractures and pain in the upper bodily region, especially around the ribs[241].

nrakta E. Asia - W. Himalayas from Pakistan to Uttar Pradesh. ksacta Rocky slopes and damp rocks, 3000 - 4000 metres[51]

propta Seed - best sown in a cold frame as soon as it is ripe in late summer. Spring sown seed is slower to germinate[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Grows best in a woodland soil in partial shade[1, 200]. The soil should be lime-free, moist, well-drained and moderately rich[200]. Dislikes full sun and windy positions[200]. Monocarpic, the plants living for a number of years before flowering but then dying once they flower[200].

# 7.2.449 Paeonia potaninii

Tree Peony

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Paeonia potaninii is a deciduous Shrub growing to 0.6 m (2ft) by 1.5 m (5ft in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: The following use is for P. suffruticosa. It quite probably also applies to this closely-related species.[K - see 214]. Flowers - cooked[46, 61, 177]. The fallen flower petals are parboiled and sweetened for a teatime delicacy, or cooked in various dishes[183].

dwatta Analgesic Antibacterial Antiinflammatory Antispasmodic Cholera DysenteryThe bark obtained from the root has an antimicrobial effect upon various bacteria, including Escherichia coli, typhoid, cholera, Staphylococcus aureus, streptococcus hemolyticus and Pneumococci[250]. The root is also anti-inflammatory and has been used with success in the treatment of arthritic joint swelling[250]. The root is also analgesic, sedative and anticonvulsant, it has a high success rate in the treatment of dysentery and can also be used to treat allergic rhinitis[250]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastro-intestinal infections[238]. This remedy should only be used under the supervision of a qualified practitioner[238]. The herb acts as a synergist when used with liquorice (Glycyrrhiza spp)[218]. A tea made from the dried crushed petals of various peony

species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - W. China to Tibet. ksacta Woodland edges and mountain slopes.

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division of suckers in the dormant season. They are probably best potted up and grown on in light shade in a greenhouse until they are established.

nwatta Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Hardy to about -20°c[184], plants do better in the north of Britain than they do in the south and are generally best if given an open northerly aspect[11]. Closely related to P. delavayi, differing mainly in the size of the flowers, its more dissected leaves and its suckering habit[11]. This species is not recognised by Chinese botanists, who hold that it is no more than a form of P. delavayi[214]. A very ornamental plant[1]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. Plants come into growth early in the year and are then subject to damage by late frosts, they are therefore best sited in a position that is shaded from the early morning sun[11]. The branches are brittle and very subject to wind damage, especially when young[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Cultivated in China as a medicinal plant[214].

#### 7.2.450 Amsinckia lycopsoides

Tarweed Fiddleneck

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Amsinckia lycopsoides is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Fresh juicy shoots[161, 177, 257]. No more details are given. Seed - raw[257]. The parched seed is ground into a powder then made into cakes and eaten without being cooked[257]. If this species is like most other members of the family Boraginaceae, the seed is likely to ripen over a period of time and individual seeds fall from the plant when they are ripe. This

overwinter in a cold frame. Plant out in late spring. High percentage[78] but very slow[11]. Cuttings of mature wood, 10 - 15cm with a heel, November in a frame[78]. Plant out the following autumn[78, 200]. High percentage[78] but very slow[11].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Rock garden, Screen, Specimen. Requires a deep rich moist soil in a sheltered sunny position[11, 200]. Prefers a cool but sunny position[200]. A very ornamental plant, it only successful outdoors in Britain in favoured localities[1]. Grows well in Cornwall[59]. Tender when young[11], the shoot tips of mature plants can be damaged by hard frosts[200]. A number of named forms have been developed for their ornamental value[182]. Untidy old stems on established plants can be pruned to the base in spring[188]. Cultivated for its fruit in China and Japan[2] ( does this refer to medicinal usage?). It does not fruit freely in Britain[11]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, Attractive foliage, Not North American native, Invasive, Naturalizing, Attractive flowers or blooms.

# 7.2.402 Eupatorium japonicum

Poi I ar

6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eupatorium japonicum is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Young leaves - cooked. Boiled and well seasoned[177]. Root - cooked. It is sometimes eaten for food and is considered beneficial to the circulation[218].

dwatta Anodyne Antibacterial Antidandruff Antiviral Carminative Diaphoretic Diuretic Nervine Vermifuge Women's complaintsThe leaves and stems are anodyne, antibacterial, antiviral, carminative, diaphoretic, diuretic, nervine and vermifuge[176, 218]. They are taken internally in the treatment of indigestion, nausea, vomiting, diarrhoea, feverish colds etc[147, 176, 238]. In excess the plant causes irritation to the stomach[238]. The leaves and stems are harvested in the summer before the flower buds open, and are dried for later use[238]. The plant contains the essential oil thymol. In large doses this can cause various health problems such as headaches, tinnitus, vertigo, inhibition of respiration and the circulation[176]. Use with caution[176]. The seed is prescribed in China for the '36 diseases of women'[218]. The root is considered to be beneficial to the circulation and a restorative to women after parturition[218]. It is harvested in the autumn and dried for later use[238]. The herbage, soaked in oil, is applied to the hair as a treatment for dandruff[218].

nrakta E. Asia - S. China, Japan. ksacta Moist grassland along river banks[275].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Succeeds in ordinary well-drained but moisture retentive garden soil in sun or part shade[200]. A very polymorphic species[58], it is closely related to E. cannabinum[1]. This species is a member of natural moist grassland flora on river banks in the Kanto District of Japan. Due to urbanization of this area, the habitat is now restricted to a very small area, and the species is endangered[275]. Plants seem to be immune to the predations of rabbits[233].

### 7.2.403 Artemisia indica

6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 1.2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Artemisia indica is a ANNUAL/PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: LeavesEdible Uses: Colouring CondimentYoung leaves - cooked and eaten with barley[183]. The leaves are also pounded with steamed glutinous rice to give a flavour and colouring[177, 183].

tcanta Essential Incense InsecticideThe plant yields about 0.2% essential oil. This is a good larvicide and a feeble insecticide[240]. The dried leaves and flowers are used as an incense[2721.

dwatta Anthelmintic Antiseptic Antispasmodic Dysentery Emmenagogue Expectorant Ophthalmic Stomachic TonicThe leaves and flowering stems are anthelmintic, antiseptic, antispasmodic, emmenagogue, expectorant and stomachic[240, 272]. An infusion is used in the treatment of nervous and spasmodic affections, in asthma and in diseases of the brain[240, 272]. This infusion is also considered to be helpful in improving the appetite[272]. The juice of the plant is used in Nepal to treat diarrhoea, dysentery and abdominal pains[272]. It is used as an eyewash where it is said to relieve the burning sensation in conjunctivitis[272]. A paste of the plant is applied externally to treat wounds[272]. The roots are antiseptic and are a tonic for the kidneys[240, 266, 272].

nrakta E. Asia - China, Japan, India. ksacta Waste ground in central and southern Japan[58]. The sides of paths and tracks, margins of cleared forests at elevations of 300 - 2500 metres in Nepal[272].

propta Seed - surface sow spring in a greenhouse. Do not allow the compost to dry out. When large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. The seed can also be sown in situ in late spring.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Plants are annuals or short-lived perennials[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 7.2.404 Scrophularia umbrosa

Water Betony, Water figwort 6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scrophularia umbrosa is a PERENNIAL growing to 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollimated by Bees, wasps. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista The plant is probably poisonous to cows[76]. kcakta Edible Parts: RootEdible Uses: Root - cooked[2, 105]. There must be some doubts about the edibility of this root[K].

dwatta Detergent Eczema VulneraryThe leaves are detergent and vulnerary[4]. They are harvested as the plant comes into flower and can be used fresh or dried for later use[4]. The plant has a good reputation as a wound herb, either applied externally as a poultice or taken as a decoction[4]. Water betony is said to have similar medicinal properties to the knotted figwort, S. nodosa[254]. These properties are as follows: Knotted figwort is a plant that supports

detoxification of the body and it may be used as a treatment for various kinds of skin disorders[254]. The whole plant is alterative, anodyne, anti-inflammatory, diuretic, mildly purgative and stimulant[4, 9, 21, 165]. It is harvested as the plant comes into flower in the summer and can be dried for later use[4]. A decoction is applied externally to sprains, swellings, burns, inflammations etc, and is said to be useful in treating chronic skin diseases, scrofulous sores and gangrene[4, 254]. The leaves can also be applied fresh or be made into an ointment[4]. Internally, the plant is used in the treatment of chronic skin diseases (such as eczema, psoriasis and pruritis), mastitis, swollen lymph nodes and poor circulation[238]. It should not be prescribed for patients with heart conditions[238]. The root is anthelmintic[9].

nrakta Europe, including Britain, south and east from S. Sweden to France, Palestine and Asia to Tibet. ksacta Damp shady ground, usually near water[4, 17]. An occasional garden weed[1].

propta Seed - sow spring or autumn in a cold frame[238]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed then it can be sown outdoors in situ in the autumn or the spring. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most moist soils. A good bee plant[4].

### 7.2.405 Cistus albidus

Rock Rose

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Cistus albidus is an evergreen Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

koakta Edible Parts: Edible Uses: Condiment TeaThe leaves are used as a tea substitute[177, 183]. The dried leaves are sometimes used as an adulterant for marjoram (Origanum majorana)[183].

nrakta S.W. Europe to N. Africa - Mediterranean. ksacta Garigue, rocky places on limestone soils and open pine forest[89].

propta Seed - gather when ripe and store dry[78]. Surface sow in late winter in a greenhouse[164]. The seed usually germinates in 1 - 4 weeks at  $20^{\circ}$ c[164]. Prick out the seedlings as soon as they are large enough to handle into individual pots. Grow them on in the greenhouse for their first winter and plant them out the in the following spring or early summer, after the last expected frosts[164]. The seed stores for at least 3 years[K]. Cuttings of softish to half-ripe wood, 8cm long with a heel or at a node, June/August in a frame. Roots are formed within 3 weeks[78]. High percentage[78]. Cuttings of almost mature wood, 8 - 12cm with a heel or at a node, September/October in a frame. High percentage[78]. Lift and pot up in the spring, plant out when a good root system has formed[78]. Layering in spring.

nwatta Requires a sunny position in a well-drained light sandy soil[1, 182]. Prefers a calcareous soil[190]. Withstands drought once it is established[190]. Tolerates maritime exposure[188]. One of the hardiest species in this genus, tolerating temperatures down to about -15°c[184] and surviving all but the coldest winters in Britain[11], it is however apt to be short-lived[182]. Plants are somewhat hardier when grown in poor soils[182]. Individual flowers only last one day but there is a long succession of them[200]. Dislikes pruning or root disturbance[182, 200]. Plants should be pot grown and then planted out in their final positions

whilst still small. Plants in this genus are notably resistant to honey fungus[200]. Hybridizes freely with other members of this genus[200].

# 7.2.406 Onopordum illyricum

Cotton Thistle, Illyrian cottonthistle

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Onopordum illyricum is a BIENNIAL growing to 1.3 m (4ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flower buds-cooked. Used as a globe artichoke (Cynara scolymus) substitute[183], though they are even more fiddly than that plant[K].

nrakta S. Europe. ksacta Sunny and well-drained habi-

propta Seed - sow spring in situ[200]. The seed can also be sown in situ in autumn[200]. If the seed is in short supply then it can be sown in a pot in the greenhouse in the spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out into their permanent positions in early summer.

nwatta Succeeds in almost any ordinary garden soil. Requires a well-drained soil in full sun. Prefers a slightly alkaline soil. Plants are hardy to about -15°c. Often self-sows, sometimes to the point of nuisance, though the seedlings can easily be hoed out and can also be transplanted if they are moved whilst still small[200]. The flowers are very attractive to bees

# 7.2.407 Viscum album

Mistletoe, European mistletoe 6 tlin 9 cyuc 1 keak 0 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Viscum album is an evergreen Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from February to April, and the seeds ripen from November to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[10, 19], though the toxicity level is very slight[65]. Hepatitis may occur. Toxic doses: hypotension, coma, seizures, pupil dilation, death. Contraindicated during pregnancy. Can interfere with allopathic drugs for high blood pressure, heart disease, antidepressants and anticoagulants. Avoid for progressive disorders like tuberculosis. It's use for cancers and leukemia is currently under review [301].

kcakta Edible Parts: FruitEdible Uses: The ripe fruit is edible[272]. Some caution is advised, see notes above on toxicity[K].

dwatta Antianxiety Anticonvulsant Antidiarrhoeal Antispasmodic Cardiac Cytostatic Diuretic Epilepsy Hypotensive Narcotic Nervine Stimulant Tonic VasodilatorMistletoe is chiefly used to lower blood pressure and heart rate, ease anxiety and promote sleep. In low doses it can also relieve panic attacks and headaches, and also improves the ability to concentrate[254]. The plant's efficacy as an anticancer treatment has been subject to a significant amount of research - there is no doubt that certain constituents of the

pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta The European Union has granted the refined oil of the seed of Buglossoides arvensis novel food status (a type of food that does not have a significant history of consumption or is produced by a method that has not previously been used for food) and some farmers are growing it.

dwatta DiureticAn infusion of the leaves is used as a diuretic[240].

nrakta Central and southern Europe, including Britain, through Asia to the Himalayas. ksacta Arable fields, rough ground and open grassy places[17].

propta Seed - sow spring in situ. Germination should take place within a few weeks.

nwatta 207189 Prefers a moderately fertile well-drained soil[200].

## 7.2.445 Geranium dissectum

Cut-Leafed Cranesbill, Cutleaf geranium 6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Geranium dissectum is a ANNUAL growing to 0.6 m (2th). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. A famine food, used when all else fails[177].

tcanta Dye TanninA brown dye is obtained from the dry flowers[168]. The leaves and roots are rich in tannin[4].

dwatta Antiseptic Astringent Cholera Dysentery Styptic TonicThe whole plant, but especially the roots, is rich in tanini[4]. It is antiseptic, highly astringent, styptic and tonic[4]. An infusion of the whole plant, or of the roots alone, is used in the treatment of diarrhoea (especially for children and the elderly), dysentery, cholera, gastro-enteritis, internal bleeding, excessive menstruation etc[4]. Externally, it is used in the treatment of purulent wounds, haemorrhoids, thrush, vaginal discharges, inflammations of the mouth etc[238]. It is best to harvest the roots as the plant comes into flower since they are then at their most active medicinally[4]. The leaves should be harvested before the plant sets seed[4]. Both are dried for later use[238].

nrakta Most of Europe, including Britain, south to N. Africa and east to Iran. ksacta Cultivated and waste ground, grassland, hedgebanks etc to 375m[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a range of soil types[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

#### 7.2.446 Anemone rivularis

Can Vu Mai

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anemone rivularis is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, many members of this genus contain protoanemonin, an irritating acrid oil that is an enzymatic

breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270].

kcakta Edible Parts: SeedEdible Uses: Seeds - roasted and pickled[272].

dwatta Analgesic Antidote Antiemetic VermifugeThe plant is said to be antiemetic and vermifuge[91]. It is said to warm the stomach and stop vomiting. A paste made from the plant is used in Nepal to treat coughs and fevers[272]. The juice of the leaf, mixed with water, is inhaled through each nostril to treat sinusitis[272]. The seeds are used in Tibetan medicine, they are said to have a bitter and acrid taste with a heating potency[241]. Analgesic and antidote, they are used in the treatment of rotting tissues, snake poisoning and stomach/intestinal pain from worm infestation[241]. A decoction of the root is applied externally to cuts and wounds[272].

nrakta E. Asia - Tibet, Himalayas, Sri Lanka. ksacta Meadows, forest clearings, bunds between paddy fields, streamsides and hedges[187]. Under alpine brush in the Himalayas. 4000 - 5000 metres[91].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring, it requires 3 - 5 weeks cold stratification. The seed usually germinates in 1 - 6 months at 20°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first year in a lightly shaded place in a greenhouse. When large enough, plant them out into their permanent positions in the spring. Division in late summer after the plant dies down.

nwatta Easily grown in a moist well-drained soil in sun or semi-shade[187]. Succeeds in ordinary garden soil but prefers a rich sandy loam[1]. Requires a damp soil, doing well by water[1, 111]. A very ornamental plant[1], it is hardy to about -20°c[187]. This species is closely related to A. narcissiflora[233]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially lequimes[54].

# 7.2.447 Paronychia argentea

Algerian Tea

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.1 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Paronychia argentea is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: TeaAn infusion of the flowers is used as a tea[183].

tcanta Especially useful as a ground cover plant after bulbs have flowered[200, 208]. The plants form a low carpet, rooting as they spread, and they should be spaced about 30cm apart each way[208].

dwatta Aphrodisiac Diuretic TBAn infusion of the leaves is aphrodisiac and diuretic[200]. It is also used in the treatment of TB[200]

nrakta S. Europe to S.W. Asia. ksacta Dry rocky habitats[200]

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[2001.

nwatta Requires a warm open position in full sun, in a sharply drained sandy or gritty soil. If the soil is too rich the plants leaves will not be so silvery[200]. Plants can be grown in a wall[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between – and -10°c, perhaps more if in a perfectly drained soil[200].

very alkaline soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought.

pcista The berries are purgative[8]. Caution required if used in patients on treatment for high blood pressure. An increase in tone of veins can influence blood pressure allowing more blood to flow to the heart [301].

kcakta Edible Parts: StemEdible Uses: CoffeeYoung shoots - cooked[1, 2, 4, 5, 8, 11]. They are harvested in the spring as they grow through the soil and used as an asparagus substitute[7, 183]. The taste is pungent and rather bitter[132, 183]. The roasted seed is a coffee substitute[1, 105, 183].

tcanta Broom ScourerMature shoots are bound into bunches and used as scourers or as besoms[4, 6, 8, 11, 100, 182]

dwatta Antipruritic Aperient Deobstruent Depurative Diaphoretic Diuretic VasoconstrictorButcher's broom is little used in modern herbalism but, in view of its positive effect upon varicose veins and haemorrhoids, it could be due for a revival[254]. The root is aperient, deobstruent, depurative, diaphoretic, diuretic and vasoconstrictor[4, 7, 238]. It has been taken internally in the past in the treatment of jaundice, gout, and kidney and bladder stones, at the present time it is used to treat venous insufficiency and haemorrhoids[238]. It should not be prescribed for patients with hypertension[238]. It is also applied externally in the treatment of haemorrhoids[238]. The root is harvested in the autumn and dried for later use[4]. The whole plant is also sometimes used[4]. This remedy should not be given to people with high blood pressure[254]. The plant contains saponin glycosides, including ruscogenin and neoruscogenin. These substances are anti-inflammatory and cause the contraction of blood vessels, especially veins 2541. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Ruscus aculeatus for haemorrhoids (piles) and venous conditions (see [302] for critics of commission E) [301].

nrakta Western and southern Europe from Britain to Switzerland, south to the Mediterranean. ksacta Outskirts of dry woods and in moist uncultivated ground especially on chalk/7. 17. 1861.

propta Seed - sow the seed thinly in early spring in a cold frame in light shade. The seed germinates better if it is given a period of cold stratification. Germination can be rather slow, sometimes taking 12 months or more. Grow the seedlings on in the pot in light shade in the greenhouse for their first growing season, giving occasional liquid feeds to ensure they do not suffer nutrient deficiencies. Prick them out into individual pots in the following spring and grow them on for at least another year in the pots before planting them out in early summer. Be very sure to protect the seedlings from slugs[K]. Division as the plant comes into growth in early spring[186]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Tolerant of most soils[11], including chalky and heavy clay soils[200]. Prefers a shady position[1, 31], tolerating dense dry shade and bad growing conditions[186], including the drip-line of trees[182]. Dislikes much wetness at the roots[186]. Established plants are drought resistant[186]. A very hardy plant, when fully dormant it can tolerate temperatures down to about -25°c[187]. Plants have a slowly creeping tough rootstock and eventually form large clumps[187]. Plants in this genus are notably resistant to honey fungus[200]. Plants are unusual in that the flowers are produced from the middle of the leaf[4]. Although normally dioecious, some hermaphrodite forms are known[200]. One of these is called 'Sparkler'. Male and female plants must usually be grown if seed is required.

# 7.2.442 Orychophragmus violaceus

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Orychophragmus violaceus is a AN-NUAL/BIENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[200].

nrakta E. Asia - eastern China to Korea. ksacta Roadsides, gardens, forests, fields, thickets, valleys, hillsides and sunny slopes from near sea level to 1500 metres[266].

propta Seed - sow in situ in spring or early summer. nwatta Suceeds in a fertile well-drained soil in a sunny position[200]. Plants are not very cold-tolerant[188], but they can be overwintered outdoors in areas where winter temperatures do not fall below about -5°c[200]. This species is cultivated as a vegetable in China[200].

## 7.2.443 Coprosma atropurpurea

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Coprosma atropurpurea is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw[173]. Sweet, but with little flavour[225, K]. The wine-red fruit is about 8 - 12mm in diameter[200, 225]. The roasted seed is an excellent coffee substitute[153].

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153].

nrakta New Zealand. ksacta Lowland to higher montane regions in tussock grass, stream margins, rocky places and dry river beds on North and South Islands[44].

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[K]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame. Division of suckers[225].

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Succeeds in most soils, so long as they are well-drained[225]. Somewhat intolerant of frost, this species is only likely to succeed outdoors in the milder areas of Britain[200]. Another report says that it is quite hardy in Britain[225]. Closely related to C. pumila, and often confused with that species[225]. It hybridizes freely with other members of this genus[200, 225]. This species is often confused with C. petriel[11, 44], though it is quite distinct and does not hybridise with that species[225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

# 7.2.444 Buglossoides arvensis

Field Gromwell, Corn gromwell 6 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Buglossoides arvensis is a ANNUAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is

plant, especially the viscotoxins, exhibit an anticancer activity but the value of the whole plant in cancer treatment is not fully accepted[254]. It is said that the constituents of mistletoe vary according to the host plant it is growing on - that found on oak trees is said to be superior[238]. Because of the potential side effects, this plant should only be used internally under the guidance of a skilled practitioner. Using the plant internally can provoke intolerant reactions to certain substances[7]. The leaves and young twigs contain several medically active compounds[279]. They are antispasmodic, cardiac, cytostatic, diuretic, hypotensive, narcotic, nervine, stimulant, tonic and vasodilator[4, 7, 19, 21, 46, 66, 165, 238, 279]. They are harvested just before the berries form and are dried for later use[4]. Mistletoe has a reputation for curing epilepsy and other convulsive nervous disorders[4]. The effect of the correct dosage is to lessen and temporarily benumb the nervous activity that causes the spasms, but larger doses can produce the problem[4]. Mistletoe has also been employed in checking internal haemorrhages, in treating high blood pressure and in treating cancer of the stomach, lungs and ovaries[4, 9, 238, 279]. Externally, the plant has been used to treat arthritis, rheumatism, chilblains, leg ulcers and varicose veins[238]. A homeopathic remedy is made from equal quantities of the berries and leaves[4]. It is difficult to make because of the viscidity of the sap[4]. The German Commission E Monographs, a therapeutic quide to herbal medicine, approve Viscum album Mistletoe for rheumatism, tremor therapy as a adjuvant (see [302] for critics of commission E).

nrakta Europe, including Britain, from Scandanavia south and east to N. Africa, central Asia and Japan. ksacta Grows on the branches of many trees, especially poplars, apples, chestnut and birch and especially on calcareous soils[7, 17]. Not usually found on conifers[17].

propta This is a parasitic plant that grows entirely on the host tree. To grow it you need to obtain berries and squash them onto the branches of host trees in late autumn and early winter[11]. This is best done on the lower side of the branch[1]. It is then simply a matter of waiting and hoping

nwatta A parasitic plant, growing on the branches of several deciduous species of trees. It is not usually found on coniferous trees, though the subspecies V. album abietis is found on conifers, especially Abies spp, whilst V. album austriacum is found on pine and larix. The host tree must be at least 20 years old[200]. Although the host branch might eventually succumb, the host tree is seldom killed[200].

# 7.2.408 Hydrangea hirta

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli xre7t hjonli

drutta Hydrangea hirta is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked[105]. Eaten with rice[177].

nrakta E. Asia - C. Japan. ksacta Not known

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[2001.

nwatta Tolerates most soils[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is

grown in a low rainfall area then it requires shade at the hottest part of the day[11]. It grows well on very acid soils with a pH around 4.5[200]. Although the dormant plant is quite hardy in Britain, the young growth in spring can be damaged by late frosts. Closely related to H. scandens[200]. This species is notably susceptible to honey fungus[200].

# 7.2.409 Geranium nepalense

Nepalese Crane's Bill

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geranium nepalense is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Leaves[179]. No further details are given. Fruits - chewed fresh[272]. The fruit is a small dry capsule[K].

tcanta Dye TanninA red dye is obtained from the root, it is similar to Rubia cordifolia[61]. The root contains 25 - 32% tannins[272].

dwatta Antibacterial AstringentThe whole plant is antibacterial and astringent[145, 174, 218]. It is prescribed in the treatment of nervous diseases, numbness of the limbs, pains, rheumatism, renal diseases etc[218, 240]. The juice of the plant is valued in treating renal diseases[272].

nrakta E. Asia - China to the Himalayas. ksacta Semishaded scrubby slopes and in forests, 1500 - 2300 metres in the Himalayas [145].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

# 7.2.410 Bromus rigidus

Ripgut Brome

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Bromus rigidus is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind, Cleistogony (self-pollinating without flowers ever opening). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed[161, 177]. Used as a piñole, or dried then ground into a powder and mixed with water to make a gruel[257]. The seed is small and would be rather fiddly to use[K].

nrakta Southern and western Europe, including Britain, to N. Africa. ksacta Waste places on sandy shores in the Channel Islands, a casual in other parts of Britain[17].

propta Seed - sow spring or autumn in situ and only just cover. Germination should take place within 2 weeks.

nwatta Succeeds in ordinary well-drained garden soil in a sunny position[138, 200]. The plant has cleistogamous flowers, these flowers do not open but produce seed by means of self-fertilization.

## 7.2.411 Eupatorium chinense

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Eupatorium chinense is a PERENNIAL growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe young leaves are used as a flavouring[177].

tcanta The powdered plant is used in Nepal to prepare marcha, a fermenting cake from which liquor is distilled[272].

dwatta Anodyne Carminative Diuretic Nervine Vermifuge Women's complaintsThe leaves are anodyne, carminative, diuretic, nervine and vermifuge[218]. An infusion is used in the treatment of colds, diphtheria and rheumatoid arthritis[238]. The leaves and stems are harvested in the summer before the flower buds open, and are dried for later use[238]. The seed is prescribed in China for the '36 diseases of women'[218]. The root is considered to be beneficial to the circulation and a restorative to women after parturition[218]. The roots are harvested in the autumn and dried for later use[238]. The milky latex is applied to treat goitre[272].

nrakta E. Asia - China, Japan, Korea. ksacta Mountains all over Japan. Open and deforested areas at elevations of 2000 - 2600 metres in Nepal[272].

propta Seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Succeeds in ordinary well-drained but moisture retentive garden soil in sun or part shade[200]. Plants seem to be immune to the predations of rabbits[233]. A polymorphic species[58].

# 7.2.412 Dracocephalum parviflorum

American Dragonhead

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Dracocephalum parviflorum is a ANNUAL/BIENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: CondimentSeed[105, 161, 177, 257]. No more details. The leaves have been used as a flavouring[257].

dwatta Febrifuge OphthalmicThe plant has been used to treat diarrhoea in children[257]. The leaves are febrifuge and ophthalmic[257]. A cold compound infusion has been used in the treatment of fevers and headaches[257]. Externally, it has been used as an eyewash[257].

nrakta N. America - Quebec and Ontario to Alaska, New York, Iowa, Missouri and Arizona. ksacta Dry, rocky or gravelly calcareous soils, often in recent clearings[43].

propta Seed - sow early spring in situ. Pinch back the shoot tips in May in order to encourage bushy growth[200].

nwatta Succeeds in a sunny position in a fertile well-drained soil[200]. The plant is very fragrant[200]. It is useful for filling gaps in the summer border[200].

### 7.2.413 Paeonia ostii

Tree Peony 6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Paeonia ostii is a deciduous Shrub growing to 1.5 m (5ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-ertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: The following use is for P. suffruticosa. It quite probably also applies to this closely-related species. [K - see 214]. Flowers - cooked[46, 61, 177]. The fallen flower petals are parboiled and sweetened for a teatime delicacy, or cooked in various dishes [183].

dwatta Analgesic Antibacterial Antiinflammatory AntispasmodicA tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250]. The following uses are for P. suffruticosa. They quite probably also apply to this closely related species.[K - see 214]. The root and root bark is analgesic, antibacterial, anti-inflammatory, antipyretic, antispasmodic, emmenagogue, sedative, styptic and tonic[46, 61, 174, 176, 178, 218]. An extract of the plant has antibacterial activity[218]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastro-intestinal infections[238]. This remedy should only be used under the supervision of a qualified practitioner[238]. The herb acts as a synergist when used with liquorice (Glycyrrhiza spp)[218]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - China in Shaanxi and Heenan. ksacta Deciduous broad-leaved forests, thickets on slopes at elevations of 800 - 1600 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K].

nwatta Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Hardy to about -20°c[184], plants do better in the north of Britain than they do in the south and are generally best if given an open northerly aspect[11]. A very ornamental plant[1]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. Plants come into growth early in the year and are then subject to damage by late frosts, so are best sited in a position that is shaded from the early morning sun[11]. The branches are brittle and very subject to wind damage, especially when young[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with

and the seeds ripen in August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw or cooked. Sweet, but without much flavour[225]. The fruits vary in colour from white to blue or sea-green[225]. The fruit is seldom borne in Britain[208]. The fruit is about 12mm wide[200]. The roasted seed is an excellent coffee substitute[153].

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153]. A dense carpeting plant, it can be planted about 25cm apart to form a ground cover[208]. The cultivar 'Violet Drops' is much more vigorous than the type, forming compact mats up to 2 metres across and making a very good ground cover[225].

nrakta New Zealand. ksacta Lowland to higher montane grassland, stream margins, rocky places and dry river beds on North and South Islands[44].

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[K]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Succeeds in most soils, so long as they are well-drained[225]. This plant has survived very dry conditions with us and appears to be very drought tolerant[K]. One of the hardiest members of this genus, it succeeds outdoors in the rock garden in many parts of the country[1]. Hybridizes freely with other members of this genus[200, 225], though it does not seem to cross with C. pumila, C. atropurpurea or any red-fruited species[225]. There are several named forms selected for their ornamental value[225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

#### 7.2.439 Sedum forsterianum

Stonecrop

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum forsterianum is an evergreen Perennial growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. pcista Although not poisonous, if large quantities of this

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 46, 105, 115].

nrakta Western Europe, including Britain, south and east from the Netherlands to Morocco and W. Germany. ksacta A very local plant in Britain, growing on rocks and screes on dry soils to elevations of 360 metres[17].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any

time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are drought tolerant[200]. Can be grown on a wall[200]. Requires a sunny position[188]. Hardy to about -15°c[200]. This species is closely related to S. reflexum. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233].

## 7.2.440 Farfugium japonicum

Leopard Plant

6 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Farfugium japonicum is an evergreen Perennial growing to 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from November to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Leaf stems -cooked[46, 61, 177]. The leaf stems are boiled in water to remove a bitter taste, the outer peel is removed and they are then added to salads, soups etc[183].

dwatta Antidote PoulticeThe leaves are antidote[218]. They are taken internally to treat fish poisoning and externally to treat lacquer poisoning[218]. They are also applied to suppurating abscesses and pox[218].

nrakta E. Asia - C. and S. Japan. ksacta Rocky cliffs near sea shores[58, 275]. In the long grass of streamside meadows[200]. Lower elevational forests, grassy slopes and valleys in China[266].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Landscape Uses:Border, Foundation, Massing, Specimen, Woodland garden. Prefers a deep moist fertile humus-rich soil[200]. Requires a sheltered position[166]. Plants often wilt on bright sunny days if they are growing in a sunny position[200]. This species is not very hardy, tolerating temperatures down to between  $\cdot 5$  to  $\cdot 10^{\circ} ([200]$  and succeeding outdoors in a woodland garden in the milder areas of Britain[166]. A good plant for growing in a window[1]. There is possibly some confusion, in the references quoted, between this species and Ligularia japonica[K]. Special Features: Attractive foliage, Attracts butterflies.

#### 7.2.441 Ruscus aculeatus

Butcher's Broom - Knee Holly

6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.8 m hkuc pcimhmim cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Ruscus aculeatus is an evergreen Shrub growing to 0.8 m (2ft 7in) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from January to April, and the seeds ripen from August to March. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in

drutta Scabiosa japonica is a BIENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to September, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Leaves RootEdible Uses: Leaves cooked. Eaten boiled[105, 177]. Root[105, 177, 179]. No more details are given.

nrakta E. Asia - Japan, ksacta Sunny grassy slopes in mountains all over Japan[58].

propta Seed - sow spring in a cold frame. The seedlings are subject to damping off[1] so water with care and make sure to give adequate ventilation. Prick out the seedlings into individual pots once they are large enough to handle and plant them out into their permanent positions in the summer.

nwatta Prefers a neutral or alkaline soil and a sunny position[200]. Succeeds in ordinary garden soil[1]. Requires a well-drained soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 7.2.435 Chionographis japonica

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chionographis japonica is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and 7.2.437 Eragrostis pilosa young plants[177]. No more details are given.

nrakta E. Asia - C. and S. Japan, Korea. ksacta Not known

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse as soon as it is ripe if possible otherwise in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or after flowering in the summer.

nwatta Prefers a moisture-retentive but well-drained humus-rich loamy soil and a position in light dappled shade[1, 200]. It is well suited to the woodland garden[200]. Plants are hardy to about -15°c but they often require some protection in the winter, especially in areas where cold temperatures are prolonged[200].

# 7.2.436 Artemisia capillaris

6 tlin 9 cvuc 1 kcak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Artemisia capillaris is a deciduous Shrub growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some people[222].

kcakta Edible Parts: LeavesEdible Uses: Leaves and stems - soaked and boiled[177].

dwatta Antibacterial Anticholesterolemic Antiviral Cholagogue Diuretic Febrifuge Hepatic VasodilatorYin Chen Hao has been used in Chinese herbal medicine for over 2,000 years. It is considered to be a bitter and cooling herb, clearing "damp heat" from the liver and gall ducts and relieving fevers[254]. It is an effective remedy for liver problems, being specifically helpful in treating hepatitis with jaundice[254]. Modern research has confirmed that the plant has a tonic and strengthening effect upon the liver, gallbladder and digestive system[254]. The leaves and young shoots are antibacterial, anticholesterolemic, antiviral, cholagogue, diuretic, febrifuge and vasodilator[147, 176, 178, 218]. An infusion is used internally in the treatment of jaundice, hepatitis, gall bladder complaints and feverish illnesses[238]. Externally it has been applied in the form of a plaster for treating headaches[254]. The plant is harvested in late spring and can be dried for later use[238]. Yin Chen Hao is contraindicated for pregnant women[254].

nrakta E. Asia - China, Japan, Korea, Manchuria. ksacta Grassy thickets[147], and along rivers and seashores, C. and S. Japan[58]. Humid slopes, hills, terraces, roadsides and river banks at elevations of 100 - 2700 metres in China[266].

propta Seed - surface sow from late winter to early summer in a greenhouse[200]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Cuttings of half-ripe wood, July/August in a frame. Division in spring or autumn.

nwatta An easily grown plant, succeeding in a welldrained circumneutral or slightly alkaline loamy soil, preferring a sunny position[1, 200]. Established plants are drought tolerant[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. This species is probably not hardy in all parts of Britain, it tolerates temperatures down to at least -5°c[238]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus are rarely if ever troubled by browsing

Soft Love Grass, Indian lovegrass 6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Eragrostis pilosa is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - ground into a flour and used as a cereal[105]. It is generally seen as a famine food, but is used regularly in some areas[177]. The seed is very small and fiddly to utilize[K].

dwatta VulneraryThe plant is said to be an effective cure for contusions[218].

nrakta Warm Temperate regions. ksacta Roadsides, waste places and old fields[43].

propta Seed - sow early spring in a greenhouse and only just cover the seed. Germination should take place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts. The seed can also be sown in situ in mid to late spring, though in a cool summer it may fail to ripen many seeds[162].

nwatta Succeeds in any good loam or humus-rich soil in a sunny position[162]. Prefers a light soil[1]. Plants are harvested (from the wild?[K]) on a regular basis in E. Africa for their edible seed[177].

# 7.2.438 Coprosma petriei

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nvanhien hionli

drutta Coprosma petriei is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, other species if these flower nearby at the same time[250]. 61, 177]. The fallen flower petals are parboiled and sweet-Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Commonly cultivated in China as a medicinal plant, the cultivar 'Phoenix White' has especially vigorous roots and so is the favoured form for medicinal

### 7.2.414 Crocosmia aurea

Monthretia

6 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crocosmia aurea is a CORM growing to 1 m (3ft 3in) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: Colouring A yellow dye is obtained from the flowers and used as a saffron substitute for colouring foods[61, 177, 183].

nrakta S. Africa. ksacta Shady forest areas in moist country, 2000 - 2500 metres from East Cape province and north to Mozambique, Malawi etc[79]. Especially common in conifer plantations[90].

propta Seed - best sown as soon as it is ripe in a cold greenhouse[1]. The seed usually germinates in 3 - 9 weeks at 20 - 25°c[164]. Stored seed can be sown in early spring in a greenhouse[164]. Sow the seed thinly so that the plants can be grown on undisturbed in their pot for the first year, but give the seedlings an occasional liquid feed to ensure they do not become nutrient deficient. Once the plants are dormant in the autumn, pot up the bulbs putting 2 - 3 bulbs in each pot. Grow them on for another year or two in the greenhouse before planting them out when they are dormant in the autumn. Division in spring as new growth commences[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta A very easily grown plant, it succeeds in almost all soils other than very heavy clays or bogs[233], though it prefers a light rich sandy soil[1, 79] in full sun or light dappled shade[200, 233]. Another report says that it prefers a fairly shady position and plenty of moisture in the growing season[79]. The corms are hardy to about -10°c[200] but in cold areas it is wise to lift them when the plants die down in the autumn, store them in a cool frost-free place over the winter and plant them out in the spring[1]. Make sure the corms do not dry out[1]. It is best to avoid lifting the corms if at all possible since the new corms seem to derive some nutrition from the old corms that have flowered[200]. Plants can divide quite freely when growing in a suitable location[233]. Although the fresh flowers have no perfume, when dried and immersed in warm water they release a scent like that of the saffron crocus[245]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

### 7.2.415 Paeonia szechuanica

Tree Peony

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Paeonia szechuanica is a deciduous Shrub growing to 1.5 m (5ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: The following use is for P. suffruticosa. It guite probably also applies to this closely-related species.[K - see 214]. Flowers - cooked[46, ened for a teatime delicacy, or cooked in various dishes[183].

dwatta Analgesic Antibacterial Antiinflammatory AntispasmodicA tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250]. The following uses are for P. suffruticosa. They quite probably also apply to this closely-related species.[K - see 214]. The root and root bark is analgesic, antibacterial, anti-inflammatory, antipyretic, antispasmodic, emmenagoque, sedative, styptic and tonic[46, 61, 174, 176, 178, 218]. An extract of the plant has antibacterial activity[218]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastro-intestinal infections[238]. This remedy should only be used under the supervision of a qualified practitioner[238]. The herb acts as a synergist when used with liquorice (Glycyrrhiza spp)[218].

nrakta E. Asia - China in north-west Sichuan. ksacta Woodland edges in mountains at altitudes of 2,640 - 3,100

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance [250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K].

nwatta Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Hardy to about -20°c[184], plants do better in the north of Britain than they do in the south and are generally best if given an open northerly aspect[11]. A very ornamental plant[1]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. Plants come into growth early in the year and are then subject to damage by late frosts, it is therefore best to site them in a position with shade from the early morning sun[11]. The branches are brittle and very subject to wind damage, especially when young[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1]. Cultivated in China as a medicinal plant[214].

# 7.2.416 Paeonia lutea

Tree Peony, Dian mu dan

6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli fvifxre7t hionli

drutta Paeonia lutea is a deciduous Shrub growing to 1.5 m (5ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is selffertile. Suitable for: light (sandy), medium (loamy) and heavy

(clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: The following use is for P. suffruticosa. It quite probably also applies to this closely-related species.[K - see 214]. Flowers - cooked[46, 61, 177]. The fallen flower petals are parboiled and sweetened for a teatime delicacy, or cooked in various dishes[183].

dwatta Analgesic Antibacterial Antiinflammatory Antispasmodic Cholera DysenteryThe bark obtained from the root has an antimicrobial effect upon various bacteria, including Escherichia coli, typhoid, cholera, Staphylococcus aureus, streptococcus hemolyticus and Pneumococci[250]. The root is also anti-inflammatory and has been used with success in the treatment of arthritic joint swelling[250]. The root is also analgesic, sedative and anticonvulsant, it has a high success rate in the treatment of dysentery and can also be used to treat allergic rhinitis[250]. The plant is used internally in the treatment of fevers, boils, menstrual disorders, nosebleeds, ulcers, irritability and gastro-intestinal infections[238]. This remedy should only be used under the supervision of a qualified practitioner [238]. The herb acts as a synergist when used with liquorice (Glycyrrhiza spp)[218]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - S.W. China. ksacta Spruce forests and the edge of scrub in open pastures at altitudes of 3,300 -4 000 metres[250]

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K].

nwatta Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1]. Prefers a limy soil and a sheltered position[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Hardy to about -15°c[250], plants do better in the north of Britain than they do in the south and are generally best if given an open northerly aspect[11]. This species is not recognised by some Chinese botanists, who hold that it is no more than a form of P. delavayi[214]. A very ornamental plant[1]. It grows best in areas with long hot summers[1] and requires an airy position because it is very subject to fungal attack[11]. Plants in this genus are notably susceptible to honey fungus[200]. Plants come into growth early in the year and are then subject to damage by late frosts, they are therefore best sited in a position that is shaded from the morning sun[11]. The branches are brittle and very subject to wind damage, especially when young[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. The plant does not really need much pruning apart from removing dead or diseased stems. It is, however, very tolerant of pruning and can be cut right back to ground level if it requires rejuvenation[200]. This species strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually selffertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 -5 years to flower from seed[200]. They generally breed true from seed[1]. Cultivated in China as a medicinal plant[214].

## 7.2.417 Arisaema consanguineum

Tian Nan Xing

6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 1 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Arisaema consanguineum is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

kcakta Edible Parts: LeavesEdible Uses: Leaves - boiled and used as a vegetable[272]. Some caution is advised, see the notes above on toxicity.

dwatta Anodyne Antibacterial Anticoagulant Antifungal Antiinflammatory Antiphlogistic Antirheumatic Antispasmodic Antitumor Epilepsy Expectorant Sedative Stomachic-Tian Nan Xing has been used in Chinese herbal medicine for thousands of years and is valued especially for its beneficial affect upon the chest[254]. When prescribed internally it is always used dried and in conjunction with fresh ginger root[254]. The root is an acrid irritant herb that is anodyne. antibacterial, antifungal, antiphlogistic, antirheumatic, anticancer, antispasmodic, antitumor, expectorant, sedative and stomachic[147, 176, 218, 238]. The dried root is used internally in the treatment of coughs with profuse phlegm, tumours, cervical cancer, epilepsy, tetanus and complaints involving muscular spasms[176, 238]. The fresh root is applied externally as a poultice to ulcers and other skin complaints[254]. The root is harvested when the plant is dormant in the autumn or winter and is dried for later use[238]. The whole plant is anticoagulant, anti-inflammatory, antispasmodic and anodyne[218].

nrakta E. Asia - Himalayas to S.W. China ksacta Damp shady pine and mixed forests, shrubberies and grassy slopes at elevations of 1800 - 3300 metres in the Himalayas 51, 147,

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame[134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1 - 6 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Prefers a cool peaty soil in the bog, woodland garden or a sheltered border in semi-shade[200]. Prefers a loamy or peaty soil[1] and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too exposed[1, 200]. This species requires a warm corner in British gardens[233]. Plants are nearly hardy in Britain, they normally succeed outdoors in the milder areas of the country[1]. They tolerate temperatures down to about -10°c[90], though the young growth can be damaged by spring frosts[238]. Tubers should be planted about 10cm deep[233]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants need protection from slugs[200]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year.

# 7.2.418 Ipomopsis aggregata

Skyrocket, Scarlet gilia 6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc eyes[257]. A powder of the dried and ground root can be used as a dressing on cuts, wounds, burns and sores[257]. A poultice of the crushed roots has been used to treat boils, deep cuts and wounds[257]. A cold infusion of the seeds has been used as a cough medicine[257]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta Western N. America - California to Nevada and Washington. ksacta Sagebrush desert and ponderosa pine forest at altitudes of 900 - 1800 metres[60].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species requires an extremely well-drained soil[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. A very cold-hardy plant, tolerating temperatures down to about -30°c[250]. A long-lived plant, specimens can survive in the garden for at least 50 years[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1].

### 7.2.432 Aletris farinosa

Unicorn Root - Colic Root, White colicroot 6 tlin 9 cyuc 1 kcak 0 tcan 3 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Aletris farinosa is a PERENNIAL growing to 0.6 m (2ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil

pcista The fresh root is mildly poisonous[21] causing abdominal discomfort (hypogastric). May lead to colic, diarrhoea and vomiting. As used to treat amenorrhoea avoid during pregnancy [301].

kcakta Edible Parts: RootEdible Uses: Bulb cooked[105, 161, 177]. Intensely bitter[2]. A bitter-sweet soapy taste[238].

dwatta Antiflatulent Antiinflammatory Appetite Stimulants Appetizer Bitter Diuretic Dysentery Narcotic TonicThe greatest value of unicorn root is its tonic influence on the female generative organs, proving to be of great use in treating cases of habitual miscarriages[4]. Used for gynaecologi-

An infusion of the root has been used as a wash for sore cal disorders or 'female complaints' in the US including dysmenorrhoea, amenorrhoea and prolapsed vagina complaints [301]. It also promotes the appetite and is used in the treatment of diarrhoea, rheumatism and jaundice[222]. The root is bitter, diuretic, narcotic and tonic[1, 21, 46, 213]. Only use the dried rootstock[21], in large doses the fresh root is somewhat narcotic, emetic and cathartic[4]. A decoction of the root is a bitter tonic and has been used for expelling flatulence and for various uterine disorders[207, 222]. It is used in the treatment of colic, though small doses, especially of the fresh root[4], can cause hypogastric colic[222]. The root is harvested in late summer after flowering and dried for later use[238]. The root contains diosgenin, which has both antiinflammatory and oestrogenic properties[222]. A tea of the leaves has been used in the treatment of colic, stomach disorders, dysentery and bloody dysentery[213, 257].

nrakta South-eastern N. America - Southern Maine to Florida, west to Texas and Wisconsin, ksacta Grassy or sandy woodlands, in dry or moist peats, sands and gravels, especially on the seashore[4, 21, 43]

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse in early spring. Sow the seed thinly to allow the seedlings to be grown on for their first year without potting them up, but give a liquid feed from time to time to ensure that they do not become nutrient deficient. Prick the young plants out into individual pots the following spring and grow them on in the greenhouse for the next winter. Plant them out into their permanent positions in early summer. Division in spring.

nwatta Prefers a damp sunny position in peat, leafmold and sand[1]. Requires a sunny position[200]. Plants are hardy to between -10 and -15°c[200].

# 7.2.433 Saxifraga cortusifolia

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc hmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Saxifraga cortusifolia is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[177].

nrakta E. Asia - Japan. ksacta Wet shaded places, especially on rocks and along streams in mountains, C. and S. Japan[58].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame in the spring. Surface sow, or only just cover the seed, and make sure that the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Prefers a cool position in a moist humus-rich soil[1]. Prefers an acid soil[200]. Grows well in light woodland[200] or in a shady position in the rock garden. This species is not very hardy in Britain according to one report[1], whilst another says that it is in climatic zone 7 and should therefore succeed outdoors in most parts of this country[200]. However, the leaves and the flowers are liable to be frost-damaged by autumn frosts[200]. A polymorphic species[1], it is closely related to S. stolonifera, differing in not having runners[200].

# 7.2.434 Scabiosa japonica

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

has creeping rhizomes[266]. There has been some confusion between this species and A. crenata, the name Ardisia crispa was misapplied by de Candolle to Ardisia crenata[266].

### 7.2.428 Potentilla glandulosa

Gland Cinquefoil, Sticky cinquefoil, Arizona cinquefoil, Ashland cinquefoil, Ewan's cinquefoil, Hans

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Potentilla glandulosa is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaA tea-like beverage is made by boiling the leaves or the whole plant in water[61, 11, 177, 183].

dwatta Astringent Stimulant TonicAll parts of the plant are astringent[257]. An infusion has been drunk, and a poultice of the plant applied externally in the treatment of swollen parts[257]. An infusion of the plant has been used as a stimulant and tonic[257].

nrakta Western N. America. ksacta Rocky hillsides, Black Hills on Sioux quartzite in eastern South Dakota.

propta Seed - sow early spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Easily grown in a well-drained loam, preferring a position in full sun but tolerating shade[1]. Prefers an alkaline soil but tolerates a slightly acid soil[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 7.2.429 Thymus cilicicus

Cilician Thyme

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.2 m hkuc

htut cyutli kyuctcup hwicli hrasilut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Thymus cilicicus is an evergreen Shrub growing to 0.2 m (0ft 8in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe leaves have a lemon scent and are used as a flavouring in food[238].

tcanta Deodorant Disinfectant EssentialAn essential oil is obtained from the leaves.

dwatta Antiseptic Deodorant DisinfectantThe leaves, and especially the essential oil contained in them, are strongly antiseptic, deodorant and disinfectant[200, 238]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta W. Asia. ksacta Not known

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Prefers a light, well-drained calcareous soil and a sunny position[200]. This species thrives in stony situations[238]. Plants tolerate occasional walking on and can be grown in cracks in paths, they also succeed on walls[200]. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. Plants are hardy to at least -10°c[238]. The flowers are rich in nectar and are very attractive to honey bees[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200].

## 7.2.430 Carduus crispus

Welted Thistle, Curly plumeless thistle 6 tlin 9 cvuc 1 kcak 1 tcan 1 dwat 0.9 m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Carduus crispus is a BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to August, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

pcista The root may be slightly toxic[178]. kcakta Edible Parts: Leaves OilEdible Uses: OilYoung leaves - cooked[105]. An emergency food, used when all else fails[177].

tcanta OilThe seed of all species of thistles yields a good oil by expression[4]. No details of potential yields etc are given[K]. A favorite foodplant of caterpillars of the Painted Lady butterfly (Vanessa cardui).

dwatta Alterative AnodyneThe root is alterative and anodyne[178, 218].

nrakta Europe to Asia. A rare casual in Britain[17]. ksacta Waste ground, cultivated fields and roadsides in Japan[58].

propta Seed - sow spring in situ.

nwatta Succeeds in a sunny position in ordinary garden soil[1, 200]. This species is closely related to C. acanthoides[17].

# 7.2.431 Paeonia brownii

Brown's Peony

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Paeonia brownii is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root. A liquorice flavour[105, 161].

tcanta BeadsThe seeds can be used as beads in necklaces etc[257].

dwatta Antitussive Cardiac Febrifuge Laxative Pectoral Poultice TBThe root is cardiac, febrifuge, laxative and pectoral[257]. A decoction has been used by some native North American Indian tribes in the treatment of pneumonia, tuberculosis, VD, nausea, indigestion, coughs, diarrhoea and kidney troubles[207, 257]. A decoction of the sun-dried roots has been used to help people put on weight[257]. A decoction of the root has been used as a liniment on swellings[257].

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis 7.2.420 Cucubalus baccifer hpa7tmwatli xre7t hjonli

drutta Ipomopsis aggregata is a BIENNIAL/PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: NectarEdible Uses: TeaThe plant has been boiled up as a tea[257]. The nectar is sucked from the flowers by children[257].

tcanta Adhesive Disinfectant SoapThe plant is reported to contain saponins[212] and so could possibly be used as a soap substitute[K]. A decoction of the plant has been used as a face and hair wash by adolescent girls[257]. The whole plant has been boiled up to make a glue[257].

dwatta Cathartic Disinfectant Emetic Skin TonicThe whole plant is cathartic and emetic[61, 257]. The leaves are steeped in hot water until the water turns a bright green, this liquid is taken in small doses as a tonic for the blood[207, 257]. An infusion of the whole plant has been used to treat blood diseases[257]. A decoction has been used as a disinfectant wash on itchy skin[257]. A poultice of the whole plant has been applied to rheumatic joints[257]. An infusion of the roots is used as a laxative and in the treatment of high fevers, colds[257].

nrakta Western N. America - Oregon to California to Texas, north to N. Dakota, ksacta Dry rocky slopes in sagebrush, scrub and clearings in pine forests to 3000 metres in California[187].

propta Seed - sow spring in situ[200].

nwatta Requires a well-drained dry soil in sun or partial shade[187]. Requires a light very well drained fertile soil in full sun[200]. Plants are cold-hardy to about -15°c[187], but they are susceptible to rot in areas with wet winters[260]. It is best to cover the plants with a pane of glass in wet winter areas[260]. A slow-growing[188] and short-lived perennial or biennial species[187]. A polymorphic species[60]. The leaves have a musky scent[187]. The crushed leaves smell like a skunk[212]

### 7.2.419 Carex paniculata

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Carex paniculata is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June, and the seeds ripen from June to July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta Edible Parts: Root SeedEdible Uses: Root cooked[172]. Seed[172]. No further details are given, but the seed is small and fiddly to use[K].

tcanta BeddingThe straw is used for bedding[61].

nrakta Most of Europe, including Britain, north to 62° N., W. Asia and N. America. ksacta Wet, often shady places, on peaty base-rich soils[17].

propta Seed - sow in situ in the spring in a moist soil in light shade. If seed is in short supply it can be sown in a cold frame and be planted out in the summer. The seed usually germinates in 2 - 6 weeks at 15°c[138]. Division in spring[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring.

nwatta Easily grown in a damp to wet soil in full sun or shade[162, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

Berry-Bearing Catchfly

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Cucubalus baccifer is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and young plants - cooked[177, 179].

tcanta TanninThe plant is rich in tannin[179]. dwatta StypticA decoction of the plant is used in the treatment of haemorrhages[218, 240].

nrakta S. Europe to W. Asia. ksacta Damp shady habitats in scrub and woodland[200].

propta Seed - sow spring in situ.

nwatta See the plants native habitat for ideas on its cultivation needs. Plants are hardy to between -10 and -15°c[200].

# 7.2.421 Scirpus cyperinus

Woolly Grass Bulrush, Woolgrass

6 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc

hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Scirpus cyperinus is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. Used as a rice substitute[178].

tcanta Stuffing WeavingThe stems are woven to make matting and ropes[178]. The small rushes have been used in making woven mats and storage bags[257]. The fruiting tops of the plant have been used as a resilient material for stuffing and making pillows[257].

nrakta Eastern N. America - Newfoundland to Saskatchewan, south to Florida and Louisiana. ksacta Wet low ground[60]. Swamps[235]. Marshes, moist meadows, ditches, shallow ponds, frequently growing in disturbed areas from sea level to 800 metres[270].

propta Seed - sow in a cold frame as soon as it is ripe in a pot standing in 3cm of water. Only just cover the seed with soil[200]. The seed usually germinates fairly quickly. Prick out the plants when large enough to handle and plant out in their permanent positions in early summer. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in any wet to moisture retentive ground, pond margins and shallow water in full sun or shade[200]. A polymorphic species[60].

### 7.2.422 Ribes lobbii

Gummy Gooseberry

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1.8 m hkuc

htut cvutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ribes lobbii is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[101, 105, 161, 257]. Generally considered to be unpalatable, but they were occasionally eaten by some native North American Indian tribes[256].

tcanta Needles StringThe roots have been boiled with cedar (Juniperus spp, Thuja sp.) and wild rose (Rosa spp) roots, then pounded and woven into rope[257]. The sharp thorns have been used as probes for boils, for removing splinters and for tattooing[257].

dwatta Astringent Poultice SalveThe root has been used in the treatment of diarrhoea[257]. A poultice of the roots and salt water has been applied to mouth sores, body sores, blisters and carbuncles[257]. The root ash, mixed with oil, has been used as a salve on boils[257].

nrakta Western N. America - southern British Columbia to northern California. ksacta Creek banks and lowland valleys to open or forested mountain slopes[60].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 3 months cold stratification at between 0 and 5°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth, November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but well-drained loamy soil of at least moderate quality[11, 200]. Requires a sunny position[11]. Hardy to about -20°c[200]. A very ornamental plant[60], it is closely related to R. menziesii[1]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200].

### 7.2.423 Vaccinium bracteatum

Sea Bilberry

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Vaccinium bracteatum is an evergreen Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177, 183]. The fruit is about 6mm in diameter[200].

dwatta Cancer The plant has been used in the treatment of cancer [218].

nrakta E. Asia - China, Japan, Korea. ksacta Low elevations in mountains, C. and S. Japan[58]. Forests and thickets at elevations of 400 - 1400 metres[266],

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade

though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Plants are hardy at Kew but they are better grown in milder areas[11]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Closely related to V. sprengelii[182]. Plants in this genus are notably resistant to honey fungus[200].

# 7.2.424 Eragrostis curvula

Weeping Love Grass

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Eragrostis curvula is an evergreen Perennial growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion), wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed -cooked[269]. Used as a grain[269].

tcanta Basketry Biomass Soil stabilizationA deep-rooted plant, it is considered excellent for protecting terraces and for grassing water channels and is valuable for erosion control[269]. In Lesotho, the plant is used to make baskets, brooms, hats, ropes, and candles[269].

nrakta S. Africa - north to Zimbabwe and the Transvaal. ksacta Not known

propta Seed - sow early spring in a greenhouse and only just cover the seed. Germination should take place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts. The seed can also be sown in situ in mid to late spring, though in a cool summer it may fail to ripen many seeds[162]. Division in spring.

nwatta Easily grown in most well-drained soils so long as the plant is in a hot, dry, sunny position[200]. Weeping love grass is reported to tolerate an annual precipitation of 31 to 163cm, an annual temperature range of 5.9 to 26.2°C and a pH in the range of 5.0 to 8.2[269]. It is adapted to semi-arid and desert areas and sandy soils, growing well on low fertility soils[269]. A very drought-resistant plant, but it lacks hardiness for more northern areas[269]. It grows well on a wide range of well-drained soils, especially sandy loams; moderately frost-resistant in southern areas[269]. Plants are hardy to about -5°c and succeed outdoors in the milder areas of Britain[200]. The roots contain pyrocatechol, suggesting an explanation for the plants resistance to nematodes[269]. The species and its varieties are apomictic (producing seed without fertilization) although sexual plants have occasionally been found[269].

# 7.2.425 Skimmia laureola

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Skimmia laureola is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to June. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista A poisonous alkaloid called 'skimmianin' is found in all parts of the related S. japonica, it is probably also present in this species[211].

kcakta Edible Parts: LeavesEdible Uses: CondimentLeaves - cooked. Used as a condiment[272]. The

strongly aromatic leaves are used in curries or as a flavouring for other foods[146, 177, 183].

tcanta Essential Incense WoodAn essential oil in the leaves is used in scenting soap[61, 240, 272]. The dried leaves are used as an incense[61, 145, 211]. The fresh leaves are used to make garlands for weddings[211]. Plants can be grown as a ground cover when planted about 1 metre apart each way[208]. Wod - used to make handles of small farming implements such as hoes and axes[272].

dwatta The leaves are used in the treatment of small-pox[240]. The smoke produced by burning them is said to purify the air[240].

nrakta E. Asia - N.W. Himalayas to N. China. ksacta An undershrub in rocky places in oak and fir forests, 2400 - 3600 metres from C. Nepal to N. China[51, 146, 184].

propta Seed - can be sown as soon as it is ripe in a cold frame[K]. It also succeeds when sown in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If there is sufficient seed then it can be sown can be in an outdoor seedbed in early spring[200]. Grow the plants on in the seedbed for a couple of years before planting them out in late autumn or early spring. Cuttings of half-ripe wood, July/August in a cold frame[11]. Cuttings of nearly mature side shoots, 7 - 10cm with a heel, September in a cold frame. Slow to root, they should be left for 18 months before moving to their permanent positions. Good percentage[78]. Layering in autumn. Takes 18 months. Good to high percentage [78].

nwatta Succeeds in a well-drained open loam or in a peaty soil in a sunny position[1]. Probably flowers well in the shade[11]. Plants are very tolerant of atmospheric pollution, being unharmed by deposits of soot or a sulphurladen atmosphere[245]. This species is not very frost-hardy and so is rather tender in much of Britain[1]. The flowers are sweetly scented[184]. The small yellow flowers are oppressively scented, giving a somewhat unpleasant smell near to, though agreeable at a distance[245]. The bruised leaves are strongly aromatic[245]. The plant is superficially similar to Daphne cannabina and is often mistaken for that species[211]. Dioecious. Male and female plants must be grown if seed is required.

#### 7.2.426 Convza canadensis

Canada Fleabane, Canadian horseweed 6 tlin 9 cyuc 1 kcak 1 tcan 3 dwat 1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasilut hpa7tli pr

hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli hionli

drutta Conyza canadensis is a ANNUAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to October, and the seeds ripen from July to October. The species is monocious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees, flies. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Skin contact with the plant can cause dermatitis in some people[222].

kcakta Edible Parts: LeavesEdible Uses: CondimentYoung leaves and seedlings - cooked[105, 177]. Boiled, cooked in rice or dried for later use[183]. A nutritional analysis of the leaves is available[218]. The source of an essential oil that is used commercially for flavouring sweets, condiments and soft drinks[183]. The fresh leaves contain 0.2 - 0.66% essential oil[218].

tcanta EssentialThe plant contains small quantities of essential oil[7]. Since the plant is readily obtainable, extraction of the oil is feasible - it has a special quality that would make it suitable in the making of perfumes with unusual nuances[7, 240].

dwatta Astringent Diuretic Dysentery Emmenagogue Homeopathy Hypoglycaemic Styptic Tonic VD Vermifugeln traditional North American herbal medicine, Canada fleabane was boiled to make steam for sweat lodges, taken as a snuff to stimulate sneezing during the course of a cold and burned to create a smoke that warded off insects[254]. Nowadays it is valued most for its astringency, being used in the treatment of gastro-intestinal problems such as diarrhoea and dysentery[254]. It is said to be a very effective treatment for bleeding haemorrhoids[254]. The whole plant is antirheumatic, astringent, balsamic, diuretic, emmenagogue, styptic, tonic and vermifuge[4, 7, 9, 21, 222]. It can be harvested at any time that it is in flower and is best used when fresh[4, 207, 238]. The dried herb should not be stored for more than a year[238]. The seeds can also be used[4]. An infusion of the plant has been used to treat diarrhoea and internal haemorrhages[213] or applied externally to treat gonorrhoea[213] and bleeding piles[7]. The leaves are experimentally hypoglycaemic[218]. The essential oil found in the leaves is used in the treatment of diarrhoea, dysentery and internal haemorrhages[4, 207, 218]. It is a uterine stimulant[213] and is also said to be valuable in the treatment of inflamed tonsils plus ulceration and inflammation of the throat[4]. A tea of the boiled roots is used to treat menstrual irregularities[213]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of haemorrhoids and painful menstruation[9].

nrakta N. America. Naturalized in Britain[17]. ksacta Light soils on waste and cultivated land, also on walls, avoiding acid soils in Britain[17].

propta Seed - we have no information on this species but suggest sowing the seed in spring in situ. An autumn sowing in situ might also be worthwhile.

nwatta Prefers a well-drained light or medium neutral to alkaline soil in a sunny position, though it tolerates most conditions[238]. Originally from N. America, Canada fleabane has become naturalized in many areas of the world and is considered to be a nuisance weed in many areas[268]. The plant is very adaptable to differing conditions and can vary dramatically in height, from only a few centimetres in poor soils to as much as 3 metres tall in rich soils[213]. The plant is used commercially as a food flavouring[183]. A good bee plant[200] but unfortunately it also harbours various insect pests such as the tarnished plant bug[1].

# 7.2.427 Ardisia crispa

6 tlin 9 cyuc 1 kcak 0 tcan 1 dwat 1.2 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ardisia crispa is an evergreen Shrub growing to 1.2 m (4ft) by 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to July, and the seeds ripen from September to December. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw Used in salads[218].

dwatta Antidote Diuretic PectoralThe root is antidotal and diuretic[218]. An infusion is pectoral[218]. The plant is crushed and applied to scurf, it is also applied to the ears in the treatment of earache[218].

nrakta E. Asia - S. China, Japan, India. ksacta Woods in low mountains, C. and S. Japan[58]. Mixed or broad-leaved forests, damp places, bamboo woods, hillsides and valleys at elevations of 100 - 2500 metres[266].

propta Seed - best harvested when it is ripe in the winter and sown immediately in a greenhouse[1]. Sow stored seed as early in the year as possible. When large enough to handle, prick the seedlings out into individual pots and grow them on in a shady part of the greenhouse for at least their first winter. Plant out into their permanent positions in late spring or early summer, once the plants are 20cm or more tall. Cuttings of half-ripe wood in summer[200]. Grow on in cool, shaded humid conditions until well rooted[200].

nwatta Prefers a well-drained humus rich soil in partial shade in a position sheltered from cold drying winds[200]. We are not sure if this plant is hardy outdoors in Britain. One report says that it is hardy in zone 7 (tolerating temperatures down to between -10 and -15°c) but then goes on to suggest that it is best grown in pots or tubs outdoors and moved into a cold greenhouse in the winter[200]. There are some named varieties, selected for their ornamental value[200]. The plant

propta Seed

watta Grows best in a sunny position [200]. Prefers a fertile, well-drained but moisture-retentive soil [200]. The plant grows back quickly from the base when it is cut down, and has been known to produce new growth of 15 metres within 12 months [146]. This species has a symbiotic relationship with certain soil bacteria; these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [755].

### 8.1.17 Acacia pycnantha

Golden Wattle

tfo2n 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 8 m hkuc htut cyutli kyuctcup hwicli hyishras hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Acacia pycnantha is an evergreen Tree growing to 8 m (26ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: GumFlowers - cooked[144]. Rich in pollen, they are often used in fritters. The plant yields an oily gum which is said to be edible[177, 183]. Some species produce a gum that is dark and is liable to be astringent and distasteful, but others produce a light gum and this is sweet and pleasant. It can be sucked like candy or soaked in water to make a jelly.[193]. The gum can be warmed when it becomes soft and chewable[193].

tcanta Dye Gum Soil stabilization TanninA yellow dye is obtained from the flowers[168]. A green dye is obtained from the seed pods[168]. The extensive root system of this plant helps to prevent soil erosion[200]. It is often planted for this purpose on sandy banks[167]. The bark is rich in tannin[1, 171]. On a 10% moisture basis, the bark contains 40.8% tannin[223].

nrakta Australia - New South Wales, Southern Australia, Victoria. ksacta Thickets, or as an under-storey in Eucalyptus forests, especially on very poor soils[167].

propta Seed - best sown as soon as it is ripe in a sunny position in a warm greenhouse[1]. Stored seed should be scarified, pre-soaked for 12 hours in warm water and then sown in a warm greenhouse in March. The seed germinates in 3 - 4 weeks at 25°c[133]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in a sunny position in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in individual pots in a frame[78]. Overwinter in a greenhouse for the first winter and plant out in their permanent positions in late spring or early summer. Fair percentage[78].

nwatta Prefers a rather poor sandy loam and a very sunny position[1, 11]. Succeeds in any good garden soil that is not excessively limey and in dry soils[11]. Most members of this genus become chlorotic on limey soils[200]. Prefers a pH in the range 5.8 to 6.5. This species is not very hardy outdoors in Britain. Plants require hot, sunny summers if they are to ripen their wood fully and flower freely. In Britain they tend to do best when grown in coastal gardens in a sunny, sheltered position that is protected from the wind[11]. A fast growing but short-lived tree in cultivation[167]. It is sometimes cultivated for the tannin obtained from its bark[1, 171]. This tree is the floral emblem of Australia [167]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 8.1.18 Acacia retinodes

Swamp Wattle, Water wattle tfo2n 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Acacia retinodes is an evergreen Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from February to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers SeedEdible Uses: Flowers cooked[144]. Rich in pollen, they are often used in fritters. Seed[144, 157]. No more details are given. The seedpods can be up to 18cm long[219]. Acacia seeds are highly nutritious and contain approx 26% protein, 26% available carbohydrate, 32% fibre and 9% fat[278]. The fat content is higher than most legumes with the aril providing the bulk of fatty acids present[278]. These fatty acids are largely unsaturated which is a distinct health advantage although it presents storage problems as such fats readily oxidise[278]. The mean total carbohydrate content of 55.8 + 13.7% is lower than that of lentils, but higher than that of soybeans while the mean fibre content of 32.3 + 14.3% is higher than that of other legumes such as lentils with a level of 11.7%[278]. The energy content is high in all species tested, averaging 1480+270 kJ per 100g[278]. Wattle seeds are low glycaemic index foods. The starch is digested and absorbed very slowly, producing a small, but sustained rise in blood glucose and so delaying the onset of exhaustion in prolonged exercise[278].

tcanta Dye Soil stabilizationA yellow dye is obtained from the flowers[168]. A green dye is obtained from the seed pods[168]. The extensive root system of this plant helps to prevent soil erosion[200].

nrakta Australia - Victoria, New South Wales, Tasmania. Locally naturalized in S. Europe[50]. ksacta Occurs mainly in open forest in poorly drained soils inland from the coast[286].

propta Seed - best sown as soon as it is ripe in a sunny position in a warm greenhouse[1]. Stored seed should be scarified, pre-soaked for 12 hours in warm water and then sown in a warm greenhouse in March. The seed germinates in 3 - 4 weeks at 25°c[133]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in a sunny position in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in individual pots in a frame[78]. Overwinter in a greenhouse for the first winter and plant out in their permanent positions in late spring or early summer. Fair percentage[78].

nwatta Prefers a well-drained sandy loam and a very sumy position[1, 260], but it also stands drought and wet well[260]. Succeeds in any good garden soil, this species is said to be fairly lime tolerant[11, 166, 182, 200]. Succeeds in a hot dry position[166]. Plants are fairly tolerant of salt in the soil and salt-laden winds[260]. This species is said to be hardy from mid-Sussex southwards and westwards[1]. However, trees are not very hardy outdoors in most parts of Britain and even in the mildest areas of the country they are likely to be killed in excessively harsh winters[11]. A very ornamental tree[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 8.1.19 Coriaria sinica

tfo2n 7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Coriaria sinica is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

## 7.2.489 Saxifraga fortunei

Saxifrag

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Saxifraga fortunei is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[105]. They are added to soups or cooked with rice[177].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Wet shaded rocks by streams in the mountains and down to sealevel in the north of its range[187]. Forests and rock crevices at elevations of 2200 - 2900 metres in Hubei, S Jilin and Liaoning[266].

propta Seed - we have no information for this species but suggest sowing the seed in a cold frame in the spring. Surface sow, or only just cover the seed, and make sure that the compost does not dry out. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring after the last expected frosts. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Alpine garden, Container, Ground cover, Massing, Rock garden, Woodland garden. Prefers a cool position in a moist humus-rich soil[1]. Prefers an acid soil[200]. Grows well in light woodland[200] or in a shady position in a rock garden. The plant is hardy to at least -15°c[187], the leaves and the flowers, however, are liable to be damaged by autumn frosts[200]. A polymorphic species[58], there are several named forms selected for their ornamental value[187]. Special Features:Attractive foliage, Naturalizing.

# 7.2.490 Arabis serrata

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arabis serrata is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - cooked[177].

nrakta E. Asia - Japan. ksacta Rocky or sandy places in mountains - only found on Mt. Fuji in C. Japan[58].

propta Seed - it is best to surface sow the seed as soon as it is ripe in a light position in a cold frame[134]. Seed can also be sown in spring. It usually germinates in 2 - 3 weeks at 21°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division after flowering[111]. Very easy, the divisions can be planted out straight into their permanent positions if required. Cuttings in a shady border in summer[1].

nwatta Easily grown in ordinary well-drained soil[1]. A polymorphic species[58]. Plants are stoloniferous[1].

#### 7.2.491 Salvia carnosa

Purple Sage

6 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 0.8 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia carnosa is an evergreen Shrub growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked. Ground into a powder and used to thicken soups etc or added to cereal flours when making bread etc[105].

dwatta Analgesic Antispasmodic Febrifuge Pectoral StomachicA decoction of the seeds and stems is used to treat colds[61]. A decoction or infusion of the leaves has been used in the treatment of fevers, coughs, colds and stomach aches[257]. A poultice of the crushed leaves has been applied tot he chest to treat congestion[257]. A decoction of the leaves and stems can be drunk, used as a wash or as a steam bath in the treatment of headaches[257]. A decoction of the flowering stems has been used as a poultice and a wash to treat swollen leg veins[257]. The plant is much valued as a treatment for an epileptic or faint person, either administered as a drink or prepared like tobacco and the smoke blown into the patients face[216, 257].

nrakta South-western N. America. ksacta Dry slopes and flats, 1000 - 1500 metres in California [71].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Soils rich in nitrogen encourage excessive leaf growth at the expense of flowering[11]. Plants can be killed by excessive winter wet[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 7.2.492 Ornithogalum narbonense

Star Of Bethlehem

6 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ornithogalum narbonense is a BULB growing to 0.4 m (1ft 4in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to June, and the seeds ripen from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of this plant as being toxic has been seen, it belongs to a family where there are some species that are said to be toxic. Caution should be observed. Any toxins are likely to be concentrated in the bulb[200].

kcakta Edible Parts: RootEdible Uses: Bulb[46, 61, 177]. No further details are given, though it is probably cooked before being eaten. Some caution is advised, see the notes above on toxicity.

nrakta Europe - Mediterranean. ksacta Grassy places and waste ground[50, 90].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Sow the seed thinly and leave the seedlings undisturbed in the pots for their first dormancy, but apply liquid feed at intervals, especially in their second year of growth. Divide the bulbs at the end of their second year of growth, putting 2 - 3 bulbs in each pot. Grow them on for one more year and them plant them out into their permanent positions whilst they are dormant. The seed can also be sown in a cold frame in early spring. Division of offsets in September/October[200]. The larger bulbs can be replanted immediately into their permanent positions. It is best to pot up

the smaller bulbs and grow them on for a year before planting them out when dormant in late summer.

nwatta An easily grown plant[90], it succeeds in any position[42] in ordinary garden soil[1]. Prefers a sunny position[200]. Succeeds in short grass[90], though this should not be mown from the time the bulbs start to grow until they have set seed and the leaves are dying down. Plants are hardy to about -10°c[200].

## 7.2.493 Geum japonicum

6 tlin 9 cvuc 1 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geum japonicum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: The plant is edible[46, 105]. No further details are given.

dwatta Astringent Diuretic PoulticeThe root is used as a poultice, applied externally to boils and ulcers[178, 218]. The whole plant is diuretic and astringent[222]. It is cooked with other foods as an astringent in the treatment of coughs and haemoptysis[218].

nrakta N. America, E. Asia, ksacta Woods and thickets in hills and low mountains all over Japan[58].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer' Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Prefers a soil rich in organic matter[200]. Hybridizes freely with other members of this genus[200].

# 7.2.494 Sedum spathulifolium

Broadleaf Stonecrop, Purdy's stonecrop, Yosemite stonecrop, Stonecrop, Blood Leaf Sedum

6 tlin 10 cvuc 1 kcak 0 tcan 1 dwat 0.1 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli drutta Sedum spathulifolium is an evergreen Perennial

growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. They are best used before the plant flowers[172].

tcanta Can be used as a ground cover plant in a sunny position[197]. It requires weeding for the first year or so[197]. Plants are best spaced about 30cm apart each wav[208]

dwatta Antihaemorrhoidal Birthing aid Galactogogue Haemostatic Laxative Salve SedativeThe leaves are antihaemorrhoidal, galactogogue and haemostatic[257]. The leaves can be eaten, or a poultice of the warmed leaves applied to the breasts, in order to stimulate the milk flow of a nursing mother[257]. The juice of the leaves and stems has

been rubbed over bleeding wounds to stop the bleeding [257]. A decoction of the stems has been drunk by a woman in the ninth month of her pregnancy in order to ease childbirth[257]. A decoction of the whole plant has been given to children as a treatment for constipation and has been used as a wash to soothe nervous and irritable babies[257]. The plant is used as a treatment for sore gums[257].

nrakta Western N. America - British Columbia to California. ksacta Coastal cliffs and ledges, or in the gravelly soil of the foothills[60].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made. it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year [K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Alpine garden, Container, Ground cover, Rock garden, Seashore. A very easily grown plant, it succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Tolerates some shade[188]. Established plants are drought tolerant[200]. Succeeds in poor soils and on walls[200]. Hardy to at least -15°c[200]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they are eaten in guantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]. Special Features:Attractive foliage, North American native.

# 7.2.495 Abies spectabilis

Himalavan Fir

6 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 30 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli hjonli

drutta Abies spectabilis is an evergreen Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Essential Fuel Incense WoodAn essential oil is obtained from the plant, though the report does not give yields or uses[240]. The dried leaves, mixed with other ingredients, are used in making incense[272]. The wood is used for construction and thatching roofs[272]. It is also used for fuel[272].

dwatta Antiperiodic Astringent Carminative Expectorant Stomachic TonicThe leaves are astringent, carminative, expectorant, stomachic and tonic[240]. The leaf juice used in the treatment of asthma, bronchitis etc[240, 243, 272]. An essential oil obtained from the leaves is used to treat colds, rheumatism and nasal congestion[272]. The leaf juice is antiperiodic[240, 243].

nrakta E. Asia - Himalayas from Afghanistan to Nepal. ksacta Forests in Nepal between 2700 - 3900 metres[243]. Moist open areas[272].

propta Seed - sow early February in a greenhouse or outdoors in March[78]. Germination is often poor, usually taking about 6 - 8 weeks[78]. Stratification is said to produce a more even germination so it is probably best to sow the seed in a cold frame as soon as it is ripe in the autumn[80, 113]. The seed remains viable for up to 5 years if it is well stored[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in pots. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Alternatively, if you have sufficient seed, it is possible to sow in

on the prairies[270]. It helps stabilize shifting sand. An important food for livestock and for wild grazers such as bison, desert bighorn sheep, elk, mule deer, pronghorns, and iackrabbits.

nrakta Western N. America - British Columbia to Manitoba, south to Texas, California and Mexico, ksacta Sandy prairies and rocky slopes[43]. Generally found in dry, welldrained soils, in association with a range of plants[270].

propta Seed - sow spring in situ[200]. We have had better results from sowing the seed in a greenhouse. Only just cover the seed and it should germinate freely within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer[K]. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early

nwatta New Crop Staple Crop: Balanced carbSucceeds in any moderately fertile moisture retentive soil in full sun[200]. This species is unlikely to tolerate temperatures lower than about -5°c, and so will only be suitable for the milder areas of the country[213]. Currently (1992) being tested for its potential as a perennial cereal for sandy soils in dry regions[183]. This plants roots are often surrounded by a rhizosheath that harbors nitrogen-fixing organisms[270]. These organisms probably contribute to the species' success as a colonizer[270]. Climate: cold to warm temperate. Humidity: arid to humid. Carbon Farming Solutions - Cultivation: new crop (Describes the non-destructive management systems that are used in cultivation) [1-1].

# 8.1.15 Acacia dealbata

Mimosa. Silver wattle

tfo2n 7 tlin 10 cyuc 2 kcak 3 tcan 0 dwat 25 m hkuc htut cyutli hgatkyuctcup hwicli hrasilut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Acacia dealbata is an evergreen Tree growing to 25 m (82ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from January to February. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FlowersEdible Uses: GumFlowers cooked[144]. Rich in pollen, they are often used in fritters. A gum that exudes naturally from the trunk is edible and is used as a substitute for Gum Arabic[46]. It is very soluble in water and viscous[46, 153], but is of low quality[64]. Larger quantities can be obtained by tapping the trunk[64]. Some species produce a gum that is dark and is liable to be astringent and distasteful, but others produce a light gum and this is sweet and pleasant. It can be sucked like candy or soaked in water to make a jelly.[193]. The gum can be warmed when it becomes soft and chewable[193].

tcanta Dye Gum Soil stabilization TanninA yellow dye is obtained from the flowers[168]. A green dye is obtained from the seed pods[168]. The extensive root system of this plant helps to prevent soil erosion[200]. Tannin is obtained from the bark[61, 171]. On a 10% moisture basis, the bark contains 19.1% tannin[223].

nrakta Australia - Victoria, New South Wales, Tasmania. Naturalized in S. Europe[50]. ksacta In many habitats by streams, gullies and alpine ridges[154, 184]. Dry forests[260].

propta Seed - best sown as soon as it is ripe in a sunny position in a warm greenhouse[1]. Stored seed should be scarified, pre-soaked for 12 hours in warm water and then sown in a warm greenhouse in March. The seed germinates in 3 - 4 weeks at 25°c[133]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in a sunny position in the greenhouse for their first winter. Plant them out in late spring or early summer. after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in individual pots in a frame[78]. Overwinter in a greenhouse for the first winter and plant out in their permanent positions in late spring or early summer. Fair percentage[78].

nwatta Prefers a sandy loam and a very sunny position sheltered from strong winds[1, 11]. Succeeds in any good garden soil that is lime-free[11]. Plants become chlorotic on limey soils[200]. They grow well in a hot dry position[166]. and are very drought tolerant[245]. Fast growing[88]. Although it prefers a well-drained soil, the plant is tolerant of both drought and wet conditions[260]. Hardy to about -10°c, this species succeeds outdoors in the milder areas of Britain[11, 184], growing well in Cornwall[49, 59]. If it is cut down by frosts it usually resprouts from the base to form a thicket of slender stems[166]. It can be trained and grown against a sunny wall[202]. Plants require hot, sunny summers if they are to ripen their wood fully and flower freely. In Britain they tend to do best when grown in coastal gardens in a sunny, sheltered position that is protected from the wind[11]. This species is closely allied to A. decurrens[11]. Old specimens sucker very freely, often at considerable distances from the parent tree[200]. Plants can be coppiced[134]. A very ornamental tree[1], there are some named varieties[260]. The species is cultivated in S. Europe for ornament, timber and soil stabilization[50]. The flowers are very attractive and are often sold in florists[11, 61]. The violet-like perfume of the flowers can be guite intoxicating on a calm day[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 8.1.16 Bauhinia vahlii

Malu Creeper, Adda Leaf, Pahur Camel's Foot Creeper tfo2n 7 tlin 11 cyuc 2 kcak 4 tcan 3 dwat 20 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Bauhinia vahlii is an evergreen Climber growing to 20 m (65ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. The flowers are pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Seed SeedpodEdible Uses: GumEdible portion: Seeds, Pods, Leaves, Flower. The seeds are eaten raw or fried[ 287, 317, 668 ]. Cooked as a pulse[310]. The tender young pods and leaves are cooked as vegetables. The flower buds are eaten as a vegetable. The seeds are eaten raw, roasted, or dried and fried.

tcanta Basketry Containers Fibre Gum Soil stabilization String Tannin ThatchingOther uses rating: High (4/5). Agroforestry Uses: The plant is considered to be a formidable enemy of trees in India, where it has been known to completely smother the tree into which it has grown for support[ 372 ]. It is of use on rocky or disturbed and bare slopes, where its can guickly clothe the ground and its large leaves protect the soil from erosion[ 146 ]. Other Uses A good quality fibre is obtained from the inner bark. It can be made into very strong ropes 287, 317, 454]. It is used for sewing straw mats with the fresh bark[ 454 ]. It can be cut in all seasons; the outer bark is stripped off and thrown away, the inner coating being used for ropes, as wanted, by being previously soaked in water and twisted when wet[ 454 ]. Before being used, the bark is boiled and beaten with mallets, which renders it soft and pliable for being made into ropes and string for charpoys[ 454 ]. The stems are used for matting, basketry and wickerwork[ 310 ]. The leaves are utilized for thatching and making umbrellas[ 317 ]. The large flat leaves are sewn together and used as plates, cups, rough tablecloths, umbrellas, cloaks, and rain capes [668]. A gum exudes copiously from the tree[ 668 ]. Of little value[ 146 ]. The bark contains up to 17% tannins[ 287, 310 ]. The tannin cannot be extracted easily, but is of very good quality 310 ].

dwatta Aphrodisiac DemulcentThe seeds are tonic and aphrodisiac[ 287 ]. The leaves are demulcent and mucilaginous[ 287 ].

nrakta E. Asia - India, Nepal, Pakistan. ksacta Climax monsoon-deciduous forests at elevations up to 1,500 metres[

first winter. Plant out in late spring or early summer[K]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Pot up and overwinter in a cold frame then plant out in late spring or early summer. Fair to good percentage[78]. Layering in spring[200].

nwatta Landscape Uses:Border, Hedge, Screen, Seashore, Specimen. Prefers a moist soil[200]. Grows well in an open position in a well-drained soil in sun or light shade[200]. Thrives in any ordinary garden soil according to one report[11] whilst another says that it thrives in an acid soil[182]. Prefers a lime-free loamy or peaty soil[1]. Plants can be cut back to the ground in severe winters in many parts of Britain[1, 11], but they are well suited to the milder parts of the country[11, 59] where they are fast-growing and produce fruit within 5 years from seed[K]. They succeed and fruit well on a south facing wall at Kew[K]. Plants in this genus are notably resistant to honey fungus[200]. The fruit is covered with a deposit of wax that has a balsamic odour[245]. Many species in this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Attracts birds, North American native, Fragrant foliage, Attracts butterflies, Inconspicuous flowers or

### 8.1.13 Glycine soja

Wild Sova Bean

tfo2n 7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Glycine soja is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

pcista The raw mature seed is toxic and must be thoroughly cooked before being eaten[76]. The sprouted raw seed is sometimes eaten and is considered to be a wholesome food. Avoid prolonged treatment and with asthma and allergic rhinitis patients. Caution with breast cancer patients. Hypoproteinaemia possible in children with cystic fibrosis using soya milk. Women with oestrogen receptor positive tumours using sova protein supplements should excercise caution. Children severely allergic to cow's milk frequently sensitive to soy [301].

kcakta Edible Parts: Leaves Oil Oil Seed SeedpodEdible Uses: Coffee Milk Oil OilMature seed - cooked[2, 33]. Very rich in protein, the seeds can be eaten as they are in soups, stews etc[183], though they are very commonly used in the preparation of various meat substitutes[34, 46]. The dried seed can be ground into a flour and added to cereal flours or used for making noodles etc[183]. The Japanese make a powder from the roasted and ground seed, it is called 'Kinako' and has a nutty flavour and fragrance - it is used in many popular confections[183]. The sprouted seed is eaten raw or added to cooked dishes. The toasted seeds can be eaten as a peanut-like snack[183]. The seed is also made into numerous fermented foods such as miso and tempeh[183] and is also used to make soya milk, used in place of cow's milk. The seed contains 20% oil and 30 - 45% protein[100]. The immature seed is cooked and used like peas or eaten raw in salads[105, 183]. The strongly roasted and ground seeds are used as a coffee substitute [183]. The young seedpods are cooked and used like French beans[116, 183]. An edible oil is obtained from the seed. It is cooked or used as a dressing in salads etc[34, 183]. Young leaves - raw or cooked[179, 183].

tcanta Oil OilThe seed contains up to 20% of an edible semi-drying oil[171]. It is non-drying according to another report[57] This oil has a very wide range of applications and is commonly used in the chemical industry[171, 206]. It is used in making soap, plastics, paints etc[34, 46, 100].

dwatta Antidote Astringent Diaphoretic Laxative Ophthalmic Resolvent StomachicThe fermented seed is weakly diaphoretic and stomachic[176]. It is used in the treatment

of colds, fevers and headaches, insomnia, irritability and a stuffy sensation in the chest[176]. The bruised leaves are applied to snakebite[218]. The flowers are used in the treatment of blindness and opacity of the cornea[218]. The ashes of the stems are applied to granular haemorrhoids or fungus growths on the anus[218]. The immature seedpods are chewed to a pulp and applied to corneal and smallpox ulcers[218]. The seed is antidote[218]. It is considered to be specific for the healthy functioning of bowels, heart, kidney, liver and stomach[218]. The seed sprouts are constructive, laxative and resolvent[218]. They are used in the treatment of oedema, dysuria, chest fullness, decreased perspiration, the initial stages of flu and arthralgia[176]. A decoction of the bark is astringent[240]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Glycine soja Wild Soya Bean for raised blood levels and cholesterol (see [302] for critics of commission E).

nrakta E. Asia - China, ksacta Lowland thickets, C. and S. Japan[58].

propta Pre-soak the seed for 12 hours in warm water and then sow in early spring in a greenhouse. The seed should germinate within two weeks at a temperature between 12 -16°c[206]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring or early summer, after the last expected frosts. Seed can also be pre-soaked for 12 hours in warm water and then sown in situ in late spring, though this will not yield well unless the summer is very hot.

nwatta Requires a rich soil and a sunny position[33, 38]. Prefers a well-drained sandy soil[1]. Prefers a slightly acid soil[200, 206]. Does not grow well in a wet climate[132]. This is the wild ancestor of the cultivated sova bean and is of potential value as a genetic resource, especially when trying to breed for increased yields. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Seed can be purchased that has been treated with this rhizobium, it is unnecessary on soils with a pH below 5.5 but can be helpful on other soils[206]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

#### 8.1.14 Achnatherum hymenoides

Indian Millet, Indian ricegrass

tfo2n 7 tlin 10 cyuc 3 kcak 3 tcan 0 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Achnatherum hymenoides is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to July. The species is hermaphrodite (has both male and fe-

male organs) and is pollinated by Wind. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid. neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong

winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - raw, cooked or ground into a meal and used in making bread etc, gruel and as a thickener in soups. The seeds are ground into a meal for bread and porridge. They can also be used for cakes. They can be mixed with cornmeal and used for dumplings, [2, 46, 85, 106, 183]. The seed is rather small but when fully ripe it falls readily from the plant and is fairly easy to harvest[183]. Another report says that the seed is rather large[183], but this has not been our experience[K]. The seeds were parched over the flames of a fire in order to remove the hairs[213]. A pleasant taste and very nutritious[85, 183], it contains about 6% sugars and 20% starch[213]. Before corn was introduced to the area, this seed was at one time a staple food for some native North American Indian tribes[213] Carbon Farming Solutions - Staple Crop. balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta Soil reclamation Soil stabilization StrawSeveral cultivars have been developed for use in restoration work an outdoor seedbed. One report says that it is best to grow the seedlings on in the shade at a density of about 550 plants per square metre[78] whilst another report says that they are best grown on in a sunny position[80].

nwatta Prefers a good moist but not water-logged soil[1]. Grows well in heavy clay soils. Plants are very shade tolerant, especially when young, but growth is slower in dense shade[81]. Intolerant of atmospheric pollution[1]. Prefers slightly acid conditions down to a pH of about 5[200]. Prefers growing on a north-facing slope[200]. This species is unsatisfactory in south-eastern Britain due to damage by late frosts, trees rarely live more than 40 years and have a poor thin crown[185]. Trees grow far better in the milder and moister western side of the country[11]. Young trees are very slow to establish because they are often damaged by late frosts, it is best to grow the young trees in high shade to get them through this time[1, 185]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm in height. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200].

### 7.2.496 Clematis mandschurica

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Clematis mandschurica is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Analgesic Antibacterial Antifungal Dysentery Emmenagogue HypotensiveThe root is analgesic, antibacterial, antidiuretic, antifungal, emmenagogue and hypotensive[279]. It contains several medically active constituents including clematosides, hederagenin and anemonin[279]. It is used in Korea in the treatment of leucorrhoea, dysentery, neuralgia, menostasis and delayed menstruation[279].

nrakta E. Asia - northern China, Japan, Korea, ksacta Shrubberies and open wooded slopes at elevations up to 800

propta Seed - best sown as soon as it is ripe in a cold frame[164, 200]. Sow stored seed as soon as it is obtained in a cold frame. Pre-soak the seed for 12 hours in warm water and remove as much of the tail and outer coat as possible[164]. A period of cold stratification is beneficial[164]. The seed germinates in 1 - 9 months or more at 20°c[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in late spring or early summer, after the last expected frosts. Internodal cuttings of soft to semi-ripe wood, late spring in sandy soil in a frame[200]. Layering of old stems in late winter or early spring[200]. Layering of current seasons growth in early summer[200].

nwatta Prefers a deep moist soil with its roots in the shade[11, 200]. Dislikes poorly-drained heavy clay soils, but grows well in clay if grit is added for drainage[11, 200]. Dislikes light sandy soils[11]. Does well on chalk[1]. Succeeds in acid as well as alkaline soils[200]. This species is closely related to C. terniflora, and is included in that species by some botanists[273]. When planting out, in order to avoid the disease 'clematis wilt', it is best to plant the rootball about 8cm deeper in the soil. This will also serve to build up a good root crown of growth buds[200]. The plant flowers on the current seasn's growth, so any pruning is best carried out in late winter or early spring[273]. A twining plant[182]. The leafstalks wrap themselves around twigs and branches for support. When a side of the stalk touches an object, the growth on that side slows down whilst the other side grows at its normal rate - this causes the leaf stalk to entwine the object. it is touching[212]. Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 7.2.497 Platanus orientalis

Oriental Plane, Oriental planetree 6 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 30 m hkuc

htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Platanus orientalis is a deciduous Tree growing to 30 m (98ft) by 30 m (98ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May, and the seeds ripen from October to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista In hot dry climates the hairs of the fruits and leaves are believed to cause an effect similar to hay fever[11,

tcanta Dye WoodA fabric dye is obtained from the branches and roots[7]. The colour is not given[K]. Wood tough, difficult to split, not durable. It is not esteemed for carpentry, but has certain advantages in cabinet making[7], it is also used for inlay work and wood pulp[46, 61, 89].

dwatta Astringent Dysentery Ophthalmic VulneraryThe leaves are astringent and vulnerary [7]. The fresh leaves are bruised and applied to the eyes in the treatment of ophthalmia[240]. A decoction is used to treat dysentery and a cream made from the leaves is used to heal wounds and chilblains[7]. The leaves are harvested in the spring and summer and can be dried for later use[7]. The bark is boiled in vinegar and then used in the treatment of diarrhoea. dysentery, hernias and toothache[240].

nrakta S.E. Europe to W. Asia. ksacta By rivers in forests in the hills[89]

propta Seed - two months cold stratification improves germination[113]. Sow spring in a cold frame in light shade[78, 98]. Home grown seed is often of poor quality and low viability. It is best to harvest the seed in late winter or spring and then sow it immediately in a cold frame[80]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood of the current years growth, 20 - 30 cm with a heel, autumn in a cold frame[1], Easy[200], Lavering of stools in spring or autumn. Takes 12 months[78].

nwatta Requires a sunny position in a deep fertile welldrained soil[188]. A fast growing species, established plants are drought tolerant[200]. Tolerates atmospheric pollution and compacted soils[200]. This species is hardy in most areas of Britain but the trees do not do well in northern parts of the country, requiring hotter summers than are normally experienced there[98]. A very ornamental and very long lived tree[1]. It is immune to 'Plane tree wilt' fungus[11]. Very tolerant of root disturbance, trees up to 5 metres tall can be moved quite easily[200].

# 7.2.498 Asarum maximum

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asarum maximum is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been found for this plant, at least 3 other members of this genus have reports that the leaves are toxic[7, 19]. Some caution is therefore advised in the use of this plant.

dwatta Analgesic ExpectorantThe dried plant is used medicinally in Vietnam[283]. The leaves ate used in the treatment of dyspepsia and colic whilst the flowers and roots are

used as a reconstituent [283]. Analgesic, expectorant. Used as a gargle for sore throats etc[174].

nrakta E. Asia - China in Hubei and E. Sichuan. ksacta Forests in humus rich soils at elevations of 600 - 800 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Plants are hardy to at least -15°c[200]. The flowers are malodorous and are pollinated by flies[200]. Plants often self-sow when growing in a suitable position[200].

### 7.2.499 Rhododendron molle

Chinese Azalea

6 tlin 9 cvuc 0 kcak 0 tcan 1 dwat m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hionli

drutta Rhododendron molle is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista The plant is very toxic[147]. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities[183].

tcanta InsecticideThe powdered flowers have a mild insecticidal effect[57].

dwatta Anaesthetic Analgesic SedativeThe flowers are analgesic, anaesthetic and sedative[218]. They are applied externally in the treatment of arthritis, caries, itch, maggots and traumatic injuries[218]. The root is used in the treatment of arthritis, rheumatism and traumatic injuries[218].

nrakta E. Asia - China. ksacta Grows amongst coarse grasses and shrubs, also in thin pine woods[11].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood, August in a frame. Difficult[78].

nwatta Succeeds in a most humus-rich lime-free soils except those of a dry arid nature or those that are heavy or clayey[1]. Prefers a peaty or well-drained sandy loam[1]. Succeeds in sun or shade, though it prefers a shady position[1]. A pH between 4.5 and 5.5 is ideal[1]. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. Plants form a root ball and are very tolerant of being transplanted, even when quite large, so long as the root ball is kept intact[200]. A very ornamental plant[1], it is the parent of many cultivars[11]. Plants in this genus are notably susceptible to honey fungus[200].

### 7.2.500 Centaurea melitensis

Maltese Star Thistle 6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli drutta Centaurea melitensis is a ANNUAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable PH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

dwatta The plant is used in the treatment of the kidnevs[257].

nrakta Mediterranean region, eastwards to Greece and Tunisia. A not infrequent casual in Britain[17]. ksacta Wasteplaces and roadsides[17].

propta Seed - sow April in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. If you have sufficient seed it can be sown in situ in the spring, and an autumn swing in situ might also be worth trying.

nwatta We do not have information on this species, but the following notes are based on the closely related C. solstitialis. Succeeds in ordinary garden soil[1, 200]. Prefers a well-drained fertile soil and a sunny position[200]. Tolerates dry, low fertility and alkaline soils[200]. A good bee and butterfly plant the flowers are rich in nectar[171]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 7.2.501 Ilex rotunda

Kurogane holly

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 20 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta llex rotunda is an evergreen Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in April, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

dwatta DepurativeThe stem bark is detoxicant[218]. The plant is used in a mixture with other herbs for its haemostatic action[218]

nrakta E. Asia - E. China, Japan, Korea. ksacta Evergreen forests[275]. Evergreen broad-leaf forests, forest margins on mountain slopes at elevations of 400 - 1100 metrac/2661

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October, Takes 2 years[78].

nwatta Succeeds in most soils so long as they are not water-logged[200]. This species should be hardy in many ar-

disease. Tannin constituents may cause gastrointestinal irritation and liver damage [301].

kcakta Edible Parts: FruitEdible Uses: Condiment TeaFruit - raw or cooked[105, 177, 183]. The fruit is about 3mm in diameter with a large seed[200]. There is very little edible flesh and the quality is poor[K]. Leaves and berries are used as a food flavouring[62, 105, 177]. They make an aromatic, attractive and agreeable substitute for bay leaves, and can be used in flavouring soups, stews etc[183]. The dried leaves are brewed into a robust tea[183].

tcanta Dye Hedge Hedge Wax WoodA wax covering on the fruit contains palmitic acid and is extracted by scalding the fruit with boiling water and immersing them for a few minutes, the wax floats to the surface and is then skimmed off. The fruit is then boiled in water to extract the wax from the pulp and once more the wax is skimmed off. It is then strained through a muslin cloth and can be used to make aromatic candles, sealing wax etc[1, 4, 6, 11, 62, 95, 171, 245, 274]. Candles made from this wax are quite brittle but are less greasy in warm weather[213]. They are slightly aromatic, with a pleasant balsamic odour[245], and do not smoke when put out, making them much more pleasant to use that wax or tallow candles[213]. The wax is also used in making soaps[213]. About 1 kilo of wax can be obtained from 4 kilos of berries[4]. A blue dye is obtained from the fruit[6]. The plant can be grown as an informal hedge[200], succeeding in windy sites[K]. Wood - light, soft, brittle, finegrained[82, 227]. The wood weighs 35lb per cubic foot[227]. It is of no commercial value[229].

dwatta Antibacterial Astringent Dysentery Emetic Narcotic Sternutatory Stimulant TonicWax myrtle is a popular herbal remedy in North America where it is employed to increase the circulation, stimulate perspiration and keep bacterial infections in check[254]. The plant should not be used during pregnancy[254]. The root bark is antibacterial, astringent, emetic (in large doses), sternutatory, stimulant and tonic[4, 21, 46, 165, 213, 254]. It is harvested in the autumn, thoroughly dried then powdered and kept in a dark place in an airtight container[4]. It is used internally in the treatment of diarrhoea, irritable bowel syndrome, jaundice, fevers, colds, influenza, catarrh, excessive menstruation, vaginal discharge etc[4, 238, 254]. Externally, it is applied to indolent ulcers, sore throats, spongy gums, sores, itching skin conditions, dandruff etc[4, 238, 254]. The wax is astringent and slightly narcotic[4]. It is regarded as a sure cure for dysentery and is also used to treat internal ulcers[4]. A tea made from the leaves is used in the treatment of fevers and externally as a wash for itchy skin[222].

nrakta South-eastern N. America. Possibly naturalized in S. England[50]. ksacta Thickets on sandy soil near swamps and marshes[43], also on dry arid hills in which situation it is often only a few centimetres tall[62].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[78]. Stored seed germinates more freely if given a 3 month cold stratification and then sown in a cold frame[78]. Germination is usually good[78]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for the first winter. Plant out in late spring or early summer[K]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Pot up and overwinter in a cold frame then plant out in late spring or early summer. Fair to good percentage[78]. Layering in spring[200].

nwatta Industrial Crop: Wax Management: Standard Wild-harvested and SoldLandscape Uses:Border. Erosion control, Screen, Seashore, Specimen. Prefers a moist soil[200]. Grows well in an open position in a welldrained soil in sun or light shade[200]. Thrives in any ordinary garden soil according to one report[11] whilst another says that it thrives in an acid soil[182]. Prefers a lime-free loamy or peaty soil[1]. Plants can be evergreen in areas with warmer winters than in Britain[227]. Some reports say that the plant is dioecious whilst others say it is monoecious. It is most likely that both forms exist[82, K]. A polymorphic species[11], there are some named forms. 'Myda' is a large-fruited female form of low growth[182]. The fruit is covered with a deposit of wax that has a balsamic odour[245]. The fruits can hang on the plant for several years[213]. Closely related to M. pensylvanica, with which it hybridizes[43]. Plants in this genus are notably resistant to honey fungus[200]. Many species in this genus have a symbiotic relationship with certain soil micro-organisms, these

form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: Attracts birds, North American native, Fragrant foliage, Naturalizing, Wetlands plant, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. An evergreen. The root pattern is stoloniferous rooting from creeping stems above

# 8.1.12 Myrica californica

California Bayberry, California Wax Myrtle, California Barberry

tfo2n 7 tlin 11 cyuc 3 kcak 3 tcan 1 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Myrica californica is an evergreen Shrub growing to 4 m (13ft lin) at a medium rate. See above for USDA hardness. It is hardy to UK zone 7. It is in leaf all year, in flower in May, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although no reports of toxicity have been seen for this species, there is a report for some members of this genus that some of the constituents of the wax might be carcinogenic[2221.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 177]. The fruit is about 6mm in diameter with a large seed[200]. There is very little edible flesh and the flavour of this is poor[200, K].

tcanta Dye Wax WoodA wax covering on the fruit is extracted by scalding the fruit with boiling water and immersing them for a few minutes, the wax floats to the surface and is then skimmed off. The fruit is then boiled in water to extract the wax from the pulp and once more the wax is skimmed off. It is then strained through a muslin cloth and can be used to make aromatic candles[106, 245]. Candles made from this wax are quite brittle but are less greasy in warm weather[213]. They are slightly aromatic and do not smoke when put out, making them much more pleasant to use that wax or tallow candles[213]. The wax is also used in making soaps[213]. To date (07/12/95) plants growing on our Cornish trial grounds have fruited freely but have not produced much wax. They produced somewhat more after the hot summer of 1995, but there was still not enough to make extraction worthwhile[K]. A grey-brown and a maroonpurple dye are obtained from the fresh or dried berries[168]. Wood - heavy, very hard, strong, brittle, close grained[82].

dwatta StomachicThe bark and root bark is used in the treatment of gastrointestinal disorders and infections[238].

nrakta South-western N. America - Washington to California. ksacta Ocean sand dunes and moist hill sides near the coast[60], usually on acid soils[1] and tolerating poorly drained soils[229].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[78]. Stored seed germinates more freely if given a 3 month cold stratification and then sown in a cold frame[78]. Germination is usually good[78]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for the

Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

## 8.1.10 Prosopis juliflora

Mesquite, Honey Mesquite tfo2n 7 tlin 12 cyuc 3 kcak 4 tcan 2 dwat 10 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli

drutta Prosopis juliflora is an evergreen Tree growing to 10 m (32ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. The flowers are pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Plant has spines or sharp edges; use extreme caution when handling

kcakta Edible Parts: Flowers Inner bark Root Seed SeedpodEdible Uses: Drink Gum Sweetener TeaSeedpods raw or cooked[301]. They can be roasted, chewed or ground into a powder[301]. A rich, delicious flour can be made from pulverized pods from which seeds have been removed[303 ]. The powder can be mixed with water to make a refreshing drink, which can be drunk immediately, made into a pudding or allowed to ferment into a sort of beer[301]. Mature seeds can be soaked overnight and then baked like kidney beans[301]. Cotyledons and embryos when pulverized yield a flour rich in protein and sugar appropriate for diabetic people[303]. Flowers - raw. A sweet flavour[301]. They can also be roasted or made into a tea[301]. A sweet gum exudes from the trunk[301]. It is used in making sweets[301 l. The wood is used as a flavouring to smoke foods[301].

tcanta Adhesive Charcoal Dye Fencing Fibre Furniture Gum Miscellany Paper Resin Shelterbelt Soil reclamation Soil stabilization Tannin WoodAgroforestry Uses: Plants can be used for erosion control, to stabilize dunes, in shelterbelts and windbreaks, and as living fences in arid and semi-arid climates[200, 303]. Mesquite is widely planted for land reclamation because it is an aggressive colonizer, tolerant of very poor, degraded, saline and alkaline soils. Aerial seeding of a mixture of P. juliflora, Nicotania glauca and several Eucalyptus species is used to revegetate abandoned copper mines[303]. Other Uses The heartwood contains significant amounts of extractable polyphenolic compounds from which can be isolated a unique flavinol compound used in the formation of new phenol-formaldehyde polymeric resins[303]. A reddish-amber gum, similar in properties to the gum arabic produced by Acacia senegal, often exudes from the stem and older branches[303]. It forms an adhesive mucilage[46] 1 Tannin or dyestuff can be extracted from the wood and bark, but the yield is only about 10%[303]. Tannin could also be extracted as a by-product when the wood is processed for other purposes[303]. There is a large potential for the wood as a source for fibre in the production of paper, paperboard and hardboard[303]. The heartwood is dark brown to red or yellowish; the thin band of sapwood light yellow. The wood is close grained, moderately hard, heavy, tough, strong and durable in the soil, though susceptible to the attacks of drywood termites. Seasoned wood is used for rail ties, fence posts, furniture, crafts and corrals. It is rarely used in construction, as most tree trunks are not long or straight enough[46, 303, 325, 447]. The generally crooked stems and branches make good firewood and provide excellent charcoal[303, 325]. The charcoal is used extensively in the USA as barbecue fuel[303].

dwatta Expectorant Miscellany SkinA syrup prepared from the ground up pods has various medicinal values. It

is given to children showing weight deficiency or retardation in motor development[303]. It is believed to increase lactation[303]. It is also used for preparing various medicinal syrups, particularly for expectorants[303]. A tea made from P. juliflora is thought to be good for digestive disturbances and skin lesions[303].

nrakta Northern and western S. America - Colombia, Ecuador, Venezuela; north through Central America to Mexico. ksacta Light, sandy or gravelly soils in arid or semiarid areas where there is subterranean moisture[200]. Commonly found on over-grazed land[200].

propta Seed - they can be stored for several years at ambient temperatures [325]. The seed has a very hard seedcoat and could take several years to germinate without pretreatment to allow moisture to be absorbed. There are various ways of doing this - carefully making a small nick in the seedcoat, being careful not to damage the seed is very effective on a small scale. On a larger scale, soaking the seed in nearly boiling water for a few minutes (being careful not to cook the seeds) and then for another 24 hours in warm water is a common method[325]. Sow the seed in a sunny position in a nursery seedbed or individual pots. Germination of treated seed is usually fast, with 80 - 90% of the seeds sprouting within 4 - 6 days 303, 325 ]. Aerial seeding is applied successfully to quickly cover remote, extensive and poorly accessible areas[303]. Inoculation with Rhizobium and mycorrhizal fungi is advantageous[303] Root cuttings. Grafting.

nwatta A plant for the drier areas of the tropics and subtropics, succeeding from sea level up to elevations of 1,500 metres[303]. It can be grown in areas where the mean annual temperature ranges from 14 - 34°c, with an absolute maximum of almost 50°c; and where the annual precipitation is as low as 50mm or up to 1,200mm[303, 325]. Adapted to many soil types from acid to alkaline and including strongly saline and severely depleted soils[303]. Requires a position in full sun in a light, well-drained soil[200]. Plants have very long taproots and, once established, are extremely drought resistant[200]. They can also tolerate seasonal waterlogging[303]. Mesquite is sometimes said to dry out the soil and compete with grasses, particularly in dry areas[303 ]. Plants can begin flowering when 3 - 4 years old, often flowering twice a year and producing seed prolifically [303]. Hence in some areas, especially the more humid ones, it can spread freely and is considered a weed[303]. A fast-growing species[381]. The plant coppices readily[303]. The plant produces fragrant, nectar-rich flowers from which bees produce a fine-flavoured clear honey[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [755]. Total nitrogen, sulphur and soluble salts, as well as organic matter, have been shown to increase 3-fold in the upper 4.5 metres of soil under P. Juliflora[303]. Flowering Time: Mid Summer Late Summer/Early Fall. Bloom Color: Pale Yellow.

#### 8.1.11 Myrica cerifera

Wax Myrtle - Bayberry Wild Cinnamon, Southern Bayberry, Wax Myrtle, Southern Wax Myrtle tfo2n 7 tlin 11 cvuc 3 kcak 4 tcan 3 dwat 9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Myrica cerifera is an evergreen Shrub growing to 9 m (29ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from April to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime

poista There is a report that some of the constituents of the wax are carcinogenic[222]. Vomiting in large doses. Constituent myricadiol may cause salt retention and potassium excretion [301]. Avoid if high blood pressure or kidney

end of its range in Japan are obtained[11]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

# 7.2.502 Pterocarva stenoptera

Chinese wingnut

6 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 20 m hkuc htut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Pterocarya stenoptera is a deciduous Tree growing to 20 m (65ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in June, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta InsecticideThe leaves have insecticidal properties[218].

dwatta Anthelmintic Astringent Eczema Febrifuge Skin StomachicAnthelmintic, astringent, febrifuge, stomachic[61, 178]. The leaves are used in the treatment of abscesses, eczema and scabies[218]. The stem bark is anthelmintic and carminative[218].

nrakta E. Asia - China. ksacta Mixed deciduous forests on mountain slopes or riverbanks, often forming pure stands in small patches in the openings of deciduous oak forests, from sea level to 1500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[80, 113]. Pre-soak stored seed for 24 hours in warm water[80] then cold stratify for 2 - 3 months[98, 113]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer of the following year[240]. Cuttings of halfripe wood, July/August in a frame[113]. Cuttings of mature shoots, November in a frame. Only use vigorous shoots[113]. Layering. Division of suckers in the dormant season[188].

nwatta Prefers a sunny position in a rich strong loam with abundant moisture at the roots[11, 200]. Succeeds in areas that do not experience prolonged winter temperatures below about -12°c[200], but young plants and the young shoots of older trees can be cut back by winter frosts[11]. Plants are tolerant of compacted soils[200]. The leaves are resinous to the touch and emit a resinous aroma[245]. The root system of this tree is too invasive for small gardens[200]. Plants in this genus are notably resistant to honey fungus[200].

## 7.2.503 Cunninghamia lanceolata

6 tlin 9 cvuc 0 kcak 4 tcan 2 dwat 15 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Cunninghamia lanceolata is an evergreen Tree growing to 15 m (49ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from January to May, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil.

pcista Plant has spines or sharp edges; use extreme caution when handling

tcanta Charcoal Miscellany WoodAgroforestry Uses: The tree is suitable for reforestation schemes in subtropical evergreen, coniferous and mixed broad-leaved forests 303 , 329 ]. It is a suitable species for agroforestry systems in

eas of Britain, especially if provenances from the northern China as it is usually intercropped with a number of crops such as maize, beans, wheat, Chinese sorghum, buckwheat, potato, 'ground chestnut' (Arachis hypogaea), tobacco and upland rice; or with other tree species such as the tung oil tree (Aleurites fordii), tea and Litsea cubeba. The interplanting is important not only to increase the income of farmers during early stages of plantations but also to avoid the land degradation that results from continuous cropping of this tree[ 303 ]. Other Uses The bark is a source of tannins[ 303 ]. The branches produce an essential oil that is used in the perfume industry. Cedrol, pinene, phellandrene, citrene, terpinol, thujenol, cadinol and borneol are the main constituents of the oil[ 303 ]. The pale vellow to white, fragrant wood is uniform-textured; straight-grained; light in weight; and durable, though it rots easily if it is continually wet. It is easily worked and resists insect and termite damage. It is used in construction, ship building etc wherever great strength is required. Older and larger branches are used in turnery 1, 46, 61, 178, 303]. A good quality fuel and a charcoal can be made from the wood[ 178, 303].

> dwatta Antidote Carminative Miscellany SkinCarminative. A decoction of the wood is used internally in the treatment of varnish poisoning (from species of Rhus), chronic ulcers, hernia etc[ 178, 218, 303]. The decoction of the wood is used as a bath for smelly feet[ 303 ]. An essential oil from the plant is used to treat bruises, pain, rheumatism and wounds 218, 303. The ash of the bark is used to treat burns, scalds and wounds 218, 303, A decoction of the cone is used in the treatment of coughs[ 218, 303 ].

> nrakta E. Asia - China. ksacta Mixed broad-leaved forests, rocky hillsides and roadsides, 200 - 2800 metres in most temperate areas of China[266]. Often forming small, pure stands on red sandstone soils[109].

> propta Seed - they have no dormancy and pre-treatment is not necessary. Germination can be improved by soaking the seeds in warm water for a few hours prior to sowing 325 l. Seeds are sown in seed beds, germination begins after 7 days and is terminated after 20 days[ 325 ]. As soon as they are large enough to handle, the seedlings are pricked out into polytubes. Seedlings are normally ready for transplanting into the field in 4 - 5 months later, when they are 35 - 40cm tall[ 325 ]. Vegetative propagation of this species is relatively easy, and at one time most planting stock was produced from coppices from basal stumps after felling 325 Nursery seedlings, however, have faster early growth and better survival than coppice sprouts. Since the 1980s, techniques have been developed to produce planting stock from root cuttings[ 325 ]. The cuttings are collected from the root collar when they reach a height of about 10 cm and placed in rooting beds. These cuttings have a survival rate of 90 -95% and the quality is similar to that of seedling stocks 325 ]. Cuttings from lateral shoots are not suitable [ 325 ].

> nwatta Landscape Uses:Pest tolerant, Specimen. A plant mainly of the warm temperate to subtropical zones, just entering into the tropics. It is found at elevations from near sea level to 2,600 metres[ 325 ]. It grows best in areas where the mean annual temperature is in the range 16 - 19°c and is fairly frost resistant - mature plants can tolerate temperatures down to about -15°c[ 418 ]. It prefers a mean annual rainfall in the range 900 - 2.350mm[ 325 ]. Reguires a rich warm soil and a sheltered sunny position[1]. 164 ]. Best growth is obtained on well-drained loamy soils[ 325 ]. Prefers a pH in the range 5.5 - 6.5, tolerating 5 - 7.5[ 325 ]. Dislikes soil with free lime otherwise the pH is unimportant[ 200 ]. Young trees can make guite rapid growth in height, up to 60cm a year once they have attained more than 1 metre in height 185 ]. Before reaching the height of 1 metre, however, they are liable to be killed by frost[ 185 ]. Trees commence coning and producing viable seeds when they are around 6 - 8 years old[ 303 , 325 ]. This is the main re-forestation tree in China[ 46 , 61 ]. The most important fast-growing timber tree of the warm regions south of the Chang Jiang valley of China[ 266 ]. Unlike most conifers, this species can be coppiedd, and it also resprouts from the roots if cut down[ 1, 303 ]. The bruised foliage emits a delicious resinous aroma[ 245 ]. This species is notably resistant to honey fungus 200 ]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

# 7.2.504 Schizophragma integrifolium

6tlin 9 cyuc 0 kcak 0 tcan 2 dwat 12 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Schizophragma integrifolium is a deciduous Climber growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Plants can be allowed to sprawl and are then used as a ground cover for a shady position[208].

dwatta Carminative RefrigerantThe root and the climbing stem are carminative and refrigerant[147, 218]. Activates blood circulation, strengthens muscles and bones [147].

nrakta E. Asia - C. and W. China. ksacta Rocky cliffs[11], sparse hillside forests and forest edges[147]. Dense to sparse forests in valleys or on mountain slopes or summits at elevations of 200 - 2000 metres[266].

propta Seed - sow late winter to early spring in a greenhouse. Germination is usually fair to very good[78]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in light shade in the greenhouse for their first winter, planting them out in late spring or early summer. Layering in spring directly into pots. A fair to good percentage[78]. Cuttings of half-ripe wood, 4 - 5cm with a heel, July in a frame[1, 78]. Keep the cuttings moist[78].

nwatta Requires a moist leafy soil and some shade at the roots. An easily grown plant[1], it prefers a good loamy soil and plenty of moisture[11] but is not fussy[219]. Plants succeed in sun or shade[182], they flower better in a sunny position but will also succeed on a north-facing wall[188, 219]. In the hotter parts of Britain they prefer shade from the midday sun[219]. Tolerating temperatures down to about -10 to -15°c, this species is not reliably hardy in the coldest parts of the country[219]. Plants do not normally require pruning, though any unwanted growth can be removed in the winter[219]. Plants have a similar growth habit to ivy (Hedera helix) climbing trees by means of aerial roots or growing along the woodland floor[1, 182]. Plants might need some help to become attached in their early years[182].

# 7.2.505 Liquidambar formosana

Formosan Gum, Chinese Sweet Gum, Formosa Sweet Gum 6 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Liquidambar formosana is a deciduous Tree growing to 12 m (39ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower in May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Resin WoodAn aromatic resin is obtained from the trunk of this tree[4]. It forms in cavities of the bark and is harvested in autumn. It is used medicinally[178]. Wood. Used to make tea chests for higher grade teas[1, 46, 61].

dwatta Anodyne Antiphlogistic Antirheumatic Astringent Balsamic Cancer Haemostatic Odontalgic SkinThe leaves are used in the treatment of cancerous growths[218]. The stem is anodyne, antiphlogistic, astringent, balsamic and haemostatic[178, 218]. The resin from the stems is mixed with Rhammus crenata fruits and used as a suppository for constipation[218]. The stem bark is used in the treatment of fluxes and skin diseases[218]. The fruits are antirheumatic, diuretic and galactogogue[176]. They are used in the treatment of arthritis, lumbago, oedema, oliguria, decreased milk production and skin diseases[176, 218]. The root is used in the treatment of cancerous growths[218]. The resin from the

stems is used to treat bleeding boils, carbuncles, toothache and tuberculosis[218].

nrakta E. Asia - Central and southern China from Taiwan to south-west Sichuan. ksacta A very wide range, especially in the warm temperate zones, growing in woodland and in open country[109]. Moist forests at elevations to 2500 metres in the south of its range[260].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Harvest the seed capsules at the end of October or November, dry in a warm place and extract the seed by shaking the capsule. Stored seed requires 1 - 3 months stratification and sometimes takes 2 years to germinate. Sow it as early in the year as possible. Germination rates are often poor. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse for their first winter. Since they resent root disturbance, it is best to plant them out into their permanent positions in early summer of their second year and give them some protection from cold for their first winter outdoors[K]. Cuttings of half-ripe wood, July/August in a frame. Suckers in early spring. Layering in October/November. Takes 12 months.

nwatta Landscape Uses:Aggressive surface roots possible, Specimen. Prefers a moist but not swampy loam in a sunny sheltered position[1, 200]. Succeeds in light shade[188]. Requires a deep fertile soil[200]. Prefers a neutral to acid soil, growing poorly on shallow soils overlying chalk[188]. Not all introductions of this species are hardy[11]. The Monticola group, which comes from western Hubei and north-eastern Sichuan, tolerates temperatures lower than -5°(200, 260]. Young plants are susceptible to frost damage and should be protected for their first few years[200]. This species resents root disturbance, young plants should be pot-grown and be placed in their permanent positions as soon as possible[200]. Special Features: Attractive foliage, Not North American native, Inconstituous flowers or blooms.

## 7.2.506 Ampelopsis japonica

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli tcup hwicli jlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Ampelopsis japonica is a deciduous Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August, and the seeds ripen from September to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist, soil.

dwatta Anodyne Antibacterial Antifungal Depurative Febrifuge VulneraryThe roots are anodyne, antibacterial, anticonvulsive, antifungal, bitter, cooling, depurative, expectorant, febrifuge and vulnerary[147, 176, 218]. A decoction of the roots is used in the treatment of tuberculous cervical nodes, bleeding from haemorrhoids and burn injuries[147].

nrakta E. Asia - China, Japan, Korea ksacta Mountain sides[147]. Usually climbing into trees and shrubs on hillsides and thickets, also found on grasslands, at elevations of 100 - 900 metres[266].

propta Seed - sow in pots in a cold frame in the autumn or stratify for 6 weeks at 5°c and sow in the spring[200]. Germination can be quite slow, sometimes taking more than a vear. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. When they are more than 20cm tall, they can be planted out into their permanent positions, preferably in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long, July/August in a frame[78]. Cuttings or eyes in late autumn or winter. Either place them in the ground in a greenhouse or cold frame, or put them in pots. An eve cutting is where you have just one bud at the top and a short length of stem with a small part of the bark removed. These normally root well and grow away vigorously, being ready to plant into their permanent positions the following autumn. Layering into pots in late summer. Partially sever the stem in spring and then lift the new plants in the autumn[78].

as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - China, Japan. ksacta Thickets in hills[58,

propta Seed - best sown as soon as it is ripe in a cold frame[78]. It should germinate freely within 4 weeks, though it may take 18 months[K]. Stored seed can be very slow to germinate, often taking more than 18 months. A warm stratification for 4 weeks followed by 12 weeks cold stratification can help[98]. The seed usually (eventually) germinates quite well[78]. Prick out the seedlings into individual pot as soon as they are large enough to handle and plant out when they are at least 15cm tall. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Good percentage[78]. It is best to take the cuttings in June[202]. Cuttings of mature wood of the current year's growth, 10 - 12cm with a heel, November in a frame. Leave for 12 months. Fair to good percentage[78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils that are welldrained[200]. Prefers a soil that is only moderately fertile, succeeding in poor soils and dry soils[11, 200]. Requires a lime-free soil[219]. A very shade tolerant plant, it can be grown under other trees and will eventually climb up into them[29, 166]. Plants are not reliably hardy in the colder areas of the country[200]. This species has some potential as a commercial crop in temperate areas. It does not always carry a good crop, and research needs to be carried out to find the reasons for it, but the fruit is of a reasonable size and, when fully ripe, of a reasonable flavour[K]. It seems to be the latest to ripen in spring of the evergreen Elaeagnus[K]. Closely related to E. pungens, differing in its unarmed branches and thinner more glossy leaves[200]. This species is notably resistant to honey fungus[88, 200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. An excellent companion plant, when grown in orchards it can increase yields from the fruit trees by up to 10%. The small flowers are deliciously scented, their aroma pervading the garden on calm days[K].

# 8.1.9 Glycyrrhiza glabra

Liquorice, Cultivated licorice tfo2n 7 tlin 10 cyuc 4 kcak 4 tcan 4 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hoa7tmwatli xre7t hionli

drutta Glycyrrhiza glabra is a PERENNIAL growing to 1.2 m (4ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista A gross overdose of the root can cause oedema, high blood pressure and congestive heart failure[9, 65]. Do not use during premenstrual syndrome as water retention and bloating occur. If pregnant or have liver cirrhosis use with caution. Avoid using for more than 6 weeks. Excessive quantities may cause headache, sluggishness and potassium depletion [301].

kcakta Edible Parts: RootEdible Uses: Sweetener Tea-Root - raw or used as a flavouring. The source of liquorice powder that is extracted and used in sweets, baked goods, ice cream, soft drinks etc[7, 34, 100, 183], it is also used medicinally. A sweet and delicious flavour, but the root is very fibrous[K]. The root contains glycyrrhizin, a substance that is 50 times sweeter than sucrose[171, 183, 238]. The dried root is often used for chewing, it is excellent for teething children and also as a tooth cleaner[7, 34]. A tea made from the roots is an excellent thirst quencher[21]. The powdered root is also used as a sweetener in other herb teas[183]. The leaves are used as a tea substitute in Mongolia[183].

tcanta Fibre MiscellanyThe plant yields a substance that is used for etching steel sections in photomicrographic

work[171]. Extracts from the root are used as a foaming agent in beers and fire extinguishers[238]. A fibre obtained from the roots is used for insulation, wallboard, boxboard etc[4, 171]. The fibres can be used after the medicinal and flavouring constituents of the root have been removed[4]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Alterative Antiinflammatory Antispasmodic Demulcent Diuretic Eczema Emollient Expectorant Laxative Miscellany Pectoral Tonic UrinaryLiquorice his one of the most commonly used herbs in Western herbal medicine and has a very long history of use, both as a medicine and also as a flavouring to disguise the unpleasant flavour of other medications[4]. It is a very sweet, moist, soothing herb that detoxifies and protects the liver[238] and is also powerfully anti-inflammatory, being used in conditions as varied as arthritis and mouth ulcers[254]. The root is alterative, antispasmodic, demulcent, diuretic, emollient, expectorant, laxative, moderately pectoral and tonic[4, 9, 21, 46, 165, 178]. The root has also been shown to have a hormonal effect similar to the ovarian hormone[7]. Liquorice root is much used in cough medicines and also in the treatment of catarrhal infections of the urinary tract[4]. It is taken internally in the treatment of Addison's disease, asthma, bronchitis, coughs, peptic ulcer, arthritis, allergic complaints and following steroidal therapy[238]. It should be used in moderation and should not be prescribed for pregnant women or people with high blood pressure, kidney disease or taking digoxin-based medication[238]. Prolonged usage raises the blood pressure and causes water retention[7, 238]. See also the notes above on toxicity. Externally, the root is used in the treatment of herpes, eczema and shingles[238]. The root is harvested in the autumn when 3 - 4 years old and is dried for later use[4, 238]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Glycyrrhiza glabra for coughs/bronchitis, gastritis (see [302] for critics of commission E).

nrakta Europe - Mediterranean. ksacta Dry open places[50], especially in sandy places near the sea[132].

propta Pre-soak the seed for 24 hours in warm water and then sow spring or autumn in a greenhouse[200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in a greenhouse. Plant out in late spring or early summer when in active growth. Plants are rather slow to grow from seed[238]. Division of the root in spring or autumn. Each division must have at least one growth bud. Autumn divisions can either be replanted immediately or stored in clamps until the spring and then be planted out[200]. It is best to pt up the smaller divisions and grow them on in a cold frame until they are established before planting them out in the spring or summer.

nwatta Requires a deep well cultivated fertile moistureretentive soil for good root production[200]. Prefers a sandy soil with abundant moisture and does not flourish in clay[4] Slightly alkaline conditions produce the best plants[238]. The plant thrives in a maritime climate[7]. Plants are hardy to about -15°c[200]. Liquorice is often cultivated for its edible root which is widely used in medicine and as a flavouring. There are some named varieties[183]. The ssp. glandulifera grows in Russia and produces adventitious roots up to 10 cm thick[142]. Yields of 10 - 12 tonnes per hectare were considered good in the early 20th century, this only being attained in the fourth year of growth[4]. Unless seed is required, the plant is usually prevented from flowering so that it puts more energy into producing good quality roots[238]. The bruised root has a characteristic sweet pungent smell[245]. Plants are slow to settle in and do not produce much growth in their first two years after being moved[4]. The young growth is also very susceptible to damage by slugs and so the plant will require some protection for its first few years[K]. A fairly deep-rooting plant, the roots are up to 120cm long[4]. It can be difficult to eradicate once it is established[238]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plant is heat tolerant in zones 12 through 10. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant

it can be difficult to eradicate once it is established[238]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 8.1.7 Arachis hypogaea

Peanut

tfo2n 7 tlin 10 cyuc 4 kcak 4 tcan 2 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Arachis hypogaea is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista Of greatest concern is possible contamination of damaged or spoiled seeds with the teratogenic, carcinogenic aflatoxins. Two principal toxins, aflatoxins B, and G, and their less toxic dihydro derivatives, aflatoxins B2 and G2 are formed by the aflatoxin producing moulds (Aspergillus flavus et al). Prevention of mould growth is the mainstay, there being no satisfactory way to remove the toxins from feed and foods (however, peanut oils are free of aflatoxins because of alkaline processing)[269]. Avoid if any suggestion of allergy.

kcakta Edible Parts: Leaves Oil Oil Seed SeedpodEdible Uses: Coffee Oil OilSeed - raw, cooked or ground into a powder. Peanuts are a staple food in many tropical zones and are widely exported to temperate area of the world. The seeds have a delicious nutty flavour and can be eaten on their own either raw or roasted[K]. The seeds are commonly ground up and used as peanut butter in sandwiches etc[269]. They can also be cooked in a variety of dishes and are also ground into a powder when they can be used with cereals to greatly improve the protein content of breads, cakes etc[K]. The seed is very rich in protein and oil, it is also a good source of minerals and vitamins, especially the B complex[200]. A nutritional analysis is available [218]. A non-drying edible oil is obtained from the seed[200]. This is one of the most commonly used edible oils is the world. It is similar in composition to olive oil and is often used in cooking, making margarines, salad oils etc[200]. The oilseed cake is said to be a good source of arginine and glutamic acid, used in treating mental deficiencies[269]. The roasted seed makes an excellent coffee substitute[7, 269]. Young pods may be consumed as a vegetable[269]. Young leaves and tips are suitable as a cooked green vegetable[269]. Javanese use the tips for lablab, and germinating seeds to make toge[269].

tcanta Biomass Oil OilThe seeds yield a non-drying oil that has a wide range of uses including the manufacture of pharmaceuticals, soaps, cold creams, pomades and lubricants, paints, emulsions for insect control, and fuel for diesel engines[268, 269]. Peanut hulls are used for furfural, fuel, as a filler for fertilizers or for sweeping compounds[269].

dwatta Antiseborrheic Aperient Demulcent Emollient PectoralThe oil from the seed is aperient, demulcent, emollient and pectoral[218]. The seed is used mainly as a nutritive food[268]. The seeds have been used in folk medicine as an anti-inflammatory, aphrodisiac and decoagulant[269]. Peanuts play a small role in various folk pharmacopoeias. In China the nuts are considered demulcent, pectoral, and peptic; the oil aperient and emollient, taken internally in milk for treating gonorrhoea, externally for treating rheumatism[269]. In Zimbabwe the peanut is used in folk remedies for plantar warts. Haemostatic and vasoconstrictor activity are reported. The alcoholic extract is said to affect isolated smooth muscles and frog hearts like acetylcholine. The alcoholic lipoid fraction of the seed is said to prevent haemophiliac tendencies and for the treatment of some blood disorders (mucorrhagia and arthritic haemorrhages) in haemophilia[269].

nrakta S. America. ksacta Not known in a truly wild

propta Seed - pre-soak for 12 hours in warm water and sow the seed in mid spring in a warm greenhouse. Germination should take place within 2 weeks. When large enough to handle, prick the seedlings out into individual pots of fairly rich soil and grow them on fast, planting them out after the last expected frosts and giving them some protection (such as a cloche) until they have settled down and are growing well.

nwatta Prefers a light humus-rich well-drained soil in a warm sunny sheltered position, though it will tolerate heavier soils[200, 269]. Plants prefer hot dry conditions when the crop is ripening[200]. Peanuts are guite tolerant of acid soils, and aluminium, requiring a minimum of lime for acceptable yields[269]. Tolerates a pH in the range 4.3 to 8.7[269]. Plants are not frost-hardy and most cultivars require too long a growing season to make them a viable crop in Britain. Some cultivars, however (listed below), have a shorter growing season and are worthy of more research in this country[K]. The peanut is widely cultivated in the tropics and sub-tropics for its edible seed and oil contained in the seed, there are many named varieties[200]. It grows best between latitudes 40° south and 40° north[200]. Yields average about 1 tonne of unshelled nuts per hectare, about 80% of this weight is edible seeds (erect forms) and 60 - 75% (running forms)[200]. Crops can be grown at further distances from the equator but vields are likely to be poor[200]. There are three main groups of cultivars:- 'Virginia' has large seeds, 'Valencia' has four seeds per pod and 'Spanish' has the smallest seeds[200]. There are running and erect forms in each group[200]. The erect forms mature more quickly and are therefore more likely to succeed in colder areas[200]. 'Early Spanish' matures in 105 days and has cropped reliably as far north as Canada[183]. 'Spanish' matures in 110 days and crops in Canada if grown in a light sandy soil with southern exposure[183]. Plants are, in general, self-pollinating, though occasional outcrossing by bees occurs[269]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their

#### 8.1.8 Elaeagnus glabra

Soat nipple

tfo2n 7 tlin 10 cyuc 4 kcak 3 tcan 2 dwat 6 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Elaeagnus glabra is an evergreen Shrub growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year, in flower from October to November, and the seeds ripen in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[105, 177]. The fruit must be fully ripe before it can be enjoyed raw, if even slightly under-ripe it will be quite astringent[K]. The oval fruit is about 15mm long[200] and contains a single large seed[K]. Seed - raw or cooked. It can be eaten with the fruit though the seed case is rather fibrous[K].

tcanta Hedge HedgePlants can be grown as a hedge in exposed positions, tolerating maritime exposure[29, 166]. They form a good wind-break, though they are somewhat slow to reach an effective size[K]. They succeed when planted under trees that have become bare at the base, in time they will scramble up into the tree and fill out the bottom[29].

dwatta CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated

nwatta Prefers a deep rich loam in a warm sheltered position in sun or semi-shade[11, 200]. Requires plenty of root room[11]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants rarely produce fruit in Britain except after a long hot sum-ner[200]. Plants are occasionally cultivated in Japan for medicinal purposes[58]. The shoots have sticky pads and are self-supporting on walls[11]. Another report says that plants climb by means of coiling tendrils but large plants often need tying in to support the weight of foliage[200].

# 7.2.507 Cotoneaster frigidus

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 10 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cotoneaster frigidus is a deciduous Shrub growing to 10 m (32ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in June, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies, midges. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

tcanta Basketry Dye Hedge HedgeA rose-tan dye is obtained from the fruit[168]. The branches are used in basketry and for making twig bridges in the Himalayas[145]. Can be grown as an informal hedge[200].

dwatta Blood tonicThe fruits are eaten to replenish the blood in cases of deficiency[272].

nrakta E. Asia - Himalayas. ksacta Shrubberies and riversides, especially in Nepal, 2200 - 3400 metres from Uttar Pradesh to S.W. China[51]. River valleys, broad-leaved deciduous forests on slopes, 2800 - 3300 metres in Tibetl2661.

propta Seed. Members of this genus hybridize freely so, if you require seed that breeds true, it is important to obtain it from a known wild source or from a controlled fertilization of garden plants. The seed is best sown as soon as it is ripe in the autumn in a cold frame, when it will usually germinate in the spring[11, 200]. Stored seed germinates faster if given 3 months warm stratification at  $15^\circ c$  and then 3 months cold stratification at  $4^\circ c [164]$ . The seed usually germinates within 1 - 18 months at  $15^\circ c$  but it can take 2 years[164]. Pot the seedlings up as soon as they are large enough to handle and plant them out into nursery beds or into their permanent positions when they are more than  $10 \mathrm{cm}$  tall. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200].

nwatta An easily grown plant, it prefers a good soil but also does well in poor soils[1, 11, 200]. It thrives in lime and is also happy in peaty soils[1]. It succeeds in any soil that is not marshy or waterlogged[11, 200]. Succeeds in dry soils[188]. Grows well in heavy clay soils. Succeeds in full sun or semi-shade but does not fruit so freely in a shady position[11, 200]. Plants also succeed in quite deep shade[219]. Tolerates atmospheric pollution[200]. A fast-growing plant[219]. The flowers, when inhaled near to, have an unpleasant smell like decaying fish[245]. They are very attractive to bees whilst the fruit is a good winter food source for many species of birds[200]. Hybridizes freely with other members of this genus, especially those species in the 'Salicifolia' group of this genus[182]. Trees are notably susceptible to honey fungus[200].

# 7.2.508 Campsis grandiflora

Trumpet Creeper 6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 9 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Campsis grandiflora is a deciduous Climber growing to 9 m (29ft 6in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in

leaf from June to October, in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

tcanta Plants can be allowed to scramble on the ground and will form an effective ground cover, rooting at intervals along the branches[208]. They should be planted about 2.5 metres apart each way[208].

dwatta Blood tonic Carminative Diuretic Febrifuge Women's complaintsThe flowers and the whole plant are blood tonic, carminative, depurative diuretic and febrifuge[147, 178, 218]. They are used in the treatment of women's complaints[147, 178]. A decoction of the flowers is used to correct menstrual disorders, rheumatoid pains, traumatic injuries, difficult urination, pruritis and oozing dermaphytoses[147, 218].

nrakta E. Asia - C. China, Japan. ksacta Hillsides and roadsides in China[147]. Climbs into trees and grows on rocks[260].

propta Seed - sow spring in a greenhouse at 10°c. Two months stratification at 5°c assists germination[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of almost ripe wood, 7 - 10cm long, July/August in a frame. Slow to root but a fair percentage[78, 200]. Root cuttings 5cm long in December. Fair to good percentage[78]. Division of suckers in the dormant season[202]. Lavering in winter[188]. Plants often self-layer[260].

nwatta Succeeds in a good well-drained loam[11, 200] and a very sunny position[166] or light shade[200]. Toterates moderately alkaline or moderately acid soils[202]. Dormant plants are hardy to about -10°c[200], though they require a sunny sheltered wall or hot summers if they are to flower well[11, 166]. The fresh young growth in spring is often damaged by late frosts[208]. Plants can take some years to settle down before they start to flower[202]. They climb by means of aerial roots but need to be supported[11, 166]. Another report says that this species does not produce aerial roots[219]. Plants can be pruned like grapes (Vitis spp.)[11] and any pruning is best done in the spring[188]. The subspecies C. grandiflora thunbergii tolerates saline winds[200]. Hybridizes freely with other members of this genus[200].

# 7.2.509 Photinia serratifolia

Taiwanese photinia , Chinese Photinia 6 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Photinia serratifolia is an evergreen Shrub growing to 8 m (26ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta WoodThe wood is hard and heavy, suitable for making furniture and other small articles[266].

dwatta Anodyne Aphrodisiac Diuretic Febrifuge Stimulant TonicThe leaves are diuretic, febrifuge, stimulant and tonic[218]. A tincture of the wood is ingested as a tonic and anodyne[218]. The plant is said to have excessive aphrodisiac properties[218].

nrakta E. Asia - China. ksacta Mixed forests, roadsides, slopes, fields, low mountain regions and sea shores from sea level to 2500 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn. Stored seed will probably require stratification and should be sown as early in the year as possible[78]. Germination is usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first

winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in a frame[200]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[11, 78]. They take about 2 months to root and should be overwintered in a greenhouse, planting out in late spring[78]. Fair to good percentage[78]. Cuttings of almost ripe side shoots, 7 - 12cm with a heel. October/November in a cold frame[78]. Lift the following autumn and plant in their permanent positions[78]. Layering in autumn. Partially sever the layer about 12 months later and lift in the following spring. High percentage[200].

nwatta Landscape Uses:Pest tolerant, Screen, Standard, Specimen, Street tree, Requires a well-drained fertile soil in a sheltered position in sun or light shade[1, 200]. Prefers a warm soil that is not too heavy or close[11]. Tolerates calcareous soils[11, 200]. Dislikes windy sites[11]. Plants are hardy to between -7 and -12°c[200]. Hardy at Kew Gardens in all but exceptionally cold winters, this species is at its best in the milder areas of the country where specimens up to 15 metres tall exist[11]. There are some named forms, selected for their ornamental value [200]. The flowers have a delicate scent[245]. Plants are susceptible to fireblight[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Blooms are very showy.

# 7.2.510 Paliurus ramosissimus

Ma Iia Zi

6 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hna7tmwatli xre7t hionli

drutta Paliurus ramosissimus is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in July, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

tcanta Hair Hedge Hedge WoodThe plants are used as a hedge in China[109]. The ashes of twigs are mixed with oil for a hairwash[178]. The hard timber can use for producing farm tools[266].

dwatta Diuretic Tonic VulneraryThe leaves are applied as a poultice to ulcers and abscesses[178, 218]. The fruit is cooling and diuretic[178, 218]. The root is used in the treatment of sore throats, swellings and internal injuries[218]. The thorny branches and flowers are used in the treatment of thoracic congestion, abscesses and swellings[218]. The spines are said to benefit the uro-genital system and to increase virility in married men[178, 218]. The flowers are applied to running sores[178, 218].

nrakta E. Asia - S. China. ksacta Roadsides and riverbanks in W. Hupeh and Szechwan[109].

propta Seed - best sown as soon as it is ripe in a cold frame and moved into the greenhouse in February. Fair to good germination[78]. Prick out the seedlings into individual pots when they are large enough to handle and overwinter them in the greenhouse for their first year. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame[200]. Root cuttings 4cm long, December in a greenhouse. Fair to good percentage[78]. Layering

nwatta Succeeds in an ordinary garden soil in full sun[200]. Prefers a limy soil[200]. Plants in this genus are notably resistant to honey fungus[200].

#### **7.2.511 Eucalyptus** pauciflora niphophila

Snow Gum 6 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 6 m hkuc htut cyutli hqatkyuctcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eucalyptus pauciflora niphophila is an evergreen Tree growing to 6 m (19ft) by 3.5 m (11ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista Citronellal, an essential oil found in most Eucalyptus species is reported to be mutagenic when used in isolation[269]. In large doses, oil of eucalyptus, like so many essential oils has caused fatalities from intestinal irritation[269]. Death is reported from ingestion of 4 - 24 ml of essential oils, but recoveries are also reported for the same amount[269]. Symptoms include gastroenteric burning and irritation, nausea, vomiting, diarrhoea, oxygen deficiency, weakness, dizziness, stupor, difficult respiration, delirium, paralysis, convulsions, and death, usually due to respiratory

tcanta Essential Fuel ShelterbeltThe leaves yield between 0.7 and 0.8% essential oil. It is a good antiseptic[154]. Fairly tolerant of maritime exposure, it can be grown as part of a shelterbelt in maritime areas[75]. Wood is a good source

dwatta AntisepticEucalyptus leaves are a traditional Aboriginal herbal remedy. The essential oil found in the leaves is a powerful antiseptic and is used all over the world for relieving coughs and colds, sore throats and other infections[254]. The essential oil is a common ingredient in many over-the-counter cold remedies[254]. An essential oil obtained from the leaves is antiseptic[154]. The essential oil obtained from various species of eucalyptus is a very powerful antiseptic, especially when it is old, because ozone is formed in it on exposure to air. It has a decided disinfectant action, destroying the lower forms of life[4]. The oil can be used externally, applied to cuts, skin infections etc, it can also be inhaled for treating blocked nasal passages, it can be gargled for sore throat and can also be taken internally for a wide range of complaints[4]. Some caution is advised, however, because like all essential oils, it can have a deleterious effect on the body in larger doses[4].

nrakta Australia - New South Wales, Victoria. ksacta Forms extensive forests in mountainous areas to 2000 metres[77, 154].

propta Seed - surface sow February/March in a sunny position in a greenhouse[11, 78, 134]. Species that come from high altitudes appreciate 6 - 8 weeks cold stratification at 2°c[200]. Pot up the seedlings into individual pots as soon as the second set of seed leaves has developed, if left longer than this they might not move well. Plant out into their permanent positions in early summer and give them some protection from the cold in their first winter. The seed can also be sown in June, the young trees being planted in their final positions in late spring of the following year. The seed has a long viability[200].

nwatta Prefers a sunny position in a moderately fertile well-drained moisture retentive circum-neutral soil[200]. Succeeds in most soils but dislikes chalk or clay soils[98]. Tolerates poor soils, especially those low in mineral elements[200]. Tolerant of drought, dry soils[200] and exposed positions[75]. This is perhaps the hardiest species in this genus, it tolerates long periods down to -14°c and short periods as low as -20°c[107, 200]. Eucalyptus species have not adopted a deciduous habit and continue to grow until it is too cold for them to do so. This makes them more susceptible to damage from sudden cold snaps. If temperature fluctuations are more gradual, as in a woodland for example, the plants have the opportunity to stop growing and become dormant, thus making them more cold resistant. A deep mulch around the roots to prevent the soil from freezing also helps the trees to survive cold conditions. The members of this genus are remarkably adaptable however, there can be a dramatic increase in the hardiness of subsequent generations from the seed of survivors growing in temperate zones[200]. Eucalyptus monocultures are an environmental disaster, they are voracious, allelopathic and encourage the worst possible attitudes to land use and conservation[200]. A very ornamental tree[1], it grows very slowly in its first 2 or 3 years but is

soils must contain the proper nitrogen-fixing bacteria. When in the amino-acid methionine[240]. The protein has a high grown on the same land for 2 - 3 successive years, increasing yields are obtained year after year[269]. Seed can be purchased that has been treated with this rhizobium, it is unnecessary on soils with a pH below 5.5 but can be helpful on other soils[206]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen. Research at the University of Illinois has crossed Glycine max (annual soybean) with Glycine tomentella (perennial) which could lead to the production of a perennial edible sovbean [1-1].

# 8.1.4 Glycine spp.

Perennial Soybean

tfo2n 7 tlin 11 cyuc 4 kcak 4 tcan 3 dwat 0.6 m hkuc hmim cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Glycine spp. is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista In some species the raw mature seed is toxic and must be thoroughly cooked before being eaten[76].

kcakta Edible Parts: Leaves Oil Seed SeedpodEdible Uses: OilCarbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Research at the University of Illinois has crossed Glycine max (annual soybean) with Glycine tomentella (perennial) which could lead to the production of a perennial edible soybean [1-1].

tcanta OilSee individual plant entries. dwatta See individual species. nrakta Cultivated origin. ksacta Unknown propta See individual plant entries.

nwatta Hypothetical Crop Management: dard Staple Crop: Protein-oilClimate: hypothetical, Humidity: semi-arid to humid. Carbon Farming Solutions - Cultivation: hypothetical. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

### 8.1.5 Lupinus angustifolius

Blue Lupin, Narrowleaf lupine tfo2n 7 tlin 9 cyuc 4 kcak 4 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Lupinus angustifolius is a ANNUAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf from April to October, in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil

pcista The seed of many lupin species contain bittertasting toxic alkaloids, though there are often sweet varieties within that species that are completely wholesome[65, 76]. Taste is a very clear indicator. These toxic alkaloids can be leeched out of the seed by soaking it overnight and discarding the soak water. It may also be necessary to change the water once during cooking. Fungal toxins also readily invade the crushed seed and can cause chronic illness[65].

kcakta Edible Parts: SeedEdible Uses: Seed cooked[177]. Used as a protein-rich vegetable or savoury dish in any of the ways that cooked beans are used, they can also be roasted or ground into a powder. If the seed is bitter this is due to the presence of toxic alkaloids and the seed should be thoroughly leached before being cooked. The seeds of low-alkaloid varieties is used in making 'tempeh'[183]. The seed is rich in protein, though it is deficient digestibility (90%) and biological value(53%)[240].

tcanta Green manure quod green manure plant, it produces a good bulk of organic matter and fixes atmospheric nitrogen[200]. It also makes phosphorus in the soil more available to other plants[201].

nrakta Europe - Mediterranean. ksacta Cultivated and rocky ground on light acid soils [45, 50].

propta Pre-soak the seed for 24 hours in warm water and sow in mid spring in situ[1, 200]. You may need to protect the seed from mice. Germination should take place within 2 weeks. The seed can also be sown in situ as late as early summer as a green manure crop.

nwatta An easily grown plant, it succeeds in any moderately good soil[1]. Requires a sunny position[200]. Prefers a light acid soil[50] but tolerates adverse conditions. Dislikes limey soils[50]. Sometimes cultivated for its edible seeds. there are some named varieties that are low in the bitter toxic alkaloids. 'Uniwhite' is a low-alkaloid variety with a permeable seed coat. It has reduced pod-shattering[183] and so is easier to harvest mechanically. The blue lupin is a good companion plant for most vegetables[201]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200] When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their

# 8.1.6 Glycyrrhiza echinata

Wild Liquorice. Chinese licorice

tfo2n 7 tlin 10 cyuc 4 kcak 3 tcan 3 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Glycyrrhiza echinata is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Sweetener Tea-Root - raw or cooked. Very fibrous, it is often boiled to extract the sugars and is a source of Russian and German liquorice[183]. It is used as a confection, a sweetener and medicinally[2, 105, 177]. A delicious sweet flavour[K]. The dried root is often used for chewing, it is especially useful for teething children and as a tooth cleaner[K]. The root contains glycyrrhizin, a substance that is 50 times sweeter than sugar. A tea made from the roots is an excellent thirst quencher.

tcanta Nitrogen fixer. Dynamic accumulator.

dwatta Alterative Expectorant TonicThe root is alterative, expectorant and tonic. It is usually mixed with other herbs, partly at least to improve their taste[178].

nrakta S. Europe. ksacta Muddy places by rivers[45].

propta Pre-soak the seed for 24 hours in warm water and then sow spring or autumn in a greenhouse [200]. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on for their first winter in a greenhouse. Plant out in late spring or early summer when in active growth. Plants are rather slow to grow from seed[238]. Division of the root in spring or autumn. Each division must have at least one growth bud. Autumn divisions can either be replanted immediately or stored in clamps until the spring and then be planted out [200]. It is best to pt up the smaller divisions and grow them on in a cold frame until they are established before planting them out in the spring or summer.

nwatta Requires a deep well cultivated fertile moistureretentive soil for good root production[200]. Prefers a sandy soil with abundant moisture[238]. A slightly alkaline soil produces the best plants[238]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Cultivated for its medicinal root in S. Europe[50]. Unless seed is required, the plant is usually prevented from flowering so that it puts more energy into producing good quality roots[238]. A very deep-rooted plant,

bers of this genus are attracting considerable interest from breeding institutes for their nutrient-rich fruits that can promote the general health of the body (see edible and medicinal uses below)[214]. The deeply cleft bark favours the growth of epiphytes[146]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Dioecious. Male and female plants must be grown if seed is required.

## 8.1.3 Glycine max

tfo2n 7 tlin 10 cvuc 4 kcak 4 tcan 2 dwat m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Glycine max is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

pcista The raw mature seed is toxic and must be thoroughly cooked before being eaten[76]. The sprouted raw seed is sometimes eaten and is considered to be a wholesome

kcakta Edible Parts: Leaves Oil Oil Seed SeedpodEdible Uses: Coffee Milk Oil OilMature seed - cooked[2, 33]. The seeds furnish one of the world's most important sources of oil and protein, they can be eaten as they are in soups, stews etc[183, 269], though they are also very commonly used in the preparation of various meat substitutes [34, 46]. The dried seed can be ground into a flour and added to cereal flours or used for making noodles etc[183]. The Japanese make a powder from the roasted and ground seed, it is called 'Kinako' and has a nutty flavour and fragrance - it is used in many popular confections[183]. The sprouted seed is eaten raw or added to cooked dishes. The toasted seeds can be eaten as a peanut-like snack[183]. The seed is also made into numerous fermented foods such as miso and tempeh[183] and is also used to make soya milk, a valuable protein supplement in infant feeding which also provides curds and cheese[269]. The seed contains 20% oil and 30 - 45% protein[100]. All seeds on a soybean plant mature at essentially the same time. Maturity of the seed is accompanied by a rapid dropping of the leaves and drying of the stems[269]. Average yield of beans is about 1700 kg/ha[269]. High-yielding cvs, adapted to the locality and grown under proper culture and favourable conditions will yield more than twice the average vield[269]. The immature seed is cooked and used like peas or eaten raw in salads[105, 183]. The strongly roasted and ground seeds are used as a coffee substitute[183]. The young seedpods are cooked and used like French beans[116, 183]. An edible semi-drying oil is obtained from the seed[269]. It is cooked or can be used as a dressing in salads etc and for manufacture of margarine and shortening[34, 183, 269]. Young leaves - raw or cooked[179,

tcanta Biomass Green manure Oil Oil PaperThe seed contains up to 20% of an edible semi-drying oil[171, 269]. It is non-drying according to another report[57]. This oil has a very wide range of applications and is commonly used in the chemical industry[171, 206]. The oil is used industrially in the manufacture of paints, linoleum, oilcloth, printing inks, soap, insecticides, and disinfectants[34, 46, 100, 269]. Lecithin phospholipids, obtained as a by-product of the oil industry, are used as a wetting and stabilizing agent in food, cosmetic, pharmaceutical, leather, paint, plastic, soap, and detergent industries[269]. Both the meal and the soy bean protein are used in the manufacture of synthetic fibre, adhesives, textile sizing, waterproofing, fire-fighting foam and many other uses[269]. The plant is sometimes grown as a green manure[269]. The straw can be used to make paper, stiffer than that made from wheat straw[269]. The plant is an excellent source of biomass. The oil from the seeds can

be used as a diesel fuel whilst the stems can be burnt as a

dwatta Antidote Astringent Diaphoretic Laxative Ophthalmic Resolvent StomachicThe fermented seed is weakly diaphoretic and stomachic[176]. It is used in the treatment of colds, fevers and headaches, insomnia, irritability and a stuffy sensation in the chest[176]. The bruised leaves are applied to snakebite[218]. The flowers are used in the treatment of blindness and opacity of the cornea[218]. The ashes of the stems are applied to granular haemorrhoids or fungus growths on the anus[218]. The immature seedpods are chewed to a pulp and applied to corneal and smallpox ulcers[218]. The seed is antidote[218]. It is considered to be specific for the healthy functioning of bowels, heart, kidney, liver and stomach[218, 269]. The seed sprouts are constructive, laxative and resolvent[218]. They show an oestrogenlike activity in the body and are also antispasmodic[279]. The sprous are used in the treatment of oedema, dysuria, chest fullness, decreased perspiration, the initial stages of flu and arthralgia[176]. A decoction of the bark or root is astringent[240, 269]. Soybean diets are valued for treating acidosis[269]. Since soybean oil has a high proportion of unsaturated fatty acid, it is recommended, like safflower, poppy seed, etc. to combat hypercholesteremia[269]. Commercial grades of natural lecithin, which are often derived from sovbean, are reported to contain a potent vasopressor. Medicinally lecithin is indicated as a lipotropic agent[269]. Sovbean is listed as a major starting material for stigmasterol, once known as an antistiffness factor. Sitosterol, also a sov by-product, has been used to replace diosgenin in some antihypertensive drugs[269].

nrakta E. Asia. ksacta Lowland thickets. C. and S.

propta Pre-soak the seed for 12 hours in warm water and then sow in early spring in a greenhouse. The seed should germinate within two weeks at a temperature between 12 -16°c[206]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring or early summer, after the last expected frosts. Seed can also be pre-soaked for 12 hours in warm water and then sown in situ in late spring, though this will not yield well unless the summer is very hot.

nwatta A fairly easily-grown plant, it grows best in a sunny position on fertile, well-drained soils[33, 38], but does tolerate a wide range of soil conditions[269]. Soybeans will brow better than many crops on soils that are low in fertility, droughty or poorly drained[269]. Prefers a well-drained sandy soil[1]. Prefers a slightly acid soil[200, 206]. Soya does not grow well in a wet climate[132], nor will it withstand excessive heat or severe cold winters[269]. The plant has been reported to tolerate an annual precipitation in the range of 31 to 410cm (though it requires at least 50cm for a good crop), an annual mean temperature range of 5.9 to 27°C and a pH in the range of 4.3 to 8.4 (preferring 6 - 6.5)[269]. Soya is one of the most widely cultivated plants in the world, being grown for its oil and protein rich edible seed, there are many named varieties[183, 206, 269]. A subtropical plant, but its cultivation extends from the tropics to as far north as latitude 52°N[269]. The species, and most of its cultivars, is a short-day plant and does not flower or set seed unless the daylight hours are less than 13 hours per day[269]. There are three basic types of soya bean, those with green seeds are considered to be the most tender and best flavoured and are the type best suited for northern climates. Black seeded forms are normally used dried and yellow seeded forms are used for making soya milk, flour etc[206]. The plant requires a hot summer with a mean July temperature between 16 and 18°c[206] and a dry autumn if it is to do well in Britain[1, 33], though it is as hardy as the runner bean, Phaseolus coccineus[1]. The best crops outdoors in Britain are obtained if the plants are started off in a greenhouse and planted out in late spring although a direct sowing outdoors in early May can succeed in good summers but yields will then normally be low. Many cultivars will not flower in the shorter days of late summer in the northern hemisphere and so are not suitable for growing in Britain[206]. Some botanists separate the cultivated forms of soya from this species and call them G. soja. Sieb. and Zucc[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Soybean then capable of growing 1 metre or more a year[11]. Plants self-sow in Devon[1]. Plants are shallow-rooting and, especially in windy areas, should be planted out into their permanent positions when small to ensure that they do not suffer from wind-rock[245]. They strongly resent root disturbance and should be container grown before planting out into their permanent position[11]. In Australia this species usually regenerates from the base after forest fires[167]. The flowers are rich in nectar and are a good bee crop[200].

# 7.2.512 Buddleia globosa

Orange Ball Tree

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Buddleia globosa is an evergreen Shrub growing to 5 m (16ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

dwatta MiscellanyOne report says that it is cultivated as a medicinal plant in S. America but gives no more details[184].

nrakta S. America - Argentina, Chile, Peru. ksacta Found at altitudes up to 2000 metres.

propta Seed - cold stratify for 4 weeks at 4°c[138] and surface sow the seed in February/March in a greenhouse[78, 113]. Germination usually takes place within 3 - 4 weeks at 21°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Seedlings are inclined to damp off and so should be watered with care and kept well-ventilated[78]. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Use short side-shoots[78]. Very high percentage[113]. Cuttings of mature wood of the current season's growth, 15 -20cm long, October/November in a frame[200].

nwatta Requires a sunny position[11, 182]. Prefers a rich loamy well-drained soil[11, 200]. Very tolerant of alkaline soils[200]. Grows well by the sea, tolerating maritime exposure[184, 200]. Plants are hardy to about -15°c if they are sheltered from cold winds[184, 200]. They resprout freely from the base if cut back by cold weather[200] and are deciduous in cold winters[188]. Plants flower on the previous year's growth[200]. The flowers scent the air for a considerable distance with their sweet honey-like fragrance[245].

# 7.2.513 Rhododendron ponticum

Rhododendron

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 5 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Rhododendron ponticum is an evergreen Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil

pcista Although no specific mention of toxicity has been seen for this species, it belongs to a genus where many members have poisonous leaves. The pollen of many if not all species of rhododendrons is also probably toxic, being said to cause intoxication when eaten in large quantities[183].

tcanta Hedge HedgePlants are being grown as a hedge at the RHS gardens in Wisley, Surrey[29]. It tolerates quite hard clipping[200].

dwatta Antirheumatic CardiacA medicine made from the plant is used to treat heart and circulation malfunctions, but it should not be used without expert supervision[9].

nrakta W. Europe to the Caucasus and Lebanon. Naturalized in Britain[17]. ksacta Rich forests under Fagus, Picea and Abies species, it is also found above the tree line[11]. Sandy and peaty soils in woods and open places in Britain[17]

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn and given artificial light. Alternatively sow the seed in a lightly shaded part of the warm greenhouse in late winter or in a cold greenhouse in April. Surface-sow the seed and do not allow the compost to become dry[200]. Pot up the seedlings when they are large enough to handle and grow on in a greenhouse for at least the first winter. Layering in late July. Takes 15 - 24 months[78]. Cuttings of half-ripe wood. August in a frame. Difficult[78].

nwatta Succeeds in a most humus-rich lime-free soils except those of a dry arid nature or those that are heavy or clayev[1]. Prefers a peaty or well-drained sandy loam[1]. A pH between 4.5 and 5.5 is ideal[1]. Succeeds in sun or shade, the warmer the climate the more shade a plant requires [184, 2001. Hardy to about -15°c[184]. Plants are self-sowing aggressively in British woodlands and are often out-competing native trees by filling the understorey and preventing natural regeneration. They are considered to be a pernicious weed by many environmentalists. Succeeds in a woodland though, because of its surface-rooting habit[200], it does not compete well with surface-rooting trees[1]. Plants need to be kept well weeded, they dislike other plants growing over or into their root system, in particular they grow badly with ground cover plants, herbaceous plants and heathers[200]. Plants form a root ball and are very tolerant of being transplanted, even when quite large, so long as the root ball is kept intact[200]. Plants in this genus are notably susceptible to honey fungus[200].

### 7.2.514 Hebe salicifolia

6 tlin 9 cyuc 0 kcak 3 tcan 1 dwat 4.5 m hkuc

htut cyutli tcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Hebe salicifolia is an evergreen Shrub growing to 4.5 m (14ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution

tcanta Hedge HedgeA very wind resistant shrub, it can be grown as a shelter hedge in exposed maritime positions. Attractive flowers.

dwatta Antispasmodic DysenteryTreats dysentery, having an antiperistaltic action[153].

nrakta New Zealand. S. America - Chile. ksacta Many

habitats in South and Stewart Islands in New Zealand[44]. propta Seed - we have no information on this species

but suggest sowing the seed in a greenhouse in spring. Only just cover the seed and do not allow the compost to dry out. Prick out the seedlings into individual pots when they are large enough to handle. Grow on the young plants for at least their first winter in a greenhouse and plant out in late spring or early summer after the last expected frosts. It would probably be worthwhile giving some protection to the plant for its first winter outdoors. Cuttings of half ripe wood, 3 - 5cm with a heel, July/August in a frame. Pot up when roots are forming and keep in a frame or greenhouse for its first winter before planting out in late spring. Cuttings of mature wood, late autumn or winter in a frame.

nwatta Succeeds in most soils so long as they are not boggy or too dry[182]. Prefers a light well-drained soil[1, 166] and a sunny position[200]. Prefers a moist rich soil[166] but plants are probably hardier in a soil that is on the poor side[1]. Lime tolerant[11]. Intolerant of drought[166]. Tolerates atmospheric pollution[200]. Very wind resistant, withstanding maritime exposure[166]. A polymorphic species[200], it hybridizes freely with other members of this genus. Plants in this genus are notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth behaviour makes it easier to maintain without having to apply containment methods[2-1].

#### 7.2.515 Tamarix chinensis

Chinese Tamarisk, Five-stamen tamarisk 6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 4.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-wissliphsom hpa7tmwatli xre7t hjonli

drutta Tamarix chinensis is a deciduous Shrub growing to 4.5 m (14ft 9in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

tcanta Hedge HedgeVery tolerant of maritime exposure, it makes a good shelter hedge in coastal gardens.

dwatta Analgesic Antivinous Carminative Depurative Diuretic Febrifuge VulneraryThe leaves are analgesic, antipyretic, antivinous, carminative, depurative, diuretic, febrifuge[147, 218]. Aids measles rash surfacing[147]. The wood is used in the treatment of anthrax-like sores[218] A manna from the plant is vulnerary[218].

nrakta E. Asia - China. ksacta Roadsides and stream edges, mostly as the result of cultivation[147].

propta Seed - sow spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy[200]. Cuttings of mature wood of the current seasons growth, 15 - 25cm long, planted outdoors in late autumn in a nursery bed or straight into their permanent position. High percentage[11, 200].

nwatta An easily grown plant, succeeding in most soils and tolerant of saline conditions[11]. Grows well in heavy clay soils as well as in sands and even shingle[182]. Usually found near the coast, it succeeds inland if given a fairly good deep loam and a sunny position[11, 200]. Tolerant of maritime winds and dry soils when grown near the coast[11], plants require a moister soil and shelter from cold drying winds when they are grown inland in non-saline soils because they use the soil salts that are found in saline soils to help them reduce transpiration[200]. This species flowers on the current year's growth[227]. Any pruning is best carried out in spring, hedges are also best trimmed at this time[188]. Plants are tolerant of severe pruning, sprouting freely from old wood[K]. Very closely related to T. ramosissima[11]. This plant is often mis-identified as T. gallica[50] or T. indica[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 7.2.516 **Jasminum nudiflorum**

Winter-Flowering Jasmin, Winter jasmine 6 tlin 11 cyuc 0 kcak 0 tcan 1 dwat 3.6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Jasminum nudiflorum is a deciduous Shrub growing to 3.6 m (11ft) by 4.5 m (14ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from December to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland)

semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

tcanta Soil stabilizationA good soil stabilizer for steep banks, succeeding in shady positions[2001. The sprawling branches make this a good plant for ground cover, the plants should be spaced about 1.8 metres apart each way[208].

dwatta DiaphoreticDiaphoretic[178].

nrakta E. Asia - W. China. Locally naturalized in France. ksacta Thickets, ravines and slopes at elevations of 800 - 4500 metres in western China[266].

propta Seed - best sown as soon as it is ripe in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy. Cuttings of mature wood in November. Layering.

nwatta Landscape Uses: Arbor, Cascades, Erosion control, Foundation, Ground cover, Massing, Screen, Standard. Succeeds in a good well-drained loam[1]. Grows well in heavy clay soils. Prefers a good soil and a sunny position but succeeds in shade[11, 28, 49], including on a north facing wall[200]. Tolerates very poor soils, whether acid or alkaline[202]. Tolerates urban pollution[200]. A very ornamental plant[1], it is hardy to about -15°c[184]. Some winter die-back can be experienced and flowers can be damaged in severe winters but new flowers are usually produced when the weather warms up[202]. A winter-flowering plant, flowering mainly on wood that was produced the previous summer[219]. Pruning can be carried out in early to mid spring once flowering has finished[202, 219]. Removing one third of the oldest growth down to ground level rejuvenates the plant and encourages greater flowering[202]. Unpruned plants tend to become woody and matted with dead stems[219]. The flowers have a delicate mossy perfume[245]. This species does not set seed in British gardens. This might be because all the plants in cultivation stem from one original importation[182]. An ideal plant for growing on shady walls and banks[28, 49]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Attractive flowers or blooms.

# 7.2.517 Garrya fremontii

Fever Bush, Bearbrush

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 3 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Garrya fremontii is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric nollution

dwatta Antiperiodic TonicThe leaves are intensely bitter and are used as an antiperiodic and tonic[4]. They can be used as a guinine substitute[4].

nrakta South-western N. America - California and Oregon. ksacta In dry situations in chaparral, mixed evergreen, yellow pine and red fir forests at elevations from sea level to 2200 metres[276].

propta Seed - best sown as soon as it is ripe in a cold frame. Very slow, the seed can take 2 or more years to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10cm with a heel, August in a frame[200]. Cuttings of mature wood 10 - 12 cm with a heel, December/January in a frame[200].

# B 7 tlin

## 8.1 **bwon**

### 8.1.1 Lens culinaris

Lenti

tfo2n 7 tlin 12 cyuc 5 kcak 3 tcan 1 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lens culinaris is a ANNUAL growing to 0.5 m (fishin). It is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Cleistogomy (self-pollinating without flowers ever opening). The plant is self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Seed SeedpodEdible Uses: Seed - cooked or sprouted and eaten raw[1]. A very nutritious food[171, 177], the seeds can be cooked on their own or added to soups, stews etc[183]. The seed can be soaked for 12 hours in warm water and then allowed to sprout for about 5 days[244]. They have a crunchy, fresh flavour[244]. Lentils are more digestible than many legumes[K]. The dried seed can also be ground into a powder and used with cereal flours in making bread etc[183], this greatly enhances the value of the protein in the bread. The seed stores better if it is left in its husk[200]. Young seedpods - used fresh or cooked like green beans[61, 177, 183].

tcanta Fuel Green manureAgroforestry Uses: The plant can be used as a green manure[418]. Lentil is mainly grown as a sole crop, but sometimes mixed with other crops, e.g. in India with barley, mustard or castor[299]. Other Uses: The seeds are a source of starch for the textile and printing industries[310, 418]. The plant remains, after the seed has been harvested, can be used as a fuel[299].

dwatta Laxative PoulticeThe seeds are mucilaginous and laxative[240]. They are considered to be useful in the treatment of constipation and other intestinal affections[240]. Made into a paste, they are a useful cleansing application in foul and indolent ulcers[240].

nrakta Original habitat is obscure, possibly the Mediterranean. ksacta Not known in the wild.

propta Seed - sow early April in situ[1]. Some cultivars are probably suitable for sowing outdoors in the autumn, at least in the milder parts of the country[200].

nwatta An easily grown plant[K], it prefers a sandy soil in a warm sunny sheltered position[27, 37, 200]. Another report says that it does best on clay[37]. It produces most seed when grown on poorer soils[37]. Lentils are widely cultivated in warm temperate and tropical zones for their edible and very nutritious seed, there are many named varieties[183]. The plants are much hardier than is commonly supposed and many of these varieties can succeed in Britain, particularly in warm summers. There is at least one, called 'WH2040', that can withstand temperatures as low as -23°c in the seedling stage[200], 'Chilean' is a low-growing plant that can be grown in the winter in areas where winter vegetables can be grown[183]. 'HarLen' tolerates temperatures down to -10°c and performs very well in gardens[183]. The plants take the same time as peas to mature, so lentils are a potential commercial crop for Britain[141]. Yields of up to 2 tonnes per hectare are possible[200]. The main problem with growing them as a commercial crop is that they are produced by using cheap labour in many countries which makes it very difficult for British farmers to compete on prices. However, this does not preclude their being grown in the garden and allotment. Lentils are also beneficial to grow as part of a rotation on the farm or garden. They have a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby and, if the roots are left in the ground when the seeds are harvested, this will provide a source of nitrogen for the next crop[200].

# 8.1.2 Hippophae tibetana

Tibetan Sea Buckthorn

tfo2n 7 tlin 10 cyuc 4 kcak 0 tcan 3 dwat 15 m hkuc htut cyutli kyuctcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Hippophae tibetana is a deciduous Tree growing to 15 m (49ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in April, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 46, 272]. Very rich in vitamin C, but too acid when raw for most peoples tastes. The flavour is somewhat lemonlike[K]. The fruits of some species and cultivars (not specified) contain up to 9.2% oil[214]. Used for preserves[105, 183]. The fruit becomes less acid after a frost or if cooked. This species has the largest fruits of the genus, 100 fruits weighing around 40d[214].

tcanta Cosmetic FuelThe wood is used for fuel[146, 272]. A red cosmetic is obtained from the ripe fruit[272].

dwatta Antitussive Blood purifier Cancer Cardiac Eczema Expectorant Poultice Vitamin CThe tender branches and leaves contain bio-active substances which are used to produce an oil that is quite distinct from the oil produced from the fruit. This oil is used as an ointment for treating burns[214]. A high-quality medicinal oil is made from the fruit and used in the treatment of cardiac disorders, it is also said to be particularly effective when applied to the skin to heal burns, eczema and radiation injury, and is taken internally in the treatment of stomach and intestinal diseases[214]. The fruit is used in Tibetan medicine, it is said to have a sour taste and a neutralizing and sharpening potency[241]. Antitussive, blood purifier and expectorant, it is used in the treatment of disorders of the lungs, inflammation of the pulmonary tract, difficulty in expelling phleam and coagulation and clotting of the blood[241]. The fruit is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers[214].

nrakta E. Asia - Himalayas. ksacta Open sunny places in montane areas, rarely found below 3000 metres[214]. Rocky and sandy ground at elevations of 3800 - 4200 metres in Nepal[272].

propta Seed - sow spring in a sunny position in a cold frame[78]. Germination is usually quick and good although 3 months cold stratification may improve the germination rate. Alternatively the seed can be sown in a cold frame as soon as it is ripe in the autumn. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a greenhouse for their first winter. Plant out in late spring into their permanent positions. Male seedlings, in spring, have very prominent axillary buds whilst females are clear and smooth at this time[78]. Cuttings of half-ripe wood, June/July in a frame[200]. Difficult[113]. This is the easiest method of vegetative propagation[214]. Cuttings of mature wood in autumn[200]. Difficult[113]. The cuttings should be taken at the end of autumn or very early in the spring before the buds burst. Store them in sand and peat until April, cut into 7 - 9cm lengths and plant them in a plastic tent with bottom heat[214]. Rooting should take place within 2 months and they can be put in their permanent positions in the autumn[214]. Division of suckers in the winter. They can be planted out direct into their permanent positions and usually establish well and quickly[K]. Layering in autumn[200].

nwatta Succeeds in most soils if they are not too dry[200]. Grows well by water[1, 11]. A fast-growing and very wind-resistant tree, an excellent pioneer species[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -10°c[200]. Mem-

tcanta DyeA blue dye like indigo can be obtained by fermentation of the leaves[4].

dwatta Cardiac Cathartic Diuretic LaxativeThe twigs and leaves have a similar action to the common broom, Cytisus scoparia[4]. They are collected as the plant comes into flower and can be stored for later use. They are diuretic, cardiac, cathartic and laxative[4].

nrakta S. Europe. ksacta A common weed of cultivated ground.

propta Seed - sow early spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring.

nwatta Requires a light well-drained soil in full sun[200].

## 7.2.580 Aster diplostephioides

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Aster diplostephioides is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Antidote Febrifuge Haemostatic TonicThis plant is said to have medicinal properties, but no details were given in the report[145]. The flowers are used in Tibetan medicine, they are said to have a bitter taste and a cooling potency[241]. Antidote, febrifuge, haemostatic and tonic, they are used in the treatment of infectious fevers, influenza, nose bleeds, poisoning, sores from environmental poisoning and an inability to stretch or contract the limbs[241].

nrakta E. Asia - Himalayas from Kashmir to Sikkim ksacta Alpine pastures, 3000 - 3800 metres[145].

propta Seed - surface sow in spring in a cold frame. Do not allow the compost to become dry. Pre-chilling the seed for two weeks can improve germination rates[134]. Germination usually takes place within 2 weeks at 20°c[134]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200].

nwatta Succeeds in most good garden soils[1], preferring one that is well-drained and moisture retentive[200]. Prefers a sunny position[200]. A very ornamental plant[1], it grows well in a rock garden[1]. Most species in this genus seem to be immune to the predations of rabbits[233]. Hybridizes freely with other members of this genus[200].

# 7.2.581 Convolvulus scammonia

Scammony

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.8 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Convolvulus scammonia is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in July, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

dwatta Cathartic HydrogogueA resin is obtained from the root. The earth is cleared away from the top of the root, the top is then cut off obliquely about 5cm below the point where the stalks spring forth. The exuding juice is collected, which gradually hardens[4]. This resin is a drastic cathartic and hydrogogue and should be used with great caution[4, 46, 61]. The roots contain about 8% resin[240].

nrakta Europe - Mediterranean, to W. Asia. ksacta Scrub and forest margins[50].

propta Seed - sow spring in a greenhouse[164]. Germination can be slow and erratic, a period of cold stratification

might help reduce the germination period. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts. Division in spring. Cuttings of young shoots, August in a frame in sand[1].

nwatta Prefers a light basic sharply drained soil of low to medium fertility[4, 200]. Prefers a sunny sheltered position. Thrives in dry soils[4] and succeeds in ordinary garden soils. The root can be up to 1.2 metres long, so for best results a deep soil is required[4].

# 7.2.582 Erysimum cheiri

Wallflower, Aegean wallflower

6 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli priklwisslip hpa7tmwatli xre7t hjonli

drutta Erysimum cheiri is an evergreen Perennial growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The plant is said to be poisonous if used in large quantities[7].

tcanta EssentialThe flowers contain 0.06% essential oil[240]. It has a pleasing aroma if diluted and is used in perfumery[46, 61, 114, 244]. The seed contains about 20% fixed oil[240], but no details of any uses are given[K].

dwatta Antirheumatic Antispasmodic Aphrodisiac Cardiotonic Diuretic Emmenagogue Expectorant Nervine Ophthalmic Purgative Resolvent Stomachic TonicWallflower was formerly used mainly as a diuretic and emmenagogue but recent research has shown that it is more valuable for its effect on the heart [254]. In small doses it is a cardiotonic, supporting a failing heart in a similar manner to foxglove (Digitalis purpurea)[254]. In more than small doses, however, it is toxic and so is seldom used in herbal medicine[254]. The flowers and stems are antirheumatic, antispasmodic, cardiotonic, emmenagogue, nervine, purgative and resolvent[4]. 7, 46, 61, 240]. They are used in the treatment of impotence and paralysis[240]. The essential oil is normally used[4]. This should be used with caution because large doses are toxic[7]. The plant contains the chemical compound cheiranthin which has a stronger cardiotonic action than digitalis (obtained from Digitalis species). If taken in large doses this is very poisonous and so this plant should not be used medicinally without expert supervision[244]. The seeds are aphrodisiac, diuretic, expectorant, stomachic and tonic[240]. They are used in the treatment of dry bronchitis, fevers and injuries to the eyes[240].

nrakta S. Europe. Naturalized in lowland Britain[17]. ksacta Walls, cliffs and rocks, often near the sea in Britain[4,

propta Seed - sow spring in an outdoor seedbed. Germination should take place within 3 weeks. Plant the seedlings into their permanent positions when they are large enough to handle. If seed is in short supply, it can be sown in spring in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer.

nwatta Prefers a position in full sun in a circumneutral soil[1, 111, 200]. Succeeds in ordinary garden soils[1], tolerating poor and limey soils[187]. Plants are liable to die out if the soil is too rich[111]. Wallflowers are perennial, though they are usually grown as biennials in the flower garden for spring and early summer bedding[1]. There are some named varieties[187]. A very ornamental plant[7], it is liable to die out after flowering, probably because it exhausts itself by producing so many flowers. Plants require a very well-drained dry soil if they are to survive a second winter[187]. They grow well on dry stone walls[201] and also on old mortared walls where they usually self-sow[219]. A good butterfly and moth plant[17, 30]. A good companion for apple trees[18, 20, 201].

nwatta Prefers a sunny position succeeding in most welldrained fertile soils[182, 200, 202]. Succeeds in a hot dry position. Succeeds in light shade[202], the plants are also tolerant of quite deep shade[219]. Does not require a rich soil or abundant moisture[11], if the soil is too fertile the flowering will be delayed[200]. Resistant to urban pollution and maritime exposure but are subject to wind scorch from cold drying winds in colder areas[200]. Hardy to about -15°c[184], it is best on a sunny wall in most parts of the country but does very well as a free standing shrub in Devon and Cornwall[11]. In cold winters and springs the previous year's leaves may fall before the new leaves are produced[202]. The plant strongly resents root disturbance[1, 11] and should be placed in its permanent position as soon as possible. The plant flowers on wood produced the previous summer[200]. All pruning should be carried out in spring before new growth starts but after flowering has ended[1]. Dioecious. Male and female plants must be grown if seed is required.

# 7.2.518 Skimmia japonica

Japanese Skimmia

6 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc

pcimhmimhtut cyutli tcup hwicil hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Skimmia japonica is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

pcista A poisonous alkaloid called 'skimmianin' is found in all parts of the plant[211].

tcanta Plants can be grown as a ground cover when planted about 1 metre apart each way[208].

dwatta Carminative Restorative TonicThe poisonous stems are carminative, restorative and tonic[178, 218].

stems are carminative, restorative and tonic[178, 218].
nrakta E. Asia - Japan. ksacta Woods, sometimes as an
epiphyte on old Cryptomeria spp trees, in C. and S. Japan[58].
propta Seed - can be sown as soon as it is ripe in a

propta Seed - can be sown as soon as it is ripe in a cold frame[K]. It also succeeds when sown in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If there is sufficient seed then it can be sown can be in an outdoor seedbed in early spring[200]. Grow the plants on in the seedbed for a couple of years before planting them out in late autumn or early spring. Cuttings of half-ripe wood, July/August in a cold frame[11]. Cuttings of nearly mature side shoots, 7 - 10cm with a heel, September in a cold frame. Slow to root, they should be left for 18 months before moving to their permanent positions. Good percentage[78]. Layering in autumn. Takes 18 months. Good to high percentage[78].

nwatta Landscape Uses:Border, Container, Foundation, Pest tolerant, Massing, Woodland garden. Succeeds in a well-drained open loam or in a peaty soil[11, 200] preferring a rich slightly acid soil[184]. Thrives in moderately shady positions[11, 200] but also succeeds in full sun where the leaves may be rather yellow but the plant will flower and fruit better[200]. Plants are very tolerant of atmospheric pollution[184], being unharmed by deposits of soot or a sulphur-laden atmosphere[245]. Plants are hardy to about -15°c[184]. Often cultivated in the ornamental garden, there are many named varieties. The flowers have a sweet perfume[245]. Those of male forms are more aromatic than females[1], whilst the variety 'Fragrans' has a stronger scent like lily of the valley[245]. The bruised leaves are pleasantly aromatic[245]. The fruit is seldom eaten by birds, usually hanging on the plant until it flowers the following year[182]. A polymorphic species, it is usually dioecious but some forms are hermaphrodite, especially in ssp. reevesiana. (Fortune.) N.P.Taylor. and Airey Shaw[200]. This sub-species

is intolerant of chalky soils[182] and is also much taller than the type. Another report says that it is smaller and weaker-growing than the type species[188]. Special Features:Not North American native, Fragrant flowers, Attractive flowers or blooms.

# 7.2.519 Inula racemosa

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Inula racemosa is a PERENNIAL growing to 2 m (6ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta AnalgesicThe rhizome is used in Tibetan medicine, it is said to have a sweet, bitter and acrid taste with a neutral potency[241]. It is used in the treatment of containious fevers that have not fully ripened and pain in the upper body, especially between the neck and the shoulders[241].

nrakta E. Asia - Western Himalayas. ksacta Borders of fields to an elevation of 3,000 metres.

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[111].

nwatta Succeeds in a sunny position in ordinary garden soil[1]. Requires a moist well-drained soil in sun or partial shade[187]. Grows well in heavy clay soils. A vigorous plant, it can be naturalised in the wild garden or other informal positions[200]. Plants take some years to become fully established[233].

# 7.2.520 Ipomoea purpurea

Common Morning Glory, Tall morning-glory 6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 2.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ipomoea purpurea is a ANNUAL CLIMBER growing to 2.5 m (8ft 2in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

dwatta Anthelmintic Diuretic Hallucinogenic LaxativeThe seed is anthelmintic, diuretic and laxative[176]. It is used in the treatment of oedema, oliguria, ascariasis and constipation[176]. The seed contains small quantities of the hallucinogen LSD[200, 219]. This has been used medicinally in the treatment of various mental disorders.

nrakta Central America - Mexico to the West Indies. ksacta Scrub and waste places[260]. Stream banks, disturbed or waste areas[274]

propta Pre-soak the seed for 12 hours in warm water, or scarify the seed, and sow in individual pots in a greenhouse in early spring. The seed usually germinates in 1 - 3 weeks at 22°c. Plants are extremely resentful of root disturbance, even when they are quite small, and should be potted up almost as soon as they germinate[219]. Grow them on fast in the greenhouse and plant them out into their permanent positions after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away activaly.

nwatta Landscape Uses:Arbor, Container, Specimen. Requires a fertile well-drained loam in a sunny position[200]. The plant is not very frost hardy, but it can be grown outdoors as a tender annual in temperate zones[200]. A very ornamental plant, there are several named varieties[2001. The flowers

are blue, but they turn more pink later in the day[260]. Special Features: Not North American native, Wetlands plant, Attractive flowers or blooms.

## 7.2.521 Argemone albiflora

White Prickly Poppy, Bluestem pricklypoppy 6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Argemone albiflora is a ANNUAL growing to 1.5 m (5ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can

pcista All parts of the plant, including the seed, contain toxic alkaloids[222].

dwatta Demulcent Emetic Purgative SkinA tea made from the leaves is demulcent, emetic and purgative[222]. Caution is advised, the seed oil can cause glaucoma and oedema[222]. An infusion of the plant is used in the treatment of jaundice, skin ailments, colds, colic and wounds[222].

nrakta Southern N. America - Connecticut to Florida and west to Texas and Illinois. ksacta Waste places[222]. Waste places, roadsides, fields, beaches, dunes and coastal plains from sea level to 300 metres[270].

propta Seed - sow April in situ[200]. The seed usually germinates in 3 - 4 weeks at 15°c[134].

nwatta Easily grown in ordinary light soil in a sunny position[200]. Does best in a poor well-drained soil, often selfsowing on stony and sandy sites[200]. Plants resent root disturbance and are best sown in situ[134].

# 7.2.522 Codonopsis tubulosa

6 tlin 9 cvuc 0 kcak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Codonopsis tubulosa is a PERENNIAL CLIMBER growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Adaptogen Aphrodisiac TonicThis species is an important herb in Chinese medicine, the root is widely used as a substitute for ginseng[238]. It is a sweet, warm, soothing herb that is taken as an energy tonic[238]. It acts mainly on the spleen, lungs and stomach, raising secretion of body fluids and blood sugar levels, lowering the blood pressure and stimulating the immune system[238]. It is taken internally in the treatment of low energy, poor appetite and digestion, anaemia, shallow breathing and debility after illness[238]. It is often cooked with rice until it is glutinous as a tonic food[238]. The roots of plants at least three years old are harvested in the autumn and can be used fresh or dried[238].

nrakta E. Asia - Southwest China. ksacta Alpine brush and rocky slopes[200].

propta Seed - surface sow in spring to early summer in an ericaceous compost in a greenhouse. Do not allow the compost to dry out. The seed usually germinates in 1 - 6 weeks at 20°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in a greenhouse for their first winter. Plant out in late spring or early summer and protect them from slugs until the plants are well established[K]. Division in spring, with care, since the plant resents root disturbance[200]. We have found it best to take small divisions that are teased out from the sides of the main clump so as to cause the least possible disturbance to the plants and to avoid having to dig up

1252

the clump. These small divisions need to be potted up and placed in light shade in a greenhouse until they are rooting well. They can be planted out into their permanent positions in the summer if they are large enough, otherwise in the fol-

nwatta Prefers a well-drained fertile light soil in full sun or semi shade[1, 200]. It only succeeds in full sun if the soil remains moist during the growing season[200]. Prefers a slightly acid soil[164]. Quite cold-hardy when dormant, the young growth in spring, even on mature plants, is frosttender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. An important herb in Chinese medicine, it is widely cultivated there and is used as a ginseng substitute[238]. A climbing plant, supporting itself by twining and scrambling over other plants[219]. Plants resent root disturbance and should be planted out into their permanent position as soon as possible [164]. Plants are very susceptible to the ravages of slugs. The young shoots in spring are particularly at risk, though older growth is also

### 7.2.523 Angelica sinensis

Dang Gui - Dong Quai - Chinese Angelica 6 tlin 9 cyuc 0 kcak 0 tcan 5 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Angelica sinensis is a PERENNIAL growing to 1 m (3ft 3in) by 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All members of this genus contain furocoumarins, which increase skin sensitivity to sunlight and may cause dermatitis[238]. High doses over 500 mg a day may cause abdominal bloating and menstrual timing/flow changes. Unproven information suggests it can effect heart rhythm and lower blood pressure [301]. Caution is needed for diabetics, acute viral infections, (e.g. influenza) and with treatments with anticoagulants (e.g. warfarin)[301].

tcanta This plant is said to contain vitamin B12[176].

dwatta Alterative Analgesic Anticholesterolemic Antiinflammatory Antispasmodic Cholera Deobstruent Emollient Hepatic Laxative Malaria Sedative Vasodilator Women's complaintsDang Gui is a well-known Chinese herb that has been used in the treatment of female ailments for thousands of years. Its reputation is perhaps second only to ginseng (Panax ginseng) and it is particularly noted for its 'blood tonic' effects on women[218]. The root has a sweet pungent aroma that is very distinctive and it is often used in cooking, which is the best way to take it as a blood tonic[254]. One report says that the root contains vitamin B12 and can be used in the treatment of pernicious anaemia[176]. The root is alterative, analgesic, anti-cholesterolemic, anti-inflammatory, antispasmodic, deobstruent, emmenagogue, emollient, hepatic, laxative, sedative and peripheral vasodilator[165, 176, 218]. It is commonly used in the treatment of a wide range of women's complaints where it regulates the menstrual cycle and relieves period pain[218, 238, 254] and also to ensure a healthy pregnancy and easy delivery[218]. However conflicting information suggests it should not be used during pregnancy [301] and should not be used if menstrual flow is heavy or during menstration [301]. It is an ideal tonic for women with heavy menstruation who risk becoming anaemic[254]. The water-soluble and non-volatile elements of the root increase the contraction of the uterus whilst the volatile elements can relax the muscle of the uterus[176]. Its use prevents the decrease of liver glycogen and protects the liver[176]. Used for menopausal symptoms (hot flushes) [301]. It has an antibacterial action, inhibiting the growth of various bacteria including Bacillus dysenteriae, Bacillus typhi, B. comma, B. cholerae and haemolytic streptococci[176]. The root is an ingredient of 'Four Things Soup', the most widely used woman's tonic in China[254]. The other species used are Rehmannia glutinosa, Ligusticum wallichii

tolerant of poor soils than P. rhoeas[17]. Plants usually selfsow freely when growing in suitable conditions so long as the soil surface is disturbed[238]. When growing in cereal fields, poppies decrease the yields of nearby cereal plants[18, 20]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

#### 7.2.576 Paeonia obovata

6 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Paeonia obovata is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Analgesic Antibacterial Antiinflammatory Antispasmodic Diuretic Febrifuge SedativeThe root is analgesic, antibacterial, anti-inflammatory, antispasmodic, diuretic, febrifuge and sedative[174]. The Chinese herb Chi Shao Yao is made from the whole root of a number of peony species, especially P. lactiflora, but also occasionally this species[250]. The most important ingredient medicinally in the root is paeoniflorin, which has been shown to have a strong antispasmodic effect on mammalian intestines, it also reduces blood pressure, reduces body temperature caused by fever and protects against stress ulcers[250]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - China, Japan, Korea, Siberia. ksacta Woods and thickets in mountains all over Japan[58]. Deciduous broad-leaved, mixed broad-leaved, and coniferous forests at elevations of 200 - 2800 metres in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta Requires a deep rich soil, preferably neutral or slightly alkaline[1], doing guite well in sun or light shade[200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Dislikes cold winds[233]. Grows well in light woodland[233]. Plants are hardy to about -20°c[187]. A very long-lived plant, living for 50 years or more in the garden[200]. This species is closely related to P. japonica[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1].

### 7.2.577 Geranium lucidum

Shining geranium

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli lwis hpa7tmwatli xre7t hjonli

drutta Geranium lucidum is a ANNUAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or

dwatta Astringent DiureticThe plant is diuretic and astringent[240]

nrakta Britain, Europe and N. Africa to the Himalayas. ksacta Shady rocks, walls and hedgebanks, on calcareous soils[17].

propta Seed - sow spring in situ.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Most members of this genus tolerate a wide range of soil types[200], though this species is said to require a calcareous soil[17]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

#### 7.2.578 Geranium wallichianum

6 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Geranium wallichianum is a PERENNIAL growing to 0.3 m (1ft) by 1.5 m (5ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Dve TanninThe root contains 30% tannin, it is used as a dye[61]. A good dense ground cover plant[197, 200]. Plants should be spaced about 60cm apart each way[208].

dwatta Astringent Odontalgic Poultice StomachicThe plant has astringent properties[211]. A decoction of the root, mixed with the bark of Prunus cerasoides, is used in the treatment of peptic ulcers[272]. It has been used as a cure for toothache and has been applied externally to the eyes [145, 240]. The juice of the plant is applied to fresh cuts to stem the bleeding[272]. A paste of the plant is used as a poultice to relieve joint pains[272].

nrakta E. Asia - Himalayas from Afghanistan to Bhutan. ksacta Forests, shrubberies and open slopes, 2400 - 3600 me-

propta Seed - sow spring in a cold frame. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. Prefers a position that is cool and moist in the summer but is not heavily shaded[187]. Plants are hardy to at least -20°c[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Some named forms have been selected for their ornamental value[187].

#### 7.2.579 Coronilla scorpioides

1269

Annual Scorpion Vetch, Yellow crownvetch 6 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 0.4 m hkuc htut cyutli tcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli

drutta Coronilla scorpioides is a ANNUAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure.

dwatta Cardiac StomachicCardiac, stomachic[61].

nrakta S. Africa - Natal and N. Cape province. ksacta Grassy and rocky places, often amongst bracken, and in moist peaty soil at low elevations[187].

propta Seed - best sown in a greenhouse as soon as it is ripe[200], it can also be sown in a greenhouse in March/April[133]. The seed usually germinates in 1 - 3 months at 18°c[133], do not sow it too thickly so that it is possible to grow the seedlings on in their pot without disturbing them for their first year of growth. Give occasional liquid feeds to make sure they do not become nutrient deficient. Divide the seedlings up into individual pots in the spring following germination, grow them on for a further year in the greenhouse and then plant them out into their permanent positions in late spring or early summer. Seedlings take 2 - 3 years to flower[133]. Division of offsets in April/May. Do not move plants between October and March[175]. Division is very easy in the growing season, the divisions can be planed straight out into their permanent positions if required.

nwatta Succeeds in most soils[175] but it prefers a light very well-drained porous soil with plenty of leaf-mould[200]. Requires plenty of moisture during the growing season but it needs to be kept dry in the winter[1, 200]. Another report says that it is drought resistant when established[190]. It only flowers freely when growing in a very sunny position[175]. Plants succeed in maritime gardens[233]. The rhizomes are best planted only just below soil level - a mulch of gravel or stone chips will help to keep the crown of the plant free from excess moisture[282]. Plants are probably hardy to about -15°c[187], but are best if given a good mulch should temperatures lower than -5°c occur[200]. Some plants growing in Essex have their leaves killed by the first frosts of the autumn but the clumps are unharmed[190]. Hybridizes very freely with other members of this genus - some botanists say there is only one very variable species of Agapanthus[200]. A number of named varieties have been selected for their ornamental value[187]. Plants seem to be immune to the predations of rabbits[233]. The flowering stems lean towards the sun[175].

# 7.2.574 Colchicum autumnale

Autumn Crocus, Meadow Saffron, 6 tlin 9 cvuc 0 kcak 0 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Colchicum autumnale is a BULB growing to 0.2 m (Oft 8in) by 0.2 m (Oft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf from February to July, in flower from August to October, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is selffertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant, but especially the bulb[200], are poisonous[4, 7, 10, 19, 65]. They cause vomiting, violent purging, serious inflammation of the stomach and bowels. and death[232]. Handling the corms can cause skin allergies in some people[238].

tcanta Plant breedingThe poisonous alkaloid 'colchicine' is extracted from this plant and used to alter the genetic make-up of plants in an attempt to find new, improved varieties[9, 13, 19, 46, 100, 171]. It works by doubling the chromosome number[89].

dwatta Analgesic Antirheumatic Cathartic Emetic HomeopathyThough known since at least the time of the ancient Greeks, autumn crocus was considered too poisonous to use medicinally and it was not until research in the Eighteenth century that the plant was discovered to be of value in the treatment of gout[268]. In modern herbalism it is still used to relieve the pain and inflammation of acute gout and

rheumatism, although frequent use has been known to encourage more frequent attacks of the complaint[232, 268]. Both the corm and the seeds are analgesic, antirheumatic, cathartic and emetic[4, 7, 13, 21, 235]. They are used mainly in the treatment of gouty and rheumatic complaints, usually accompanied with an alkaline diuretic[4]. Leukaemia has been successfully treated with autumn crocus, and the plant has also been used with some success to treat Bechet's syndrome, a chronic disease marked by recurring ulcers and leukaemia[254]. A very toxic plant, it should not be prescribed for pregnant women or patients with kidney disease, and should only be used under the supervision of a qualified practitioner[238]. See also the notes above on toxicity. The seeds are harvested in early summer, the corms in mid to late summer when the plant has fully died down. They are dried for later use[238]. The fresh bulb is used to make a homeopathic remedy[232]. It is used in the treatment of nausea, diarrhoea and rheumatism[232].

nrakta Central and southeastern Europe, including Britain, from Denmark to Spain, east to Macedonia. ksacta Meadows and damp woodland clearings[1, 10, 13] on calcareous and neutral soils[17]. Extremely rare away from the Bristol Channel in Britain[7].

propta Seed - best sown as soon as it is ripe in early summer in a seed bed or a cold frame[1, 164]. Germination can be very slow, taking up to 18 months at 15°c[164]. It is best to sow the seed thinly so that it is not necessary to transplant the seedlings for their first year of growth. Apply a liquid fertilizer during their first summer, however, to ensure they get sufficient nourishment. Prick out the seedlings once they are dormant, putting perhaps 2 plants per pot, and grow them on in a greenhouse or frame for at least a couple of years. Plant them out into their permanent positions when they are dormant[K]. The seedlings take 4 - 5 years to reach flowering size[1]. Division of the bulbs in June/July when the leaves have died down[1]. Larger bulbs can be planted out direct into their permanent positions, though it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out. The plant can be divided every other year if a quick increase is required[1].

nwatta Landscape Uses: Alpine garden, Border, Foundation, Massing, Rock garden, Specimen. Prefers a rich welldrained loam in a sunny position[1, 188]. Tolerates partial shade but dislikes dry soils[1]. Tolerates a pH in the range 4.5 to 7.5. Plants are hardy to about -20°c[200]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°c[214]. The autumn crocus is easily grown in grass[90] and can be naturalized there[200]. It also grows well amongst shrubs and by woodland edges[28]. Plant the corms about 7 - 10cm deep in July[1]. Plants seem to be immune to the predations of rabbits[233], though slugs may attack the corms[238]. The flowers are very attractive to bees and butterflies[201]. Special Features:Not North American native, Naturalizing, Suitable for cut flowers.

### 7.2.575 Papaver dubium

Long-Head Poppy, Blindeves 6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Papaver dubium is a ANNUAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant is toxic to mammals, though the toxicity is low[76]. The seed is not toxic[76].

dwatta DiaphoreticThe plant is sudorific[240].

nrakta Central and southern Europe, including Britain. ksacta A weed of arable fields, especially amongst cereal crops, and of waste places[17].

propta Seed - sow spring in situ[200].

nwatta Prefers a well-drained sandy loam in a sunny position[1, 200]. Does not do well on wet clay soils but succeeds in most other soils[115]. This species is possibly more and Paeonia lactiflora[254]. The root is harvested in the autumn or winter and dried for later use[254, 283]. It has been used to treat pulmonary hypertension in combination with the allopathic medication nifedipine [301]. Other uses include: constipation (a laxative), trauma injuries, ulcers, rheumatism and malaria [301].

nrakta E. Asia - China. ksacta High ground in cool and damp areas of western and north-western China[165]. Forests[266]

propta Seed - best sown in a cold frame as soon as it is ripe since the seed only has a short viability[200]. Seed can also be sown in the spring, though germination rates will be lower. It requires light for germination[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for their first winter, planting them out into their permanent positions in the spring. The seed can also be sow in situ as soon as it is ripe.

nwatta Requires a deep moist fertile soil in dappled shade or full sun[200]. This species is not fully hardy in the colder areas of the country, tolerating temperatures down to at least -5°c[238]. Plants are reliably perennial if they are prevented from setting seed[200].

# 7.2.524 Datura stramonium

Thorn Apple, Jimsonweed, Jamestown Weed 6 tlin 9 cyuc 0 kcak 1 tcan 4 dwat 1.5 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hionli

drutta Datura stramonium is a ANNUAL growing to 1.5 m (5ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Moths. Suitable for: light (sandy) and medium (loamy) soils and prefers welldrained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

pcista All members of this genus contain narcotics and are very poisonous, even in small doses[200].

tcanta Hair RepellentThe growing plant is said to protect neighbouring plants from insects[18, 20]. The juice of the fruits is applied to the scalp to cure dandruff and falling hair[243]. There has also been considerable interest in the use of extracts of Datura species as botanical pesticides. D. metel, for example, appears to suppress a number of nematode species of economic importance. Landscape Uses: Border, Container, Foundation, Specimen.

dwatta Anodyne Anthelmintic Antiasthmatic Antidandruff Antiinflammatory Antispasmodic Hallucinogenic Hypnotic Mydriatic NarcoticThe thornapple is a bitter narcotic plant that relieves pain and encourages healing[238]. It has a long history of use as a herbal medicine, though it is very poisonous and should be used with extreme caution. The leaves, flowering tops and seeds are anodyne, antiasthmatic, antispasmodic, hallucinogenic, hypnotic, mydriatic and narcotic[1, 4, 7, 9, 13, 21, 46, 165, 238, 240]. The seeds are the most active medicinally[4]. The plant is used internally in the treatment of asthma and Parkinson's disease, excess causes giddiness, dry mouth, hallucinations and coma[238]. Externally, it is used as a poultice or wash in the treatment of fistulas, abscesses wounds and severe neuralgia[238, 257]. The use of this plant is subject to legal restrictions in some countries[238]. It should be used with extreme caution and only under the supervision of a qualified practitioner since all parts of the plant are very poisonous and the difference between a medicinal dose and a toxic dose is very small[21, 213, 238]. The leaves should be harvested when the plant is in full flower, they are then dried for later use[4]. The leaves can be used as a very powerful mind-altering drug, they contain hyoscyamine and atropine[213]. There are also traces of scopolamine, a potent cholinergic-blocking hallucinogen, which has been used to calm schizoid patients[213]. Atropine dilates the pupils and is used in eve surgery[222]. The leaves have been smoked as an antispasmodic in the treatment for asthma, though this practice is extremely dangerous[213, 222]. The seeds are used in Tibetan medicine, they are said to have a bitter and acrid taste with a cooling and very poisonous potency[241]. Analgesic, anthelmintic and anti-inflammatory, they are used in the treatment of stomach

and intestinal pain due to worm infestation, toothache and fever from inflammations[241]. The juice of the fruit is applied to the scalp to treat dandruff[243].

nrakta Original habitat is obscure, it is found in many areas of the world, occasionally in S. Britain[17]. ksacta Dry waste ground and amongst rubble or the ruins of old build-

propta Sow the seed in individual pots in early spring in a greenhouse[200]. Put 3 or 4 seeds in each pot and thin if necessary to the best plant. The seed usually germinates in 3 - 6 weeks at 15°c. Plant out in late spring or early summer, after the last expected frosts. Especially in areas with hot summers, it is worthwhile trying a sowing outdoors in situ in mid to late spring.

nwatta Landscape Uses: Border, Container, Foundation, Specimen. Succeeds in most moderately good soils but prefers a rich light sandy soil or a calcareous loam, and an open sunny position[1, 4, 200]. Plants often self-sow when well sited[1]. The thornapple is cultivated commercially as a medicinal plant[57]. It can become a weed in suitable conditions and is subject to statutory control in some countries[238]. This species is extremely susceptible to the various viruses that afflict the potato family (Solanaceae), it can act as a centre of infection so should not be grown near potatoes or tomatoes[200]. Grows well with pumpkins[20]. The whole plant gives off a nauseating stench[245]. Special Features: North American native, Naturalizing, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms.

# 7.2.525 Hebe speciosa

New Zealand hehe

6 tlin 9 cvuc 0 kcak 2 tcan 0 dwat 1.5 m hkuc

htut cyutli tcup hwicli hyishrasilut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Hebe speciosa is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

tcanta Hedge Hedge Succeeds as an untrimmed hedge in maritime areas, tolerating maritime exposure[75, 200]. At-

nrakta New Zealand. ksacta Sea cliffs on North Island[44]. Locally naturalized on sea cliffs in Ireland[50].

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse in spring. Only just cover the seed and do not allow the compost to dry out. Prick out the seedlings into individual pots when they are large enough to handle. Grow on the young plants for at least their first winter in a greenhouse and plant out in late spring or early summer after the last expected frosts. It would probably be worthwhile giving some protection to the plant for its first winter outdoors. Cuttings of half ripe wood, 3 - 5cm with a heel, July/August in a frame. Pot up when roots are forming and keep in a frame or greenhouse for its first winter before planting out in late spring. Cuttings of mature wood, late autumn or winter in a frame.

nwatta Succeeds in most soils so long as they are not boggy or too dry[182]. Prefers a light well-drained soil[1, 166] and a sunny position[200]. Prefers a moist rich soil[166] but plants are probably hardier in a soil that is on the poor side[1]. Lime tolerant[11]. Intolerant of drought[166]. Tolerates atmospheric pollution[200]. Very wind resistant, withstanding maritime exposure[166]. Very ornamental[1]. A good butterfly plant[30]. A polymorphic species[200[, it hybridizes freely with other members of this genus. Plants in this genus are notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is clumping, giving the plant a clumping habit. The predictable growth be-

haviour makes it easier to maintain without having to apply containment methods[2-1].

# 7.2.526 Ceratostigma willmottianum

Chinese Plumbago, Chinese Leadwort 6 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 1 m hkuc

6 tiin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m nkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Ceratostigma willmottianum is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta BachThe plant is used in Bach flower remedies the keywords for prescribing it are 'Distrust of self', 'Doubt of one's ability' and 'Foolishness' [209].

nrakta E. Asia - W. China to Tibet. ksacta Warm valleys at forest edges or in thickets; 700–3500 m. Gansu (Wen Xian), W Guizhou, S and W Sichuan, SE Xizang, E and N Yunnan[266].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of rooted suckers in the spring[200]. Layering in the spring. Plants often self-layer[200]. Cuttings of half-ripe wood in a closed frame[200]. Plants should be overwintered in a frost-free frame or greenhouse for their first winter[200].

nwatta Landscape Uses:Border, Foundation, Prefers a light moderately fertile and retentive soil with good drainage, though it tolerates poor dry soils[200] and grows well on chalk[11]. Requires a sunny position[11, 200]. Plants are not fully hardy in Britain, especially if treated as shrubs, but if treated as herbaceous perennials they succeed outdoors in areas where winter temperatures do not fall below about -10 to -15°c[200]. When the woody stems survive the winter it is best to prune them hard in the spring in order to obtain better flowering[11]. Plants flower best on the current years growth[200]. Most, if not all the plants in cultivation in Britain, derive from an original two plants raised from seed in 1908[11]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Blooms are very showy.

# 7.2.527 Ferula persica

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ferula persica is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta GumThe gum 'Sagapenum' is obtained from the plant (from the root?). It is used in the treatment of rheumatism and lumbago[46, 61, 64].

dwatta AntirheumaticAntirheumatic[46, 61, 64]. It is used in the treatment of rheumatism and backache[254].

nrakta W. Asia - Iran. ksacta Dry slopes to 2000 metres[74]

propta Seed - best sown as soon as the seed is ripe in a greenhouse in autumn[1]. Otherwise sow in April in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle. Plant them out into their

permanent positions whilst still small because the plants dislike root disturbance[1]. Give the plants a protective mulch for at least their first winter outdoors. Division in autumn. This may be inadvisable due to the plants dislike of root disturbance.

nwatta Succeeds in most soils[1]. Requires a deep fertile soil in a sunny position[200]. Plants have a long taproot and are intolerant of root disturbance[200]. They should be planted into their final positions as soon as possible.

### 7.2.528 Swertia chirayita

Chiretta

6 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 1 m hkuc hmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Swertia chirayita is a ANNUAL growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness, It is hardy to UK zone 7. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

pcista Do not exceed recommended dose.

dwatta Digestive Hepatic Malaria StimulantChiretta is a traditional Ayurvedic herb. A strongly bitter tonic it is an excellent remedy for a weak stomach, especially when this gives rise to nausea, indigestion and bloating, and it has also been shown to protect the liver[254]. It is perhaps best known in India as the main ingredient in mahasudarshana churna, a remedy containing more than 50 herbs[254]. The plant has an interesting chemistry, similar in many respects to Gentiana lutea, a widely used restorative tonic of the digestive system[238]. It also contains xanthones, which are reputedly effective against malaria and tuberculosis, and also amarogentin, a glycoside that may protect the liver against carbon tetrachloride poisoning[238]. The whole plant is an extremely bitter tonic digestive herb that lowers fevers and is stimulant[165, 238]. The herb has a beneficial effect on the liver, promoting the flow of bile, it also cures constipation and is useful for treating dyspensia [4, 238]. The plant is harvested when the seed is setting and then dried for later

nrakta E. Asia - Himalayas. ksacta Pastures and slopes in the Himalayas to 3,000 metres[238, 240].

propta Seed - sow spring in temperatures not exceeding  $10^{\circ}c$  in a humus-rich medium[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer.

nwatta Succeeds in a moist humus-rich soil in damp light woodlands, streamsides or the bog garden[200]. Grows best in areas with cool summers[200]. Succeeds in full sun or partial shade[238]. Plants are hardy to at least -15°c[238].

## 7.2.529 Daphne laureola

Spurge Laurel

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc

pcimhmim cyutli kyuctcup hwicli jlutnyik hpa7tli flatprik

drutta Daphne laureola is an evergreen Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from February to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil.

pcista All parts of the plant are poisonous[200]. Skin contact with the sap can cause dermatitis in some people[65, 200]

dwatta Abortifacient Cancer Emetic Emmenagogue PurgativeThe leaves have been used as an emmenagogue, though they can cause purging and vomiting[4]. Both the leaves and the bark have been used to procure abortions[4]. The plant contains various toxic compounds and these are tcanta A good ground cover for shady positions[200]. dwatta Appetizer Cardiotonic VulneraryThe root is ap-

dwatta Appetizer Cardiotonic Vulnerary Ine root is appetizer, cardiotonic and vulnerary [178, 218]. Strengthens the memory [178, 218].

nrakta E. Asia - China, Japan. ksacta Woods and foothills of C. and S. Japan[58]. Dense forests, shady and moist slopes, hillsides along valleys at elevations of 100 - 3200 metres in China[266].

propta Seed - we have no information on this species but suggest sowing the seed as soon as it is ripe in a cold frame if this is possible. Stored seed is likely to be slow to germinate and might take a year or more. Sow it in a cold frame as soon as it is received. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Divide in early spring.

nwatta Succeeds in most soils[1], preferring one that is rich in humus and a position in semi-shade[233]. An attractive shade tolerant ground cover plant for neutral or acidic soils[200]. Plants seldom flower well in areas such as Britain with cool summers, they need warm dry conditions in late summer in order to ripen well and initiate flower production[200].

# 7.2.570 Goodyera pubescens

Downy Rattlesnake Plantain

6 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 0.4 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Goodyera pubescens is an evergreen Perennial growing to 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

dwatta Appetizer Miscellany Odontalgic Ophthalmic PoulticeA tea made from the roots is used in the treatment of pleurisy and snakebites[222]. A tea made from the leaves is taken to improve the appetite, as a treatment for colds, kidney ailments, rheumatism and toothaches[222, 257]. Externally, a poultice of the wilted leaves is used to cool burns, treat skin ulcers and relieve rheumatic joints[222, 257]. An ooze from the plant (this probably means the sap or the juice of the bulb[K]) has been used as eye drops to treat sore eyes[257].

nrakta Eastern N. America - Maine to Florida, west to Alberta and Quebec. ksacta Almost any wooded habitat with acid soils, mainly on moist humus soils in shady, upland woods of hemlock, pine, oak, or maple, less frequent in low-land woods, bogs, swamps; 0 -1600 metres[270].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move.

nwatta Landscape Uses:Border, Ground cover, Massing. Requires a somewhat shady site and a well-drained compost of peat, leafmold and sand[1]. Does well in the woodland garden[42, 230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This species is closely related to the British native species, G. repens[230]. This plant is too rare

in the wild to be harvested[222]. Special Features: Attractive foliage, North American native, Attractive flowers or blooms.

# 7.2.571 Geranium rotundifolium

Roundleaf geranium

6 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 0.4 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Geranium rotundifolium is a ANNUAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Astringent DiureticThe plant is used as an astringent and diuretic[240].

nrakta Britain to E. Asia - Himalayas. ksacta Hedgebanks, wall tops etc[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Succeeds in any moderately fertile retentive soil in a sunny position[2001. Tolerates a wide range of soil types[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

# 7.2.572 Xanthium spinosum

Spiny Cocklebur

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvif hionli

drutta Xanthium spinosum is a ANNUAL growing to  $0.5 \, \mathrm{m}$  (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to October, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Poisonous[65, 76]. Most members of this genus are toxic to grazing animals and are usually avoided by them[222]. The seed also contains toxins[222].

dwatta Emetic Miscellany StypticThe whole plant is an active styptic for both local and general application[4]. It is said to be a valuable and sure specific in the treatment of hydrophobia[4]. The plant is also diaphoretic, diuretic and sedative[61]. An infusion of the root has been used as an emetic[257].

nrakta S. America. A locally established casual in Britain[17]. ksacta Naturalized in waste ground in N. America[235].

propta Seed - sow spring in situ. The seed requires plenty of moisture in order to germinate.

nwatta An easily grown plant, it succeeds in most soils but requires a sunny position. Plants often self sow.

# 7.2.573 Agapanthus campanulatus

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Agapanthus campanulatus is an evergreen Bulb growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender it is in leaf all year, in flower from July to September. The species is hermaphrodite (has both male and female organs)

conditions[254]. The leaf is discutient and vulnerary[218]. The flowers are antibacterial, carminative, cholagogue, de-obstruent, depurative, diuretic, expectorant, laxative, stomachic and tonic[218]. They are used internally in the treatment of bronchial complaints with profuse phlegm, nausea and vomiting, hiccups and flatulence[176, 238]. The flowers have an antibacterial action, but this can be destroyed by proteins in the body[176]. The plant is harvested when in flower and can be dried for later use[254]. The root is discutient, resolvent and vulnerary[218]. The plant has been mentioned as a possible treatment for cancer of the oesophagus[218].

nrakta Europe to E. Asia. Formerly naturalized in Britain, but probably now extinct there[17]. ksacta Moist meadows, streamsides, ditches, wet woods etc[17].

propta Seed - sow spring or autumn in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. If you have sufficient seed, it is worthwhile trying a sowing in situ in the spring or the autumn. Division in spring or autumn[111].

nwatta Succeeds in a sunny position in any moderately fertile well-drained soil[200]. Grows well in heavy clay soils. Plants are hardy to at least -15°c[238]. The sub-species I. britannica chinensis is the form used medicinally[238].

# 7.2.566 Halenia elliptica

Spurred Gentian

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflat hpa7tmwatli fyifxre7t hjonli

drutta Halenia elliptica is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

dwatta The entire plant is used in Tibetan medicine, it is considered to have a bitter taste and a cooling potency[241]. It is cholagogue and febrifuge[241]. It is used in the treatment of liver inflammations, stomach complaints and fevers from contaminus diseases[241]

nrakta E. Asia - Himalayas from India to China. ksacta Beside streams in valleys, grassland slopes, scrub, forest margins and forests at elevations of 700 - 4,100 metres[266].

propta Seed - best sown in early spring in a cool greenhouse[200]. Only just cover the seed. Prick out into individual pots once the plants are large enough to handle and plant out in late spring after the last expected frosts.

nwatta Requires a cool, damp soil with a pH of 5- 6, and a position in light shade with protection from strong winds[200]. Plants are not very hardy outdoors in this country and are best treated as frost-tender annuals[200].

# 7.2.567 Lysimachia paridiformis

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Lysimachia paridiformis is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

dwatta Anodyne Antitussive Blood tonic Carminative ExpectorantThe flowering tops, simmered in water, are carminative and diaphoretic[147, 218]. The whole plant is anodyne, antitussive, blood tonic, carminative and expectorant[147, 218]. A decoction is used in the treatment of pulmonary tuberculosis, 'wind-cold' coughing, rheumatoid arthritis, traumatic injuries, stomach ache, enteritis, snake bites and abscess swelling[147]. The fresh herb is also crushed and applied externally as a poultice[147].

nrakta E. Asia - W. China. ksacta Hillsides, stream edges, damp and wet places beneath forest trees[147]. Damp areas in forests, mountain valleys and wet ravines at elevations of 500 - 1400 metres[266].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn[200]. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta An easily grown plant, succeeding in a moist loamy soil[1]. Judging by its native habitat, it should succeed in shallow water. Grows well in heavy clay soils. Most species in this genus seem to be immune to the predations of rabbits[233].

### 7.2.568 Cyclamen hederifolium

Cyclamen, Alpine Violet, Persian Violet 6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.1 m hkuc pcimhmimhtut cyulli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cyclamen hederifolium is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.2 m (0ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf from October to June, in flower from July to November, and the seeds ripen from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Poisonous.

tcanta Plants can be used as a ground cover, though they will need to be given a mulch of leaf mould in order to keep the weeds at bay when they are dormant in the summer[208].

dwatta Homeopathy PurgativeThe fresh rootstock is a drastic purgative. It should be used with extreme caution[4, 21, 46]. A homeopathic remedy is made from the fresh root[4]. It is applied externally to the bowels to cause purging[4].

nrakta S. Europe. Naturalized in Britain[17]. ksacta Shady woodlands, usually on limestone[28, 31, 89].

propta Seed - best sown as soon as it is ripe in a cold frame[133, 134]. Fresh seed germinates in 3 - 6 weeks[133]. Pre-soak stored seed for 24 hours in warm water, sow shallowly and keep in a shady position at 15°c[124]. Germination may be slow and erratic[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a shady position in the greenhouse for at least their first winter. Plant them out into their permanent positions in the summer. Division in April/May. Very easy, the larger tubers can be planted out straight into their permanent positions whilst it is best to pot up the smaller ones and grow them on for a season before planting them out.

nwatta Landscape Uses:Border, Container, Rock garden. Prefers a cool habitat and a well-drained humus rich soil[13]. Easily grown in a stony leafy soil in sun or shade[90]. Thrives in the light shade of trees. Tolerates a pH between 5.5 and 8[200]. This species is hardy to about -18°c[200]. A very ornamental plant[1]. Plants seem to be immune to the predations of rabbits[233]. Special Features:Attractive foliage, Not North American native, Suitable for cut flowers.

#### 7.2.569 Reineckia carnea

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.1 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Reineckia carnea is an evergreen Perennial growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in April. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

currently being investigated (1995) for anti-leukaemia effects[238].

nrakta Western and southern Europe, from Britain and Belgium to Spain and Macedonia, N. Africa, W. Asia. ksacta Woods, mainly on calcareous soils, where it is widespread and rather common[17].

propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at 20°c followed by 12 - 14 weeks at 3°c. Germination may still take another 12 months or more at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame.

nwatta Prefers a moist soil and a position in semi-shade, growing well in woodlands[11]. Plants are often found growing in dense shade in the wild[245]. A good sandy loam suits most members of this genus[11]. Flowers are produced towards the ends of the previous year's growth[11]. They are sweetly scented[245]. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible[188].

# 7.2.530 Begonia grandis evansiana

Hardy Begonia

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Begonia grandis evansiana is a PERENNIAL growing to 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from July to August, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

tcanta This species can be grown as a ground cover in a sunny position sheltered by shrubs. The plants form spreading clumps[208].

dwatta Anodyne Antiphlogistic AntispasmodicThe tuberous roots and fruits are anodyne, antiphlogistic and antispasmodic. Stimulates blood circulation[147]. A decoction is used in the treatment of traumatic pain, haematemesis, gonorrhoea, post-partum vaginal discharge, amenorrhoea and snakebites[147].

nrakta E. Asia - China, Japan, Himalayas(Malaya). ksacta Shady slopes or wet places[147]. In moist rocky wall of valley, in dense forests of valley by streams as wall as on rocks by streams or under shrubberies of valley; 100 - 1100 metres[266].

propta Seed - surface sow in a greenhouse and keep the compost moist in a light position. The seed can be very slow to germinate, sometimes taking a year or more[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division. Basal cuttings from tubers in spring. Bulblets, formed in the leaf axils. Harvest in the autumn and store overwinter in a cool frost-free place, plant out in spring[200].

nwatta Landscape Uses:Border, Container, Foundation, Massing, Specimen, Woodland garden. Requires a well-drained soil[200]. Does not require high light intensities[200], succeeding in full sun or partial shade[233]. Prefers a pH between 6 and 7[200]. Plants tolerate temperatures down to about -5°c, and can be grown outdoors in the milder areas of the country if given the shelter of a wall[200]. This same report gives the plant a hardiness zone rating of 6 (tolerating temperatures down to about -20°c)[200]. Grows well outdoors in Cornwall amongst trees and shrubs[166].

There are some named varieties selected for their ornamental value[200]. Special Features: Attractive foliage, Naturalizing, Fragrant flowers.

# 7.2.531 Delphinium denudatum

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Delphinium denudatum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista All parts of the plant are toxic[172]. The plant is most toxic when it is young[200].

tcanta ParasiticideA parasiticide is obtained from the leaves[172]. It is quite toxic and so is for external use only.

dwatta Alterative Bitter Odontalgic Parasiticide Stimulant TonicThe roots are alterative, bitter, stimulant and tonic[240]. A paste of the rot is used in the treatment of toothache, and also as an adulterant for aconite (from Aconitum spp.)[240, 272].

nrakta E. Asia - Himalayas. ksacta Dry scrubby slopes and forest clearings, 1700 - 2300 metres[145].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°c[200]. Temperatures above 15°c inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Succeeds in most soils so long as they are rich and well-drained[200]. Intolerant of winter-wet soils[200]. Requires an open sunny position[188]. This plant is adored by slugs[175]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

#### 7.2.532 Phlomis umbrosa

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phlomis umbrosa is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Haemostatic HepaticThe root contains several medially active compounds and has been shown to exert a protective influence on the liver[279]. It is used as a haemostatic in Korea and in treating tineapedis[279].

nrakta E. Asia - northern China, Korea. ksacta Forests, grassy slopes, streamsides, thickets and wet areas at elevations of 700 - 3200 metres in China[266].

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed germinates quickly, prick out the seedlings into individual pots when they are large enough to handle and grow them on for their first year in a greenhouse. Plant them out in early summer. Division of the tubers in spring or autumn[200]. Be careful not to damage the tubers[200]. If dividing in the autumn, it is best to store the tubers in a cool but frost-free place over the winter, planting them out in the spring. Spring divisions can be planted out straight away into their permanent positions.

nwatta Requires a well-drained soil in full sun with shelter from cold winds[200]. Plants are hardy to at least - 5°c[200], probably more. A variable species, there are several sub-species[266].

### 7.2.533 Cardiocrinum giganteum

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1.8 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cardiocrinum giganteum is a BULB growing to 1.8 m (6ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland). It prefers moist soil.

tcanta MusicalA kind of flute is made from the hollow stems[272].

dwatta PoulticeThe leaves are used as an external cooling application to alleviate the pains of wounds and bruises[240]. A paste of the root is applied as a poultice to treat dislocated bones[272].

nrakta E. Asia - Himalayas from Nepal to Assam and Sikkim. ksacta Woodland clearings at an altitude of 1,500 - 2,400 metres and as high as 3,600 metres around Simla[245].

propta Seed - best sown as soon as it is ripe in a cold frame in the autumn. The plant has delayed epigeal germination and will often germinate in the spring but can take up to 2 years especially if the seed is stored prior to being sown[134]. An alternative is to mix the seed with some moist leafmould and seal it in a plastic bag. Keep this at a temperature of  $20^{\circ}\mathrm{c}$  for 3 weeks then pot up any seed that germinates and place the rest in a fridge for 4-5 weeks at 3-5 °c before sowing in a warm place[138]. Seedlings should be grown on in pots in a shaded position in a cold frame or greenhouse for 3-4 years before planting them out in their permanent positions[138]. Bulblets are obtained from the base of the old plant after flowering. Pot up and plant out when well established.

nwatta Prefers a moist well-drained position in shade and a soil that is rich in leafmould[47, 200]. Requires a deep, very fertile humus-laden soil[233]. Prefers growing in woodland conditions[42, 200]. A monocarpic plant, the bulb takes about 7 years to reach flowering size but then dies after flowering. However, it produces a number of new bulblets at the base and can be propagated by these[47, 200]. These bulblets take 3 - 5 years to flower[200]. The flowers scent the surrounding area with their rich sweet perfume[245]. When planting, only just cover the bulb with leafmould[47]. The bulb is very attractive to slugs, mice and voles and may require protection[200]. Plants seem to be immune to the predations of rabbits[233].

### 7.2.534 Hypericum patulum

Goldencup St. Johnswort

6 tlin 7 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

drutta Hypericum patulum is an evergreen Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Hedge Hedge WoodPlants are sometimes grown as a hedge[146]. Wood - close grained, moderately hard[146].

dwatta Aromatic StimulantThe seeds are aromatic and stimulant[240].

nrakta E. Asia - W. China, Japan, Himalayas. ksacta Shady ravines, sometimes on rocks[158]. Open hillsides, 1500 - 2400 metres in the Himalayas[146].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 3 months at 10°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into

their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10-12 cm with a heel, July/August in a frame. Plant out in the following spring[200]. Cuttings of mature wood, 12-17cm with a heel, October/November in a sheltered position outdoors. Plants root by the spring. Good percentage[78].

nwatta Landscape Üses:Container, Ground cover, Massing, Rock garden. Easily grown in any reasonably good well-drained but moisture retentive soil[1]. Succeeds in sun or semi-shade but flowers better in a sunny position[200]. This species is only hardy to about -5°c but plants can resprout from the base if they are cut back by cold[184]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Attractive flowers or blooms.

# 7.2.535 Thalictrum simplex galioides

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Thalictrum simplex galioides is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no records of toxicity have been found for this plant, it belongs to a family that includes many poisonous plants so some caution is advised.

dwatta DiureticDiuretic[61].

nrakta S.E. and C. Europe. ksacta Not known

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[K]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. The seed can also be sown in an outdoor seedbed in spring[111]. Plant them into their permanent positions the following spring. Division in spring as new growth commences or in the autumn[111]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Succeeds in most fairly good soils in sun or semishade[1, 111]. Members of this genus are rarely if ever troubled by browsing deer[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. This species is closely related to T. lucidum[200].

### 7.2.536 Geranium pusillum

Small geranium

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Geranium pusillum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Anodyne Astringent VulneraryThe plant is used as an anodyne, astringent and vulnerary[240].

nrakta Britain to E. Asia - Himalayas. ksacta Cultivated and waste ground and open habitats in dry grassland[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging

#### 7.2.563 Rhus toxicodendron

Eastern Poison Oak

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus toxicodendron is a deciduous Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to June, and the seeds ripen from September to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista This plant contains toxic substances and skin contact with it can cause severe irritation to some people[11]. The sap is extremely poisonous[11]. The sap contains 3-N pentadecycatechnol. Many people are exceedingly sensitive to this, it causes a severe spreading dermatitis. The toxins only reach the skin if the plant tissues have been damaged, but even indirect contact can cause severe problems[200].

tcanta Dye Ink Mordant Oil Parasiticide Tannin VarnishThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. An oil is extracted from the seeds[4]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The milky juice makes an excellent indelible marking ink for linen etc[4, 11]. It is also used as a varnish for boots and shoes[4].

dwatta Antirheumatic Homeopathy Irritant Narcotic Parasiticide Rubefacient Salve StimulantPoison oak has occasionally been used medicinally, though it is an extremely poisonous plant and great caution should be exercised. Any herbal use should only be undertaken under the supervision of a qualified practitioner. See also the notes above on toxicity. A fluid extract of the fresh leaves is irritant, narcotic, rubefacient and stimulant[4]. It has been used with some success in the treatment of paralysis, obstinate herpatic eruptions, palsy and in various forms of chronic and obstinate eruptive diseases[4]. A mash of the leaves has been used to treat ringworm[213]. An external application has also been used in the treatment of herpes sores[213]. A poultice of the plant has been used to treat infectious sores on the lips[257]. The root has been used to make a poultice and salve in the treatment of chronic sores and swollen glands[257]. A homeopathic remedy is made from the fresh leaves[232]. These should be harvested of a night-time, during damp weather and before the plant flowers[232]. This remedy has a wide range of applications and is one of the main treatments for mumps[232], it is also used in a wide range of skin disorders[4].

nrakta South-eastern N. America - New Jersey to Delaware, south to Georgia, Alabama and Texas. ksacta Dry barrens, pinelands and sands[43].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to sowing in order to leach out any germination inhibitors[200]. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 2001. Suckers in late autumn to winter[2001.

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. Judging by the plants natural habitat, it should also succeed in poor acid soils and dry soils[K]. The young growth in spring can be damaged by late frosts. Plants have brittle branches and these can be broken off in strong winds[200]. Plants are also susceptible to coral spot fungus[11]. Plants in this genus are notably resistant to honey fungus[200]. This species is a small suckering shrub, it can

spread freely in suitable conditions[K]. There is some confusion over the correct name of this species. It is united with R. radicans (under that name) by some botanists whilst others split this species off into another genus, Toxicodendron, and unite it with R. radicans as Toxicodendron radicans[200]. Many of the species in this genus, including this one, are highly toxic and can also cause severe irritation to the skin of some people, whilst other species are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus, Toxicodendron, by some botanists[200]. Dioecious. Male and female plants must be grown if seed is required.

### 7.2.564 Asarum blumei

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc

pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Asarum blumei is an evergreen Perennial growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been found for this plant, at least 3 other members of this genus have reports that the leaves are toxic[7, 19]. Some caution is therefore advised in the use of this plant.

dwatta Analgesic Antitussive Carminative ExpectorantA decoction of the root is analgesic, antitussive, carminative, expectorant and antitussive[147, 174, 218]. It is used in the treatment of sore throats[174].

nrakta E. Asia - China, Japan ksacta Damp shady spots on mountain sides[147].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Plants are hardy to at least -15°c[200]. The flowers are malodorous and are pollinated by flies[200]. Plants often self-sow when growing in a suitable position[200].

#### 7.2.565 Inula britannica

Xuan Fu Hua. British vellowhead

6 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.8 m hkuc

htut cyutli tcuphja7n hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Inula britannica is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

dwatta Antibacterial Antiemetic Cancer Carminative Cholagogue Deobstruent Depurative Diuretic Expectorant Laxative Resolvent Stomachic Tonic VulneraryXuan Fu Hua is used in Chinese herbalism as a mildly warming expectorant remedy and it is especially suitable where phlegm has accumulated in the chest[254]. The flowers are more commonly used, but the leaves are also used, generally for less serious

and antispasmodic effect makes it a valuable treatment for the symptoms of Parkinson's disease, relieving tremor and rigidity during the early stages of the disease[254]. This species is generally considered the best for internal use, whilst the black henbane (H. niger) is the form most used externally[4]. All parts of the plant, but especially the leaves and the seeds, can be used - they are anodyne, antispasmodic, mildly diuretic, hallucinogenic, hypnotic, mydriatic, narcotic and sedative[4, 9, 13, 21, 100, 165, 192, 218]. The plant is used internally in the treatment of asthma, whooping cough, motion sickness, Meniere's syndrome, tremor in senility or paralysis and as a pre-operative medication[238]. Henbane reduces mucous secretions, as well as saliva and other digestive juices[254]. Externally, it is used as an oil to relieve painful conditions such as neuralgia, dental and rheumatic pains[238, 254]. The leaves should be harvested when the plant is in full flower and they can then be dried for later use[4]. This is a very poisonous plant that should be used with great caution, and only under the supervision of a qualified practitioner[21, 238]. See the notes above on toxicity. The seed is used in the treatment of asthma, cough. epilepsy, myalgia and toothache[218].

nrakta S. Europe. ksacta Dry, uncultivated ground, walls and field margins.

propta Seed - best sown as soon as it is ripe, older seed rapidly loses viability[200]. Either sow in situ or pot up the seedlings whilst still small because plants produce a long taproot and older plants resent root disturbance[200].

nwatta Prefers a hot dry position[200] in a wall or rock crevice[187]. Succeeds in a well-drained fertile soil, preferably of an alkaline nature, in full sun[200]. Grows well in maritime areas[200]. Plants are possibly hardy to about -10°c[187], they are unlikely to succeed in the colder areas of Britain. Self-sows freely, it can be grown in wild informal areas of the garden[200].

### 7.2.561 Helianthemum canadense

Frostweed, Longbranch frostweed 6 tin 9 cyuc 0 kcak 0 tcan 2 dwat  $0.4\,\mathrm{m}$  hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Helianthemum canadense is a PERENNIAL growing to  $0.4\,\mathrm{m}$  (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects, cleistogamy. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Alterative Antiscrophulatic Astringent Cancer TonicThe dried leaves are alterative, antiscrofulatic, astringent and tonic[4, 21, 46, 207]. A tea made from the leaves is used in the treatment of kidney ailments and sore throats[222, 257]. A strong leaf tea has been used in the treatment of scrofula[222]. It is applied externally to skin diseases and eye infections[222]. It is said that an oil helpful in the treatment of cancer has been obtained from the plant[4]. Some caution is advised since an overdose can cause nausea and vomiting[4].

nrakta Eastern N. America - Maine to Ontario and Wisconsin, south to North Carolina and Mississippi. ksacta Open woods, clearings and barrens in dry sandy soils[43]

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 6 - 8cm with a heel, late summer in a sandy soil in a frame[200].

nwatta Requires a light well-drained soil in a sunny open position[200]. Tolerates a pH range from 5.5 to 8[200].

### 7.2.562 Helleborus foetidus

Stinking Hellebore, Setterwort, Bear's Foot, Bearsfoot, Setterwort, Stinkwort, Stinking Hellebore 6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.8 m hkuc

hmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Helleborus foetidus is an evergreen Perennial growing to 0.8 m (2ft 7in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from February to April, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland). It prefers moist soil.

poista All parts of the plant are poisonous[9, 10, 65], this poison can possibly be absorbed through the skin[76].

tcanta A decoction of the roots is used as a parasiticide against body lice, fleas etc[76, 213]. This use is somewhat dangerous, see the notes above on toxicity.

dwatta A very toxic plant that is considered to be useful for reducing blood pressure in various conditions of hypertension[213]. The root contains the alkaloids nervine. pseudo-nervine and veratridine[213]. It is best to harvest the root in the autumn and dry it for later use[213]. This species has similar medicinal properties to the black hellebore, H. niger[4]. These properties are:- Black hellebore is a very poisonous plant that is toxic when taken in all but the smallest doses. As such it should not be taken except under professional supervision. The plant contains cardiac glycosides which have a similar action to the foxglove (Digitalis spp) and it has been used as a heart stimulant for the elderly. though this treatment is no longer recommended[254]. The root is anthelmintic, cardiac, cathartic, diuretic, emetic, emmenagogue, irritant, violently narcotic and a drastic purgative[4, 9, 21, 46, 240]. It is harvested in the autumn and dried for later use[4]. It has been used in the treatment of dropsy, amenorrhoea, nervous disorders and hysteria, but it is very poisonous and great care must be taken over the dosage[4] The root is also applied externally as a local irritant[4], but even this should be done with care, see notes above on toxicity. A homeopathic remedy is made from the roots[9]. It is used in the treatment of headaches, psychic disorders, enteritis and spasms[9].

nrakta Western and southern Europe, including Britain, from Belgium to Spain and Italy. ksacta Woods, scrub and sunny banks on moist chalk and limestone soils[9, 17, 187].

propta Seed - best sown as soon as it is ripe in a cold frame[1, 134]. Sow stored seed as early in the year as possible[1], it usually germinates in the autumn to spring. Seed can take 18 months to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. This species produces flowering plants in 2 - 3 years from seed[200]. It is not possible to divide this species, but it is possible to take basal cuttings of young vegetative shoots[200]. Harvest the shoots when they are about 10cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Container, Massing, Rock garden. Woodland garden. Succeeds in any good garden soil[1]. preferring a moist well-drained rich loam in a sheltered position in partial shade[1, 4, 31, 111]. Plants are suitable for naturalizing in a woodland garden[200] and also succeed in the shade of a north-facing wall[233]. They do not object to lime[1]. Grow well in heavy clay soils[200]. Dislikes drought. The stems live for one or two years, dying after flowering[200]. Slugs are very fond of this plant and it will probably require some protection from them[187]. The various species in this genus hybridize freely[95]. There are some named forms, selected for their ornamental value[200]. The whole plant, especially when bruised, gives off an unpleasant smell that is similar to decaying meat[245]. Plants resent root disturbance and should be placed in their permanent positions whilst still small[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. Special Features: Attractive foliage, Not North American native, Naturalizing, All or parts of this plant are poisonous, Suitable for cut flowers, Flowers have an unpleasant odor.

by its native range it should succeed outdoors in many parts of this country. The following notes are based on the general needs of the genus. Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

# 7.2.537 Eupatorium lindleyanum

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Eupatorium lindleyanum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from September to October, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta HairUsed as a hair tonic[178]. The leaves, added to a hair pomade, promote the growth of the hair[218].

dwatta Anthelmintic Antidote Antitussive Diuretic Dysentery Restorative Women's complaintsThe whole plant is anthelmintic, antidote, antitussive, diuretic and restorative[178, 218]. It is used internally in the treatment of bronchitis and dysentery[238]. Externally, it is applied to swellings and wounds and is also important in the treatment of women's complaints, especially before and after parturition[218]. It is also used in the treatment of parasitic worms[218]. The leaves and stems are harvested in the summer before the flower buds open, and are dried for later use[238].

nrakta E. Asia - China, Japan, Korea, Manchuria. ksacta Wet grassy places in lowland and low mountains all over Japan[58]. Swamps or borders of water courses[178].

propta Seed - sow spring in a cold frame and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer. Division in spring or autumn[111]. Very easy, the clumps can be replanted direct into their permanent positions.

nwatta Requires a sunny position, succeeding in most well-drained but moisture retentive fertile soils[1]. Plants seem to be immune to the predations of rabbits[233]. There are both diploid and polypoid forms of this species. Whilst the diploids reproduce sexually, the polyploids, which are widespread, produce their seeds without sexual fertilization[275].

### 7.2.538 Onosma echioides

Onosma

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Onosma echioides is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The bristly stems and leaves can cause a good deal of irritation to the skin[219].

tcanta DyeA red dye is obtained from the root. It is an alkanna substitute[46, 61].

dwatta Alterative Laxative Poultice StimulantThe leaves are alterative[240]. They are made into a powder and given to children as a purgative[240]. The flowers are used as a cordial and stimulant in the treatment of rheumatism and palpitations of the heart[240]. The root is bruised and used as an external application to skin eruptions[240].

nrakta S. Europe to N. Africa. ksacta Limestone slopes and rocks to 1600 metres[187]. Crevices in rocks and cliffs[89].

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse in early spring. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in early summer. Cuttings in a frame in the summer. Shade them for the first  $10 \cdot 12$  days[1].

nwatta Requires a well-drained soil in full sun[1, 187]. Prefers a deep rather rich sandy loam[1]. Best grown in a crevice in a rock garden or on a wall[1, 187]. Tolerates hot dry conditions and also drought once it is established, but disliking winter wet[190]. Plants also dislike wet sumers[200]. Hardy to about -15°c[187]. There is some confusion over this species. It is given as a part of O. frutescens in some reports but [200] gives it specific status. A very ornamental plant[1].

## 7.2.539 Thymus camphoratus

Camphor Thyme

6 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 0.4 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Thymus camphoratus is an evergreen Shrub growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Deodorant Disinfectant EssentialThe essential oil obtained from the leaves is also used in perfumery, as a mouth wash, medicinally etc[200].

dwatta Antiseptic Deodorant DisinfectantAn essential oil obtained from the plant contains thymol, which is strongly antiseptic, deodorant and disinfectant[200]. The plant can be used fresh at any time of the year, or it can be harvested as it comes into flower and either be distilled for the oil or dried for later use[238].

nrakta Europe - Portugal. ksacta Dry sandy places and bushy places.

propta Seed - sow spring in a cold frame. Seed can also be sown in autumn in a greenhouse. Surface sow or barely cover the seed. Germination can be erratic. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of young shoots, 5 - 8cm with a heel, May/June in a frame[200]. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Layering.

nwatta Prefers a light, well-drained calcareous soil and a sunny position[2001]. Plants tolerate occasional walking on and can be grown in cracks in paths, they also succeed on walls[200]. Thymes dislike wet conditions, especially in the winter. A layer of gravel on the soil around them will help protect the foliage from wet soils[238]. The flowers are rich in nectar and are very attractive to honey bees[200]. This is a very difficult genus taxonomically, the species hybridize freely with each other and often intergrade into each other[200].

#### 7.2.540 Arnebia benthamii

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.9 m hkuc

htut cyutli kyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arnebia benthamii is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) soils, prefers well-drained

soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Cardiac Febrifuge MiscellanyCardiac and febrifuge. The plant is considered to be useful in the treatment of diseases of the tongue and throat[145, 240].

nrakta E. Asia - Himalayas from Pakistan to W. Nepal. ksacta Open slopes and shrubberies, 3000 - 4300 metres[51].

propta Seed - sow spring in a greenhouse. Germination usually takes place within 2 - 8 weeks at  $20^{\circ}$ ([134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer, after the last expected frosts. It is best to harvest the seed when it is slightly under-ripe, since it is quickly dispersed when ripe[200]. Cuttings with a heel in the autumn in sand in a cold frame[1]. Root cuttings in sand in a frame during the winter[1].

nwatta Requires a well-drained gritty soil and a sunny position in the rock garden or on a dry wall[1]. 211075

# 7.2.541 Clinopodium glabellum

Glade calamint

6 tlin 7 cyuc 0 kcak 3 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flat hpa7tmwatli hionli

drutta Clinopodium glabellum is an evergreen Perennial growing to 0.6 m (2ft) by 1.5 m (5ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

kcakta None Known

tcanta Bog gardens. A good fast growing, medium density ground cover. Can withstand some foot-traffic. An aromatic pest confuser that may confuse pests reducing their ability to find and eat crops [1-2].

nrakta Native to the US Nashville Basin of Tennessee, the Bluegrass Region of Kentucky, and two counties in Alabama. ksacta Found only on wet cedar glades and in seeps along limestone creekbeds. Due to its narrow range and specific habitat requirements, this species is considered vulnerable

propta Seed

nwatta An herbaceous perennial with showy flowers. Flower Color:Lavender. Bloom Size: 1"-2". Suitable Locations: Bog gardening. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. An evergreen. The root pattern is fibrous dividing into a large number of fine roots [1-2].

# 7.2.542 Arisaema ringens

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Arisaema ringens is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Flies. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water.

dwatta Alterative FebrifugeAlterative, febrifuge[178].

nrakta E. Asia - China, Japan, Korea. ksacta Forests[178]. Woods near the sea, C. and S. Japan[58, 90].

propta Seed - best sown as soon as it is ripe in a shady position in a cold frame[134]. Stored seed remains viable for at least a year and can be sown in spring in the greenhouse but it will probably require a period of cold stratification. Germination usually takes place in 1 - 6 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least a coupe of years until the corms are more than 20mm in diameter. Plant out into their permanent positions whilst they are dormant. Division of tubers when the plant dies down in late summer.

nwatta Prefers a cool moist peaty soil in the bog, woodland garden or a sheltered border in semi-shade[134, 200]. Prefers a loamy or peaty soil[1] and will tolerate a sunny position if the soil is moist but not water-logged and the position is not too exposed[1, 200]. This is probably one of the hardiest members of the genus and should succeed outdoors in a suitable position in many parts of Britain[90]. Tubers should be planted about 10cm deep[233]. Only plant out full sized tubers and mulch them with organic matter in the winter[200]. Plants need protection from slugs[200]. Most species in this genus are dioecious, but they are sometimes monoecious and can also change sex from year to year.

# 7.2.543 Delphinium caeruleum

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Delphinium caeruleum is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are toxic[65, 172]. The plant is most toxic when it is young[200].

tcanta Parasiticide Parasiticide A parasiticide is obtained from the leaves and roots[51, 61]. It is quite toxic and so is for external use only.

dwatta Parasiticide ParasiticideThe roots have been used to kill maggots in the wounds of goats[240].

nrakta E. Asia - Himalayas from Kumaon to Sikkim. ksacta Alpine areas from 2500 to 5000 metres[240].

propta Seed - sow March/April in a cold frame or May outdoors[111]. Keep moist and in a shady position until germination takes place[175]. The seed has a limited viability so it should be stored in a sealed container at about 3°c[200]. The seed usually germinates in 2 - 9 weeks at 15°c[175]. The seed usually germinates in 2 - 9 weeks at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Cuttings of basal shoots in April/May, taken before they become hollow at the base, and planted in a cold frame[111]. Division in spring[111] or early autumn[200].

nwatta Prefers a rich well-drained soil that stays moist in the summer[111, 187]. Dislikes water-logged soils[200], it is liable to die out in heavy soils over winter[111]. Requires an open sunny position[188]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

### 7.2.544 Atropa bella

1258

Deadly Nightshade, Belladonna 6 tlin 9 cyuc 0 kcak 0 tcan 3 dwat 0.9 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Atropa bella-donna is a PERENNIAL growing to 0.9 m (3ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and

tcanta Hedge HedgeAn admirable dense ground cover plant[182, 208], though it might need weeding for the first year[197]. It can be clipped in spring to give denser growth[197, 208]. Plants should be spaced about 60cm apart each way[208]. Plants can be grown as a low hedge, the cultivar 'Furzey' is often used[29].

nrakta A hybrid of garden origin, E. herbacea x E, erigena. ksacta Not known in the wild.

propta Seed - surface sow in a sandy compost in a cold frame in spring. Keep moist. Prick out the plants as soon as they are large enough to handle and plant them in their permanent positions when they are 5 - 8cm tall[11]. This species is a hybrid and will not breed true from seed. Cuttings of half-ripe wood, 3cm long taken from twiggy lateral growths near the base of the plant, July/August in a frame. Remove the leaves from the bottom part of the stem without causing any damage to the bark. The cuttings root in a few weeks if they are given some bottom heat. Plant out in spring[11]. Layering in spring or autumn. Plants can be 'dropped' and then dug up and divided about 6 - 12 months later. Dropping involves digging up the plant and then replanting it about 15 - 20cm deeper in the soil to encourage roots to form along the stems[78].

nwatta Landscape Uses:Border, Container, Massing, Rock garden, Seashore, Specimen. Requires a light loam[11]. This species tolerates lime in the soil[182, 188] so long as there is plenty of humus[208]. Grows best in a poor soil. Resents dry soils. Prefers an open situation. A very ornamental plant[1], there are many named varieties[182]. Plants are quite fast growing[1]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Not North American native, All or parts of this plant are poisonous, Extended bloom season in Zones 9A and above. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 7.2.558 Coptis japonica

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat hpa7tmwatli xre7t hjonli

drutta Coptis japonica is an evergreen Perennial growing to 0.2~m (0ft 8in) by 0.5~m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention of toxicity has been found for this species, it belongs to a family that contains many species that are mildly toxic and so it is wise to treat this plant with some caution.

tcanta Can be grown as a ground cover plant in the peat garden[200].

dwatta Antibacterial Antiinflammatory Dysentery StomachicThe root is a pungent, very bitter, cooling herb that conrols bacterial and viral infections, relaxes spasms, lowers fevers and stimulates the circulation[238]. It is locally analgesic and anaesthetic[238] and is also anti-inflammatory and stomachic. It is used in the treatment of intestinal catarrh[4, 61, 174], dysentery, enteritis, high fevers, inflamed mouth and tongue, conjunctivities tet[238]. The root is harvested in the autumn and can be used fresh or dried[238].

nrakta E. Asia - Japan. ksacta Woods in mountains all over Japan[58].

propta Seed - best sown in a greenhouse as soon as it is ripe in an ericaceous compost[164]. Seal the pot in a polythene bag until germination takes place, which is usually within 1 - 6 months at 10°c[164]. Stored seed should be sown as early in the year as possible. Four weeks cold stratification may be beneficial[164]. Prick out the seedlings into individual pots when they are large enough to handle and grow on in a shady part of the greenhouse for at least their first winter. Plant them out in mid-autumn or in spring. Division in spring[200].

nwatta Requires a light moist humus-rich slightly acidic soil with a northerly aspect or light shade[1, 200].

# 7.2.559 Anemone quinquefolia

Wind Flower, Wood anemone, Twoleaf anemone, Nightcaps 6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.3 m hkuc pcimhmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Anemone quinquefolia is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista All parts of this plant contain protoanemonin, an irritating acrid oil that is an enzymatic breakdown product of the glycoside ranunculin. While protoanemonin can cause severe topical and gastrointestinal irritation, it is unstable and changes into harmless anemonin when plants are dried or heated[4, 10, 19, 65, 270]. An extremely acrid plant, even small doses causing a great disturbance of the stomach[207].

dwatta Rubefacient VesicantEmployed as a rubefacient in the treatment of rheumatism, gout and fevers, it is also used as a vesicant in the removal of corns[207].

nrakta Eastern N. America - Nova Scotia to Georgia, western Ontario, Minnesota and Tennessee. ksacta Moist open woods, thickets, clearings, streamsides, occasionally swampy areas at elevations from 30 - 1900 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[1]. Surface sow or only just cover the seed and keep the soil moist. Sow stored seed as soon as possible in late winter or early spring. The seed usually germinates in 1- 6 months at  $15^\circ c[133]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first year. When the plants are large enough, plant them out in the spring. Division in late summer after the plant dies down.

nwatta Succeeds in ordinary garden soil but prefers a moist well-drained woodland soil[1, 200]. Prefers a moist peaty soil in some shade[187]. Tolerates drought during its summer dormancy[200]. Hardy to at least -20°c[187]. This species is very closely related to A . grayi , A . lancifolia , A . lyallii , A . oregana , and A . Piperi. This species complex also shares close morphologic affinities with both European species such as A . nemorosa and Asian species such as A . Altaica[270] Plants seem to be immune to the predations of rabbits[233]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54]. A good woodland plant[1, 187].

### 7.2.560 Hyoscvamus albus

White Henbane

1263

6 tlin 9 cyuc 0 kcak 0 tcan 4 dwat 0.9 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Hyoscyamus albus is a ANNUAL/BIENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista All parts of the plant are very toxic[7, 10, 19, 65, 76, 200]. Symptoms of poisoning include impaired vision, convulsions, coma and death from heart or respiratory failure[238].

dwatta Anodyne Antispasmodic Diuretic Epilepsy Hallucinogenic Hypnotic Mydriatic Narcotic Sedative Urinary-Henbane has a very long history of use as a medicinal herb, and has been widely cultivated to meet the demand for its use[4]. It is used extensively as a sedative and pain killer and is specifically used for pain affecting the urinary tract, especially when due to kidney stones[254]. Its sedative

is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Anthelmintic Antiinflammatory Antiseptic Bitter Cholagogue Emmenagogue Febrifuge Refrigerant Stomachic TonicThis species is one of several that are the source of the medicinal gentian root[46, 61], the following notes are based on the general uses of G. lutea which is the most commonly used species in the West[K]. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness[238]. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite[4]. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system[238], and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects[4]. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic[4, 7, 9, 14, 21, 165, 238]. It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia[238]. It should not be prescribed for patients with gastric or duodenal ulcers[238]. The root is harvested in the autumn and dried for later use[4]. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties[4].

nrakta E. Asia - N.W. Himalayas, ksacta Grassy slopes. 1800 - 2700 metres[51].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238]. nwatta In general, gentians require a moist well-drained

soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species requires a stony soil with perfect drainage[239]. It is best given some protection from winter wet[239]. This plant has a reputation for not being hardy in Britain[239], though this is more likely to be connected to excess moisture than to low temperatures. Plants are intolerant of root disturbance[200].

# 7.2.555 Clinopodium umbrosum

6 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Clinopodium umbrosum is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is

1262

hardy to UK zone 7. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

tcanta EssentialYields an essential oil[145]. No more details are given.

dwatta VulneraryThe juice of the leaves is applied to cuts and wounds[272].

nrakta W. Asia - Caucasia, Afghanistan and the Himalayas. ksacta Forest shade and damp places, 1700 - 2500 metres in the Himalayas[145].

propta Seed - sow spring in a cold frame. Only just cover the seed. Germination usually takes place within 2 weeks at 21°c. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse. Plant them out in the summer if they have made sufficient growth, otherwise plant them out in late spring or early summer of the following year. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the summer or following spring. Cuttings of soft wood in May or June

nwatta Succeeds in almost any well-drained soil[1].

#### 7.2.556 Macromeria viridiflora

Giant Trumpets, Thurber's giant-trumpets 6 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 0.9 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Macromeria viridiflora is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Miscellany MiscellanyThe plant was collected by the Hopi Indians, dried and mixed with wild tobacco and used in rain-making ceremonies[187].

dwatta Miscellany MiscellanyThe dried plant, combined with mullein (Verbascum species) has been smoked in the treatment of craziness and fits[257].

nrakta South-western N. America - New Mexico to Arizona and N. Mexico. ksacta Rocky slopes and in valleys in pine forest and in scrub, 1000 - 2750 metres[187].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected

nwatta Requires a well-drained soil and a position in full sun[187]. Plants are hardy to about -15°c[187].

### 7.2.557 Erica x darleyensis

Darley Dale Heath, Cape Heath, Molten Silver Heath,

6 tlin 9 cvuc 0 kcak 2 tcan 0 dwat 0.6 m hkuc

htut cyutli tcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Erica x darleyensis is an evergreen Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from November to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

can grow in very alkaline soils. It can grow in full shade 7.2.545 Swertia petiolata (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant, and especially the root, is very poisonous[4, 7, 10, 19, 65, 165]. Even handling the plant has been known to cause problems if the person has cuts or grazes on the hand[4]. The plant is particularly dangerous for children since the fruit looks attractive and has a sweet taste[4]. The toxins are concentrated in the ripe fruit[200].

tcanta Soil reclamationThis species has been found to be effective in removing PCB's from the soil and detoxifying them[248]. The plant is more effective in doing this if it is infected with the bacterial parasite Agrobacterium tumefaciens[248].

dwatta Analgesic Antidote Antispasmodic Diuretic Hallucinogenic Homeopathy Mydriatic Narcotic Sedative UrinaryAlthough it is poisonous, deadly nightshade has a long history of medicinal use and has a wide range of applications, in particular it is used to dilate the pupils in eye operations, to relieve intestinal colic and to treat peptic ulcers[254]. The plant can be used to treat the symptoms of Parkinson's disease, reducing tremors and rigidity whilst improving speech and mobility[254]. It has also been used as an antidote in cases of mushroom or toadstool poisoning[7]. This is a very poisonous plant, it should be used with extreme caution and only under the supervision of a qualified practitioner[238]. See also the notes above on toxicity. All parts of the plant are analgesic, antidote, antispasmodic, diuretic, hallucinogenic, mydriatic, narcotic and sedative[4, 7, 9, 21, 46, 165, 171, 192, 2401. The root is the most active part of the plant, it. is harvested in the autumn and can be 1 - 3 years old, though the older roots are very large and difficult to dig up[4, 7]. The leaves are harvested in late spring and dried for later use[7]. All parts of the plant contain tropane alkaloids[254]. The leaves contain on average 0.4% active alkaloids, whilst the root contains around 0.6%[240]. The alkaloid content also varies according to the development of the plant, being low when the plant is flowering and very high when bearing green berries[240]. These alkaloids inhibit the parasympathetic nervous system which controls involuntary body activities. This reduces saliva, gastric, intestinal and bronchial secretions, as well as the activity of the urinary tubules, bladder and intestines[254]. An extract of the plant has been used as evedrops. It has the effect of dilating the pupils thus making it easier to perform eye operations[4, 232]. In the past women used to put the drops in their eyes in order to make them look larger and thus 'more beautiful'[4, 232]. The entire plant, harvested when coming into flower, is used to make a homeopathic remedy[232]. This is used especially in cases where there is localised and painful inflammation that radiates heat [232]. It is also used to treat sunstroke and painful menstruation[238].

nrakta Central and southern Europe, including Britain, south ad east to N. Africa and Iran. ksacta Woods, thickets and hedges, mainly on calcareous soils[9].

propta Seed - best sown as soon as it is ripe in a cold frame. Germination of stored seed is slow and erratic, usually taking 1 - 6 months at 10°c[134, 200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of softwood terminal shoots in spring[200]. Root cuttings in winter[200].

nwatta Succeeds in any well-drained moisture retentive soil[200] in sun or partial shade[238]. Prefers a calcareous soil[1, 4, 9, 13]. When grown as a medicinal plant, the highest levels of the medically active alkaloids are obtained from plants growing on a light, permeable chalky soil, especially when on a south-west facing slope[4]. The highest concentrations are also formed when the plant is growing in a sunny position and in hot summers[238]. The northerly limits of cultivation are about 50 - 55° north and at an altitude between 100 - 200 metres[4]. This species is widely cultivated, especially in eastern Europe, for the medically active compounds it contains. These are used in the drugs industry to produce a range of medicines[238]. Plants tend to be short-lived[200]. Slugs are very fond of this plant and have been known to completely remove the outer bark from the stems[K].

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc hmim cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Swertia petiolata is a PERENNIAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist or wet soil.

dwatta Antiinflammatory Febrifuge HepaticThe entire plant is used in Tibetan medicine, it is considered to have a bitter taste and extremely cooling potency[241]. It is antiinflammatory, febrifuge and liver tonic[241]. It is used in the treatment of scleritis, inflammation of the liver and high blood pressure, inflammation of the stomach and liver[241].

nrakta E. Asia - Afghanistan to W. Nepal and S.E. Tibet. ksacta Montane to the alpine zone.

propta Seed - sow spring in temperatures not exceeding 10°c in a humus-rich medium[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them Tu in early summer.

nwatta Succeeds in a moist humus-rich soil in damp light woodlands, streamsides or the bog garden[200]. Grows best in areas with cool summers[200].

#### 7.2.546 Colchicum luteum

6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.1 m hkuc htut cyutli tcup hwicli jlut hpa7tli flatpriklwis hpa7tmwatli

drutta Colchicum luteum is a BULB growing to 0.1 m (0ft 4in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf from March to June, in flower from May to July, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. The plant is self-fertile. Suitable for: medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant, but especially the bulb[200], are poisonous[4, 7, 10, 19, 65]. They cause vomiting, violent purging, serious inflammation of the stomach and bowels, and death[232]. Handling the corms can cause skin allergies in some people[238].

tcanta The following notes are for C. autumnale. Since this plant also contains colchicine it can be assumed that it has the same uses[K]. The poisonous alkaloid 'colchicine' is extracted from this plant and used to alter the genetic make-up of plants in an attempt to find new, improved varieties[148]. It works by doubling the chromosome num-

dwatta Alterative Anodyne Aphrodisiac Carminative LaxativeThe corms are alterative, aphrodisiac, carminative and laxative[240]. They are used in India to treat gout, rheumatism and diseases of the liver and spleen[240]. They contain the toxic alkaloid 'colchicine' which is used externally to relieve pain[211, 240]. The dried corms contain around 0.25% colchicine and the seed about 0.4%[240].

nrakta E. Asia - China to the Himalayas. ksacta Stony or earthy hillsides and alpine meadows at higher altitudes[200].

propta Seed - best sown as soon as it is ripe in early summer in a seed bed or a cold frame[1, 164]. Germination can be very slow, taking up to 18 months at 15°c[164]. It is best to sow the seed thinly so that it is not necessary to transplant the seedlings for their first year of growth. Apply a liquid fertilizer during their first summer, however, to ensure they get sufficient nourishment. Prick out the seedlings once they are dormant, putting perhaps 2 plants per pot, and grow them on in a greenhouse or frame for at least a couple of years. Plant them out into their permanent positions when they are dormant[K]. The seedlings take 4 - 5 years to reach flowering size[1]. Division of the bulbs in June/July when the leaves have died down[1]. Larger bulbs can be planted out direct into their permanent positions, though it is best to pot up the smaller bulbs and grow them on in a cold frame for

a year before planting them out. The plant can be divided 7.2.548 Phlox nivalis every other year if a quick increase is required[1].

nwatta Prefers a rich well-drained loam that does not dry out rapidly in summer[1]. Requires a very sunny position[90]. This species is hardy to at least -15°c[200]. Plants can take 4 - 5 years to flower when grown from seed[164]. Plants seem to be immune to the predations of rabbits[233].

# 7.2.547 Scutellaria lateriflora

Virginian Skullcap, Blue skullcap 6 tlin 9 cvuc 0 kcak 2 tcan 3 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Scutellaria lateriflora is a PERENNIAL growing to 0.6 m (2ft) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Tincture overdose causes giddiness, stupor, confusion and seizures. Possible liver toxicity. may interfere with the immune response. Avoid during pregnancy [301].

dwatta Anticonvulsant Antispasmodic Astringent Diuretic Emmenagogue Epilepsy Miscellany Nervine Sedative TonicA commonly used herbal medicine. Virginian skullcap is a very effective nervine that has traditionally been used in the treatment of a wide range of nervous conditions. Its tonic and restorative properties help to support and nourish the nervous system, calming and relieving stress and anxiety[222, 238, 244, 254]. Very little research has been carried out on this species, despite its long use in American and British herbal medicine[244]. Research is sorely needed, and may reveal more uses for this valuable herb[254]. The leaves are antispasmodic, slightly astringent, diuretic, nervine, sedative and strongly tonic[4, 21, 46, 165]. They are harvested in early summer and dried for later use[4]. It is used in the treatment of various problems of the nervous system including epilepsy, insomnia, anxiety, delirium tremens, withdrawal from barbiturates and tranquillisers, and neuralgia[222, 238, 244]. An infusion of the plant has been used to promote suppressed menstruation, relieve breast pain and encourage expulsion of the placenta[213, 254], it should not be given to pregnant women since it can induce a miscarriage[238]. This plant should be used with some caution since in excess it causes giddiness, stupor, confusion and twitching[238]. The plant was once believed of use in the treatment of rabies, though there is no evidence to support this[207, 213].

nrakta N. America - Newfoundland to British Columbia, south to Florida and Ontario. ksacta Alluvial thickets, meadows and swampy woods[43].

propta Seed - sow in situ outdoors in late spring. If there is only a small quantity of seed it is better to sow it in a pot in a cold frame in early spring. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the spring. Division in spring just before new growth begins. Very easy, larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Basal cuttings in early summer in a frame. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in a sunny position in any ordinary garden soil that does not dry out during the growing season[200]. Plants are not so long-lived when grown in rich soils[4]. Many of the plants grown under this name in gardens are in fact S. altissima[238]. It is important to ensure you have the correct plant if using it medicinally[238]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

Pine phlox, Trailing phlox

6 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli hjonli

drutta Phlox nivalis is a PERENNIAL growing to 0.3 m (1ft) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate

pcista None Known

kcakta None Known

tcanta A medium density groundcover that can be grown in semi-shade. Good for woodland gardening.

nrakta Native to the southeastern United States, ksacta Sandhills, dry pinelands, dry deciduous woods, open slopes and flats in sandy ground.

propta Division or by cuttings.

nwatta Low growing, evergreen, mound-forming subshrub or semi-woody perennial. Prefers full sun to semishade, dry to moist well-drained soil. USDA Hardiness Zone: 4 to 9. It's natural distribution is on sandhills, dry pinelands, dry deciduous woods, open slopes and flats in sandy ground. The root pattern is fibrous dividing into a large number of

# 7.2.549 Lycoris aurea

Golden Spider Lily

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lycoris aurea is a BULB growing to 0.6 m (2ft) by 0.1 m (Oft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers

dwatta Cytotoxic PoulticeThe crushed bulb is used as a poultice for treating burns, scalds and ulcers[218]. The bulb contains lycorine, which is cytotoxic[218].

nrakta E. Asia - China, Japan. ksacta oblanceolate, ca. 3 x 0.5 cm, margin strongly undulate. Stamens Shady and moist places on slopes and in rock crevices at elevations from 100 - 2300 metres[266].

propta The seed is best sown as soon as it is ripe in a greenhouse and should germinate in the spring[200]. Sow the seed thinly so that it does not need to be disturbed for its first year of growth. Give an occasional liquid feed during the growing season to ensure the plants do not become nutrient deficient. Pot up the small bulbs when the plants become dormant, placing 2 bulbs in each pot. Grow them on for another 2 years in the greenhouse before planting them out when they are dormant. Division of offsets in the dormant season[2001

nwatta Requires a deep well-drained sandy soil rich in organic matter in full sun[200]. Plants require a dry period when they become dormant in the summer and they also dislike winter wet[218]. Hardy to at least -15°c[200]. Plants are attractive to slugs and need to be protected from them[200]. Very sensitive to root disturbance, the bulbs can take some years to become well established[200].

### 7.2.550 Diphylleia cymosa

Umbrella Leaf, American umbrellaleaf 6 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 0.7 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Diphylleia cymosa is a PERENNIAL growing to 0.7 m (2ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers soil. Suitable pH: mildly acid, neutral and basic (mildly al-

dwatta Antiseptic Cancer Diaphoretic DiureticA tea made from the roots is antiseptic, diaphoretic and diuretic[222, 257]. An infusion has been used in the treatment of smallpox[257]. This is a very rare plant in the wild, so little research has been carried out into its medicinal virtues. However, it is believed that the root might contain podophyllin, an effective anti-cancer agent[222].

nrakta Eastern N. America - Virginia to Georgia, ksacta Very rare in the wild, growing in rich woods in mountains[222], thriving by streams[200].

propta Seed - best sown in a cold frame as soon as it is ripe[175]. The seed is very slow to germinate, usually taking a year or more[175]. Sow stored seed as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Prefers a moist humus-rich soil and semi-shade growing well in a woodland garden[1, 130, 200]. The leaves are very large and can be up to 60cm across[233].

#### 7.2.551 Nicotiana alata

Tobacco, Jasmine tobacco, Nicotiana, Jasmine Tobacco, Ornamental Tobacco, Flowering Tobacco 6 tlin 9 cyuc 0 kcak 3 tcan 0 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Nicotiana alata is a PERENNIAL growing to 0.6 m (2ft) by 0.3 m (1ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are poisonous[1, 65, 76].

tcanta InsecticideAll parts of the plant contain nicotine, this has been extracted and used as an insecticide. Landscape Uses: Border, Container, Massing, Specimen, Dvnamic accumulator.

nrakta S. America - S. Brazil to N. Argentina. Locally naturalized in C. Europe. ksacta Not known

propta Seed - surface sow in a warm greenhouse about 10 weeks before the last expected spring frosts. The seed usually germinates in 10 - 20 days at 20°c. Keep the soil moist and pot up as soon as the plants are big enough to handle, planting them out after the last expected frosts.

nwatta Prefers a well-drained deep rich moist soil in a sunny position[1, 108]. Hardy to about -5°c[200], this plant is usually grown as an annual in Britain, flowering well in its first year, but it does survive mild winters outdoors[1]. A very ornamental plant[1], it has sweetly scented flowers that release most of their scent in the evening and attract moths[30]. Plant requires more than 14 hours daylight per day to induce flowering[169]. Special Features: Attracts birds, Not North American native, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Suitable for cut flowers. Fragrant flowers. Attractive flowers or blooms.

#### 7.2.552 Chaenactis douglasii

Morning Brides, Douglas' dustymaiden, Alpine dustymaiden 6 tlin 9 cvuc 0 kcak 0 tcan 2 dwat 0.4 m hkuc htut cyutli kyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chaenactis douglasii is a BIENNIAL/PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor kaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta Cardiac Poultice StomachicMorning brides was employed medicinally by a number of native North American Indian tribes who used it to treat a variety of complaints. but especially to treat skin problems[257]. It is not generally used in modern herbalism. An infusion of the whole plant has been given to children in order to slow their heart rates[257]. It is also used in the treatment of stomach complaints, coughs and colds[257]. The fresh plant, or sometimes just the leaves, are crushed and applied as a poultice to swellings, sores and aches[207, 257]. An infusion is used as a wash for a variety of skin problems including pimples, chapped hands, boils and insect bites[257].

nrakta Western N. America - Montana to British Columbia, south to Arizona, California and New Mexico, ksacta Dry to medium-moist soils along roadsides, waste places and hillsides, especially where the soil has been disturbed[212].

propta Seed - surface sow in spring in a greenhouse[207]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer.

nwatta Requires a deep well-drained gritty or gravelly soil, preferably of low fertility and a sunny position[207] Grows well in the rock garden[207]. The plant is a biennial or short-lived perennial[207].

# 7.2.553 Asarum arifolium

6 tlin 9 cyuc 0 kcak 0 tcan 1 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Asarum arifolium is an evergreen Perennial growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Although no reports of toxicity have been found for this plant, at least 3 other members of this genus have reports that the leaves are toxic[7, 19]. Some caution is therefore advised in the use of this plant.

tcanta EssentialAn essential oil obtained from the plant has the odour of sassafras[4].

dwatta StomachicThe root is stomachic[61].

nrakta South-eastern N. America - Virginia to Louisiana. ksacta Upland deciduous and mixed deciduous-conifer forests from sea level to 600 metres[270].

propta Seed - best sown in a cold frame as soon as it is ripe in the summer[134]. Stored seed will require 3 weeks cold stratification and should be sown in late winter[134]. The seed usually germinates in the spring in 1 - 4 or more weeks at 18°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. Plant them out when large enough in late spring. Division in spring or autumn. Plants are slow to increase[200]. It is best to pot the divisions up and keep them in light shade in the greenhouse until they are growing away strongly.

nwatta Prefers a rich moist neutral to acid soil in woodland or a shady position in the rock garden[1, 200]. Plants are hardy to at least -15°c[200]. The flowers are malodorous and are pollinated by flies[200]. The root has a pungent, aromatic smell like mild pepper and ginger mixed, but more strongly aromatic[245]. Plants often self-sow when growing in a suitable position[200].

# 7.2.554 Gentiana kurroo

6 tlin 9 cvuc 0 kcak 0 tcan 3 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Gentiana kurroo is a PERENNIAL growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September. The species

their ornamental value [200]. 'Silver Lace' is a dwarf clumping plant that grows well in containers and is more attractive with larger flowers than the type [183, 200].

#### 8.2.51 Brassica oleracea sabauda

Savoy Cabbage

7 tlin 11 cyu<br/>č4kcak2tcan0dwa<br/>t $0.8~\rm{m}$ hkuc hmimhtut cyutli tcup hwic<br/>li hrasjlutnyikfrip hpa7tli flatprikl-

wis hpa7tmwatli fyifxre7t hjonli

drutta Brassica oleracea sabauda is a BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[2, 16, 46]. The leaves have a very attractive crin-liked appearance, but are somewhat tougher than other cabbages. Finely shredded, they can be used in salads, though many people find them indigestible this way. They are delicious cooked, especially the younger leaves since the older ones can be quite tough[K]. Through careful selection of varieties, they are usually available from the autumn until the spring[K].

tcanta Dynamic accumulator.

nrakta  $\mathring{A}$  cultivated form of B. oleracea. ksacta Not known in the wild.

propta Seed - sow in a seedbed outdoors in April/May. Plant out in summer as space permits. Do not let the seedlings get overcrowded or they will soon become leggy and will not make such good plants. If your seedlings do get leggy, it is possible to plant them rather deeper into the soil - the buried stems will soon form roots and the plant will be better supported.

nwatta Succeeds in full sun in a well-drained fertile preferably alkaline soil[16, 37, 200]. Prefers a heavy soil[16]. Prefers a soil that is not too rich[37]. Succeeds in any reasonable soil. Succeeds in maritime gardens[200]. The savoy cabbage is often grown for its edible leaves. This is a very hardy form of cabbage that is able to withstand quite severe winters, providing leaves from autumn to the spring. There are many named varieties. The savoy, however, is considered by many people to be coarser tasting than other cabbages and is less grown nowadays.

### 8.2.52 Pimpinella anisum

Aniseed (Saunf - Hindi), Anise burnet saxifrage 7 tlin 10 cyuc 4 kcak 0 tcan 3 dwat 0.5 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Pimpinella anisum is a ANNUAL growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf from May to October, in flower in July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Condiment TeaYoung leaves - raw or cooked[2, 14, 21, 37, 52]. The leaves have a sweet aniseed flavour, they are very refreshing to chew and are also nice as a flavouring in salads, puddings, soups, stews etc[183, K]. When adding to cooked dishes, only add the leaves for the last few minutes of the cooking or the flavour will be lost[K]. The aromatic seed is eaten raw or used as a flavouring in raw or cooked foods such as soups, pies, bread and cakes[2, 14, 20, 21, 27, 37, 244]. A distinctive sweet liquorice flavour[183], its use improves the body's ability to digest food[244]. The seed is harvested by cutting the whole plant when the seed is ripe. The plants

are then kept in a warm, dry position for a week and then threshed to remove the seeds. Store the seeds in the dark in an airtight jar[244]. An essential oil from the seed is used as a food flavouring in sweets (especially aniseed balls) ice cream, chewing gum, pickles etc[57, 183, 238]. It is also often used to flavour alcoholic drinks such as pernod, ouzo and anisette[238, 244]. The leaves and the seeds can be brewed into a sweet liquorice-like tea[183].

tcanta Essential Insecticide Pot-pourri Repellent TeethAn essential oil is obtained from the seed, used in perfumery, tooth pastes, medicinally and as a food flavouring[57, 238]. The powdered seed can be used as a dentrifice and mouthwash[201]. The plant is an ingredient of pot-pourri. The plant can be used as an insect repellent but it is also said to attract mice[14]. If aniseed oil is liberally smeared around live-traps it can attract mice and other rodents into them[4, 201]. The plants seem to be immune to the predations of slugs and snails and can help to protect neighbouring plants[201]. A spray made by boiling of one part coriander leaves and one part anise seeds in two parts of water is very effective against red spider mites and woolly aphids[201].

dwatta Antiseptic Antispasmodic Appetizer Aromatic Carminative Digestive Expectorant Galactogogue Pectoral Stimulant Stomachic TonicAniseed has a delicious sweet liquorice-like flavour and is a commonly used and very safe herbal remedy that is well suited for all age groups from children to the elderly. However, its use has declined in recent years with the advent of cheaper substitutes such as Illicium verrum and synthetic substances[238]. It is a particularly useful tonic to the whole digestive system and its antispasmodic and expectorant effects make it of value in the treatment of various respiratory problems[254]. The seed is the part used, generally in the form of an extracted essential oil[4]. The essential oil comprises 70 - 90% anethole, which has an observed oestrogenic effect whilst the seed is also mildly oestrogenic[254]. This effect may substantiate the herb's use as a stimulant of sexual drive and of breast-milk production[254]. The essential oil should not be used internally unless under professional supervision whilst the seeds are best not used medicinally by pregnant women, though normal culinary quantities are quite safe[254]. The seed is antiseptic, antispasmodic, aromatic, carminative, digestive, expectorant, pectoral, stimulant, stomachic and tonic[4, 9, 14, 20, 21, 46, 165, 201]. It is of great value when taken internally in the treatment of asthma, whooping couch, coughs and pectoral affections as well as digestive disorders such as wind, bloating, colic, nausea and indigestion[4, 254]. Externally it is used to treat infestations of lice, scabies and as a chest rub in cases of bronchial disorders[238]. A strong decoction of the seeds can be applied externally to swollen breasts or to stimulate the flow of milk[244]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Pimpinella anisum for cough and bronchitis, fevers and colds, common cold, inflammation of the mouth and pharynx, dyspepsia, loss of appetite (see [302] for critics of commission E). Contraindicated in patients allergic to anise and anethol. Sensitization as an adverse effect observed rarely.

nrakta S. Europe - Greece. ksacta Not known in a truly wild situation

propta Seed - sow mid to late spring in situ. This sowing only succeeds in producing a crop of ripe seeds in years when the summers are hot[238]. A more certain crop (but much more labour intensive) can be obtained by sowing 4 - 5 seeds per pot in a greenhouse in early spring. They should germinate within 3 weeks. Thin if necessary to the best seedling and plant them out after the last expected frosts[K]. Aniseed strongly resents root disturbance.

nwatta Succeeds in ordinary garden soil[1] but prefers a fairly rich warm well-drained light soil in a sunny position[1, 27, 37, 52]. Prefers a pH in the range 6 to 7.5[238]. Aniseed has a very long history of herbal and culinary use, and is often cultivated for its edible and medicinal seed in warm temperate zones[46, 244]. The plant needs warm summers if it is to grow well and seeds only ripen in Britain in long warm summers[4, 37, 200]. Plants strongly resent root disturbance and should not be transplanted. A good companion plant in the garden, its aromatic nature helping to keep nearby plants free of aphis etc. Its flowers attract parasitic wasps to the garden and these prey on a large number of garden pests[238]. Aniseed grows especially well with co-

grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is poisonous[1, 11] and so are the leaves[218]. Although we have no more information, it is reasonable to assume that all other parts of the plant are also toxic.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or used as a beverage[11]. As pleasant as bilberries[177]. Use with great caution since most parts of the plant, including the seed[177], are probably very toxic and some reports suggest the fruit should not be used at all[11]. The roots are antirheumatic[218]. The plant is hallucinatory in small quantities[218].

dwatta Anodyne Antiphlogistic Antirheumatic Depurative Febrifuge Hallucinogenic Poultice Vermifuge Vulnerary-The leaves are anodyne, antiphlogistic, febrifuge, depurative, poultice and vermifuge 147, 2181.

nrakta E. Asia - China. ksacta Grassy hills and river valleys to 1500 metres. Occasionally found at higher elevations in stony and arid areas[109].

propta Seed - sow February/March in a greenhouse[78]. The seed usually germinates in 1 - 3 months at 15°c[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7cm with a heel, luly/August in a frame. Fair percentage[78].

nwatta Prefers a fairly good loamy soil in a sunny sheltered position[11, 164, 200]. Succeeds in light shade[200] This species is not very hardy in Britain, tolerating temperatures down to about -5°c though it can resprout from the base if cut back by the cold[200]. This new growth does not flower in its first year[182]. The roots of plants in this genus bear nitrogen-fixing nodules[218]. Whilst much of the nitrogen will be utilized by the growing plant, some of it will become available for other plants growing nearby[K].

# 8.1.20 Acacia angustissima

Prairie acacia. Timbre. Fernleaf Acacia tfo2n 7 tlin 10 cyuc 2 kcak 4 tcan 3 dwat 5 m hkuc htut cyutli hgatkyuctcup hwicil hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Acacia angustissima is an evergreen Tree growing to 5 m (16ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It can fix Nitrogen. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Especially in times of drought, many Acacia species can concentrate high levels of the toxin Hydrogen cyanide in their foliage, making them dangerous for herbivores to eat

kcakta Edible Parts: Inner bark SeedpodEdible Uses: The seedpods have been used for food by local peoples[46]. The bitter astringent bark is used in Mexico for precipitating mucilaginous matter and inducing fermentation in the making of alcoholic drinks[303].

tcanta Biomass Mulch Pioneer Soil reclamation TanninAgroforestry Uses: Although it may not grow into a large tree, it can be extremely valuable for use as pioneer species for rejuvenating degraded lands, and as a nurse crop for more valuable tree species. Its potential as a mulch producer has come into question, because of the presence of secondary compounds that bind the nitrogen and result in low quality (slowly decomposing) prunings. This may mean that the mulch is a poor nitrogen source for the present crop. but it may have greater residual effects that could benefit the subsequent crop, or be a good nitrogen source to help build up organic matter in the soil. These long-term benefits could outweigh the initial low nutrient return to the soil over a number of years. Slowly decomposing prunings may have value for suppressing weed growth in associated crops[303 ]. Other Uses: Tannin is obtained from the bark[46]. Bark harvested for its tannins should only be taken from mature stems, and only when the sap is rising at the beginning of the

growing season - which is when the tannin content is highest and the bark is most easily removed from the wood[601]. Carbon Farming - Industrial Crop: biomass. Agroforestry Services: nitrogen, alley crop.

dwatta DysenteryAcacia angustissima is an important medicinal species for the Tzotzil and Tzeltal Maya Indians in Mexico. They rank it the 4th most important species in the cure of bloody diarrhoea and 7th in the treatment of mucoid diarrhoea. It is also used as a cure for toothache, rheumatism and skin lesions, and is reported to inhibit growth in malignant tumours. Tests also show that it possesses a mild antimicrobial effect on Escherichia coli and Staphylococcus aureus[303]. The medical activity will at least be partly due to the astringent tannins found in the plant[K]. The bark of all Acacia species contains greater or lesser quantities of tannins and are astringent. Astringents are often used medicinally - taken internally, for example. they are used in the treatment of diarrhoea and dysentery, and can also be helpful in cases of internal bleeding. Applied externally, often as a wash, they are used to treat wounds and other skin problems, haemorrhoids, perspiring feet, some eye problems, as a mouth wash etc[601, K]. Many Acacia trees also yield greater or lesser quantities of a gum from the trunk and stems. This is sometimes taken internally in the treatment of diarrhoea and haemorrhoids[601].

nrakta C. America - Panama, north to Mexico and southern N. America. ksacta It is a subtropical plant. Hillsides, rock slopes, summits and in grassland with other shrubs, often in deciduous or semi-deciduous forest[303]. Mostly on rather dry, often rocky, brushy slopes or in thin forest, frequent in pine-oak forest, sometimes in hedges, to 2,700 m[331]

propta Seed - germinates best when soaked for 12 hours in cold water prior to sowing[303]. The standard seed treatment for Acacia species (pre-soaking the seed in warm water for 12 hours) results in inferior germination. Scarifying the seed by scratching or nicking the round end of each seed with a file, knife or nail clipper (without damaging the cotyledon) before sowing has also been suggested[303]. Fernleaf acacia seems to fare better when grown from transplanted seedlings than from direct seeding. If it is to be directly seeded, then it is important not to sow too deeply. The seeds should be sown on the surface of cultivated soil and covered with a layer of soil equal to the width of the seed[303].

nwatta Agroforestry Services: Alley crop Agroforestry Services: Nitrogen Industrial Crop: Biomass Management: Coppice Management: Standard Regional CropAcacia angustissima is a versatile plant that can grow from the warm temperate zone to the tropical zone. It succeeds at elevations from sea level to 2,600 metres, tolerating a mean annual temperature in the range of 5 - 30°c and a mean annual rainfall in the range 895 - 2.870mm[303]. It can tolerate quite cold climates with occasional temperatures falling below freezing[303]. Grows best in a sunny position. Grows well in free-draining, acidic, infertile soils[303]. It is adapted to a wide range of soils including vertisols of slightly alkaline pH[415]. A very drought-tolerant plant, possibly due to its substantial taproot. It can retain its green foliage in dry seasons that can be as long as 8 months[303]. Acacia angustissima is fast-growing, quick to mature and a prolific seed producer[303]. It flowers throughout the year in its natural range[303]. This ability to grow quickly and reproduce when young has resulted in the plant becoming weedy and forming thickets, especially along roadsides and in sandy soil in pastures in its native range[303]. This weed potential has created concern among some researchers about the advisability of its use in agroforestry or agricultural systems[303]. The plant responds well to regular cutting and to coppicing[303 This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. When introducing A. Angustissima into a new area it may be necessary to inoculate with an appropriate Rhizobium before planting[303]. Carbon Farming -Cultivation: regional crop. Management: standard, coppice. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2].

### 8.1.21 Medicago arborea

Moon Trefoil

tfo2n 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Medicago arborea is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from May to October. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked[K]. This plant was supplied to Plants for a Future in early 1994 from a person in Greece who said that it was often used in salads there[K]. Young shoots, when the plant is growing vigorously, have a slightly sweet, grass-like flavour but a rather chewy texture[K]. Older leaves, and younger leaves if the plant is not growing vigorously, have a distinct bitterness and are rather unpleasant[K].

nrakta Europe - Mediterranean. ksacta Scrub and rocky hillsides[184].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in a greenhouse[200]. The seed can also be sown in a greenhouse in autumn. Germination should be quite rapid. Prick out the seedlings into individual pots when they are large enough to handle and grow them on for at least the first winter in a greenhouse. Plant out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[188]. Very easy if bottom heat is given[11].

nwatta Requires a warm position in full sun, succeeding in dry or well-drained moist soils[182]. Best grown against a wall[182] in the colder areas of the country[188]. Tolerant of wind and salt spray[200], it grows well in maritime gardens[184]. Plants are not hardy in the colder areas of Britain, they tolerate temperatures down to about -10°c when fully dormant[184, 200], though the young growth in spring can be damaged by late frosts. They do not succeed in the open at Kew, though they grow well against a wall[11]. The flowers have a vanilla or sweet pea scent[245]. Any pruning should consist of cutting out dead wood in the spring[188]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 8.1.22 Coriaria napalensis

tfo2n 7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Coriaria napalensis is a deciduous Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

poista The seed is poisonous[1, 177]. Although we have no more information, it is reasonable to assume that other parts of the plant are also toxic.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or used as a beverage[145, 146, 272]. Use with great caution since most parts of the plant, including the seed, are very toxic[177]. Some reports suggest it is safer not to use the fruit at all[11]. The fruit is about 8mm in diameter[200].

tcanta Basketry Dye Ink Tannin WoodThe wood contains a considerable quantity of tannin[146, 272]. The leaves contain 20% tannin[240]. The branches are used for making baskets[272]. Wood - hard, beautifully marked, takes a good polish. Used for picture frames and other small articles[146, 1581.

dwatta StomachicThe juice of the bark is used in the treatment of stomach aches[272]. Some cauion is advised - see notes above on toxicity[K].

nrakta E. Asia - Himalayas from Pakistan to S.W. China. ksacta Forests and shrubberies, mainly on the outskirts of the forests, 1000 - 2700 metres[51]. Plants are found at elevations up to 3300 metres in Sikkim[146].

propta Seed - sow February/March in a greenhouse[78]. The seed usually germinates in 1 - 3 months at 15'c[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7cm with a heel, July/August in a frame. Fair percentage[78].

nwatta Prefers a fairly good loamy soil in a sheltered position in full sun or light shade[11, 164, 200]. This species is not very hardy in Britain, it tolerates temperatures down to about -5°c[200]. According to one report plants succeed at Kew but are frequently cut to the ground in severe winters though they resprout from the base[11, 200]. This new growth does not flower in its first year[182]. However, a medium-size tree seen at Kew in 1990 seemed to have survived many winters without untoward damage[K]. The roots of plants in this genus bear nitrogen-fixing nodules[218]. Whilst much of the nitrogen will be utilized by the growing plant, some of it will become available for other plants growing nearby[K].

#### 8.1.23 Acacia mucronata

Narrow-Leaf Wattle

htto beta heade tfo2n 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishras hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Acacia mucronata is an evergreen Tree growing to 9 m (29ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in March. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure

kcakta The following uses are for the closely related A. longifolia, they almost certainly also apply to this species[K]. Flowers - cooked[144]. Rich in pollen, they are often used in fritters. Seed - roasted[2, 46, 61, 105]. Starchy[177]. Acacia seeds are highly nutritious and contain approx 26% protein, 26% available carbohydrate, 32% fibre and 9% fat[278]. The fat content is higher than most legumes with the aril providing the bulk of fatty acids present[278]. These fatty acids are largely unsaturated which is a distinct health advantage although it presents storage problems as such fats readily oxidise[278]. The mean total carbohydrate content of 55.8 + 13.7% is lower than that of lentils, but higher than that of soybeans while the mean fibre content of 32.3 + 14.3% is higher than that of other legumes such as lentils with a level of 11.7%[278]. The energy content is high in all species tested, averaging 1480+270 kJ per 100g[278]. Wattle seeds are low glycaemic index foods. The starch is digested and absorbed very slowly, producing a small, but sustained rise in blood glucose and so delaying the onset of exhaustion in prolonged exercise[278]. Seedpods - roasted[177]. The pods are up to 10cm long[219].

tcanta The following uses are for the closely related A. longifolia, they almost certainly also apply to this species[K]. A yellow dye is obtained from the flowers[168]. A green dye is obtained from the seed pods[168]. The extensive root system of this plant helps to prevent soil erosion[200]. It is used on sandy soils and steep banks[200]. Trees are planted as a screen in Australia[157]. This species is often grown as a rootstock for grafting lime-intolerant members of the genus[11]. Wood - pale, tough[154].

nrakta Australia - Tasmania, Victoria. ksacta Usually occurs in forests and woodlands, sometimes forming low closed forests, from sea-level to the highland zone

propta Seed - best sown as soon as it is ripe in a sunny position in a warm greenhouse[1]. Stored seed should be scarified, pre-soaked for 12 hours in warm water and then sown in a warm greenhouse in March. The seed germinates in 3 - 4 weeks at 25°c[133]. As soon as the seedlings are

3cm wide at the top, they are tender and juicy but usually insipid[K]. Occasionally the root has a pleasant acid flavour, we have yet to find out what causes the difference[K].

nrakta Southern N. America - Mexico. Occasionally established in Europe. ksacta Not known

propta Seed - best sown as soon as ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Our plants have never produced seed. Division in autumn, harvest the bulbs and replant in the spring. They usually increase very freely.

nwatta An easily grown plant, preferring a sandy soil in a warm dry position[1, 27, 37]. It dislikes dry or heavy soils[37]. Dislikes lime[37]. Prefers a southerly aspect[37]. This species is only hardy outdoors in the milder areas of Britain, tolerating temperatures down to about -5°c or perhaps a bit lower if the soil is very well-drained. The bulbs are easily harvested in late autumn, however, and can be stored overwinter in a cool frost free place, replanting them in the spring[K]. In milder winter areas a good mulch is usually sufficient to see the bulbs through the winter and they will then normally be more productive of leaves and flowers in the following year. Plants have survived the winter for several years without a mulch on our trial grounds in Cornwall[K]. A very ornamental plant, flowering freely all summer[1, K]. It was formerly cultivated in Mexico for its edible tuber[46] (this may be a mistaken entry that should have referred to O. tuberosa. Whilst the root of this plant is edible it is neither productive nor very flavourful. The leaves and the flowers are far superior[K]). This species is closely related to and probably part of O. tetraphylla[200], differing only in its sessile bulbils and truncate leaves[50].

# 8.2.49 Brassica oleracea capitata

Cabbage, Ornamental Cabbage, Red Cabbage, Savoy Cabbage

7 tlin 11 cyuc 4 kcak 3 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Brassica oleracea capitata is a BIENNIAL growing to 0.8 m (2ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves raw or cooked[1, 27, 46]. Cabbages are generally used as a cooked vegetable, though the shredded leaves can also be eaten in salads. Dutch cabbages are generally sweeter and milder in flavour making them more suitable for raw eating. Those leaves in the heart of the plants are more tender than outside leaves and so are also more suitable for eating raw. These heart leaves, though, are less nutritious because they have been excluded from the light[K]. Many people find that the raw leaves give them indigestion[K]. The leaves can be fermented and made into sauerkraut, used as a health food and said to be good for the digestive system[K]. By careful selection of cultivars, it is possible to harvest cabbages all year round[K]. Seeds - sprouted and added to salads. Very good eating[183].

tcanta DyeA blue dye can be obtained from the leaves of purple cultivars[168].

nrakta A cultivated form of B. oleracea. ksacta Not known in the wild.

propta Seed - this can be sown from early spring to late summer in a seedbed outdoors, depending on the cultivar. The plants are moved to their final positions when about 7 - 15cm tall. Do not let the seedlings get overcrowded or they will soon become leggy and will not make such good plants. If your seedlings do get leggy, it is possible to plant them rather deeper into the soil - the buried stems will soon form roots and the plant will be better supported. For a summer crop, the seed is sown in early to late spring, autumn maturing

cultivars are sown in mid to late-spring and winter maturing cultivars in late spring. Winter to spring maturing cultivars are sown in mid to late summer, these are often sown in situ and thinned as required. Seed of fast-growing summer cabbages can also be sown in a greenhouse in January/February in order to provide an early crop. This is planted out in early to mid-spring as the weather allows and can be harvested in late spring and early summer.

nwatta Landscape Uses:Border, Container, Massing, Succeeds in full sun in a well-drained fertile preferably alkaline soil[16, 37, 200]. Prefers a heavy soil and a cool moist climate[16, 27]. Succeeds in any reasonable soil. Succeeds in maritime gardens[200]. Tolerates a pH in the range 4.3 to 8.3. The cabbage is widely cultivated throughout the world for its edible leaves There are three main types of cabbage, the common hearting cabbage has dark green leaves, Dutch cabbages form a much larger heart and the leaves. which have a milder flavour, are a pale green or even white, whilst the third type, red cabbages, has red leaves. There are many named varieties of each type and by careful choice of varieties it is possible to ensure a year round supply of fresh leaves. Several cultivars are hardy enough to stand the rigours of a British winter, there are also some less-hardy varieties that can be harvested in early winter and stored for a few months in a cool place to provide leaves in areas with very severe winters[200]. Some varieties have been selected for the ornamental value of their leaves, these tend to be of poor culinary quality[206]. Cabbages are good companions for dill, camomile, sage, wormwood, mint and other aromatic plants which help to reduce insect predations on the cabbages[18, 201]. Cabbages also grow well with potatoes and beet[201]. They grow badly with strawberries, tomatoes and climbing beans[18, 201]. Special Features: Attractive foliage, Not North American native, Attracts butterflies, Inconspicuous flowers or blooms.

# 8.2.50 Tulbaghia violacea

Society Garlic

7 tlin 11 cyuc 4 kcak 3 tcan 0 dwat 0.3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tulbaghia violacea is an evergreen Perennial growing to 0.3 m (1ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and stems - raw or cooked. A mild garlic flavour, they are used as a flavouring in soups and salads[183]. Flowers - raw or cooked. They can be added to salads, used as a garnish or as a flavouring in cooked foods[183]. The flowers are very ornamental, they have a sweet, onion-like heat in the mouth.

tcanta Companion Cut flowersLandscape Uses: Border, Container, Ground cover, Rock garden, Seashore. Special Features: Attractive foliage, Not North American native. Suitable for cut flowers. Fragrant flowers. Attractive flowers or blooms.

nrakta S. Africa - Eastern Cape, Transvaal. ksacta Forest margins and stream banks[282].

propta Seed - best sown as soon as it is ripe in the greenhouse[200]. Sow stored seed in early spring in the greenhouse[200]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for at least their first winter. If planting them outdoors, this is best done in late summer when the plants are dormant. Division of the dormant plants in late summer.

nwatta Requires a well-drained soil in a sunny sheltered position[200]. Hardy in the mildest areas of Britian, tolerating temperatures down to about -10°c, it can be grown as a bedding plant or at the base of a warm wall[200]. Plants succeed outdoors at Edinburgh botanical gardens[90]. Plants grow from a cluster of small bulbs attached to a basal plate that is sometimes regarded as a rhizome[200]. The flowers are very fragrant at night, the whole plant has a garlic-like aroma[200]. There are some named varieties, selected for

nrakta Pantropical. ksacta Moist, marshy or inundated localities, shallow pools, ditches, rice fields, forming dense masses[310]. Also found along roadsides at elevations from sea-level up to 1,000 metres[310].

propta Seed - sow in situ in moist to wet soil[300 ]. Only the annual form is usually propagated this way[300 ]. Germination rates of local cultivars are often low (less than 60%) because of hard-seededness induced by long storage. Reliable seed companies supply improved cultivars with a high (in excess of 80%) germination percentage. The seeds do not germinate well at temperatures lower than 25°c[299 ]. Cuttings of young shoots at any time of the year. The shoots readily produce roots, even whilst still on the parent plant[300 ].

nwatta Swamp morning glory is a plant of the moist to wet, lowland tropics, where it is found at elevations up to 1.000 metres. It grows best in areas where annual daytime temperatures are within the range 15 - 35°c, but can tolerate 10 - 40°c[418]. It prefers a mean annual rainfall in the range 2,000 - 2,500mm, but tolerates 700 - 4,200mm[418]. Plants grow well in full sun[296]. A very easy plant to grow. it succeeds in bathtubs, ponds and still water[296]. Succeeds in a wide range of soils, including heavy clays[300]. Best leaf production comes from plants grown in soils rich in organic matter[298]. Prefers a pH in the range 5 - 7, tolerating 4.3 - 7.5[418]. The plant is widespread as a swamp weed in all tropical and many subtropical lowland areas. It is a declared aguatic or terrestrial noxious weed in the southeastern United States[299]. A very fast-growing plant, it starts developing lateral branches from cotyledonary buds 2 - 3 weeks after sowing. Thereafter the main axis and both laterals each produce about one leaf every 2 - 3 days[298, 299 ]. Cultivars selected for once-over harvest or uprooting have retarded branching or almost no branching. Their harvest takes place 21 - 30 days after sowing[296, 299]. Cut and come again harvesting of vegetatively propagated plants or wild plants can start about one month after plant establishment[299]. Flowering commences after 2 - 5 months, but the plant continues to form new leaves and branches[299] ]. Swamp morning glory is a quantitative short-day plant, early flowering being induced by short days of less than 12 hours. Flowering is also stimulated by drought[299]. There are some named varieties[301]. Two main forms exist in cultivation:- A short-lived perennial form grows in very wet soils and water (it has been named Ipomoea aquatica aquatica by some authorities). This form can produce yields ofup to 90 tonnes per hectare in Thailand[300]. An annual creeping form tolerates drier conditions (this has been named Ipomoea aquatica reptans)[300]. Under dryland cultivation, yields per crop can range from 7 - 30 tonnes per hectare. averaging 20 tonnes. In theory one crop can be produced every month leading to a potential yield of around 240 tonnes per hectare in a year[299] produce.

### 8.2.47 Linum hybrids

Perennial Flax

7 tlin 11 cyuc 4 kcak 4 tcan 4 dwat 0.8~m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Linum hybrids is a PERENNIAL growing to  $0.8\,$ m (2ft 7in) by  $0.2\,$ m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 4. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed of some strains contain cyanogenic glycosides in the seed though the toxicity is low, especially if the seed is eaten slowly. It becomes more toxic if water is drunk at the same time[76, 222]. The cyanogenic glycosides are also present in other parts of the plant and have caused poisoning to livestock[240]. Contraindicated with a stricture of the oesophagus in no bowel movement conditions and acute gut inflammatory diseases. Contraindicated in pregnancy. Some suggestion it should be avoided with prostate gland diseases [3011].

kcakta Edible Parts: Oil SeedEdible Uses: OilCarbon Farming Solutions - Staple Crop: oil (The term staple crop typically refers to a food that is eaten routinely and accounts

for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta Fibre OilCarbon Farming Solutions - Industrial Crop: fiber (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1].

dwatta Analgesic Antiinflammatory Antitussive Cancer Cardiotonic Demulcent Emollient Expectorant Laxative Nervine Pectoral Resolvent UrinaryLinseed has a long history of medicinal use, its main effects being as a laxative and expectorant that soothes irritated tissues, controls coughing and relieves pain[238]. The seed, or the oil from the seed are normally used[238]. The seed is analgesic, demulcent, emollient, laxative, pectoral and resolvent[4, 9, 21, 46, 165, 218, 240]. The crushed seed makes a very useful poultice in the treatment of ulceration, abscesses and deep-seated inflammations[4, 244]. An infusion of the seed contains a good deal of mucilage and is a valuable domestic remedy for coughs, colds and inflammation of the urinary organs[4]. If the seed is bruised and then eaten straight away, it will swell considerably in the digestive tract and stimulate peristalsis[9] and so is used in the treatment of chronic constipation[238]. The oil in the seed contains 4% L-glutamic acid, which is used to treat mental deficiencies in adults[218]. It also has soothing and lubricating properties, and is used in medicines to soothe tonsillitis, sore throats, coughs, colds, constipation, gravel and stones[4, 244]. When mixed with an equal quantity of lime water it is used to treat burns and scalds 2441. The bark and the leaves are used in the treatment of gonorrhoea[240]. The flowers are cardiotonic and nervine[240]. The plant has a long history of folk use in the treatment of cancer[218]. It has been found to contain various anticancer agents[218]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Linum usitatissimum for constipation, inflammation of the skin (see [302] for critics of commission E)

nrakta Origin: Hypothetical. ksacta Native to temperate and subtropical regions of the world.

propta See individual species.

nwatta Industrial Crop: Fiber Management: Hand Standard Staple Crop: Oil Under DevelopmentClimate: boreal to warm temperate. Humidity semi-arid to humid. Carbon Farming Solutions - Cultivation: under development? Management: standard, hay (Describes the non-destructive management systems that are used in cultivation) [1-1].

# 8.2.48 Oxalis deppei

ron Cross Plant

7 tlin 10 cyuc 4 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Oxalis deppei is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from June to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and flowers -raw or cooked[2, 37, 183]. A delicious lemony flavour, the leaves are tender and fairly free of fibres even when they get older[K]. Both the leaves and the flowers make a very refreshing and thirst-quenching munch in the garden, they also make an excellent flavouring in salads[K]. The leaves are available from June to October and the flowers from July to October, or even later in mild autumns[K]. Use in moderation, see notes at top of sheet. Root - raw or cooked[1, 2, 27, 37, 183]. The roots are up to 10cm long and

large enough to handle, prick them out into individual pots and grow them on in a sunny position in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in individual pots in a frame[78]. Overwinter in a greenhouse for the first winter and plant out in their permanent positions in late spring or early summer. Fair percentage[78].

nwatta Prefers a sandy loam and a very sunny position.[1, 182] Succeeds in any good garden soil that is not excessively limey[11]. This species is fairly lime-tolerant[11, 200]. Plants are very tolerant of drought[260], they succeed in a hot dry position[166] and in poor soils[184]. A fairly wind resistant tree, growing well in maritime areas[49, 166, 182]. Tolerates some salt in the soil[200]. Hardy to about -10°c for short periods[200], it can be grown outdoors in many of the milder areas of the country though, even in Cornwall, it is liable to be cut back to the ground in excessively cold winters[11]. It can resprout from the base[11]. This species is closely related to A. longifolia, but is considered to be hardier and is possibly the hardiest of all the Acacias in Britain[11] Dislikes root disturbance[78]. A very ornamental plant[1]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 8.1.24 Coriaria ruscifolia

tfo2n 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Coriaria ruscifolia is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant, except the 'fruit' (actually the petals) are highly poisonous[61, 153, 173].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or used as a beverage[11, 46, 61, 105, 153]. The pressed fruit yields a very palatable juice, which is drunk raw or fermented into wine[2]. Use with great caution since most parts of the plant, including the seed[173], are very toxic and some reports suggest the fruit should not be used at all[11].

tcanta DyeA black ink is obtained from the leaves, it can also be used as a dye[46, 139, 153]. The bark can also be used, it is rich in tannin.

nrakta Southern S. America, ksacta Not known

propta Seed - sow February/March in a greenhouse[78]. The seed usually germinates in 1 - 3 months at 15°c[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7cm with a heel, luly/August in a frame. Fair percentage[78].

nwatta Prefers a fairly good loamy soil in a sunny sheltered position[11, 164, 200. Succeeds in light shade[200]. This species is not very hardy in Britain, it tolerates temperatures down to about -5°c and succeeds outdoors from Sussex and westwards[200]. There is some confusion over the name of this species, some botanists unite this species with the New Zealand C. sarmentosa whilst others maintain that they are distinct[11, 200]. The roots of plants in this genus bear nitrogen-fixing nodules[218]. Whilst much of the nitrogen will be utilized by the growing plant, some of it will become available for other plants growing nearby[K].

### 8.1.25 Coriaria terminalis

tfo2n 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Coriaria terminalis is a deciduous Shrub growing to  $1.2~\mathrm{m}$  (4ft) by  $2~\mathrm{m}$  (6ft 7in). See above for USDA hardiness, It is hardy to UK zone 8. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed may be poisonous[1]. Although we have no more information, it is reasonable to assume that other parts of the plant are also toxic.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or used as a beverage[1, 11, 105]. The seed must not be eaten. Use with great caution since most parts of the plant, including the seed, are probably toxic and some reports suggest the fruit should not be used at all. The fruit is about 8mm in diameter[2001.

nrakta E. Asia - Sikkim, Tibet, China. ksacta Thickets and woodland margins, 2000 - 2600 metres in W. China[109]. propta Seed - sow February/March in a greenhouse[78]. The seed usually germinates in 1 - 3 months at 15°c[164].

When they are large enough to handle, prick the seedings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7cm with a heel, July/August in a frame. Fair percentage[78]. Division in the spring.

nwatta Succeeds in any good soil[233], though it prefers a fairly good loamy soil in full sun or light shade[11, 164, 200]. Requires a sunny sheltered position[164, 233]. This species is one of the hardiest members of the genus, tolerating temperatures down to at least -5°c if sheltered from cold winds[200]. Plants are hardy from Sussex westwards[1]. It is hardy at Kew where it fruits annually and resprouts from the base if cut back in severe winters[11, 200]. Plants flower and fruit at the tips of the current years growth and so can produce fruit even if they have been cut to the ground[182, K]. They can fruit well even when young, plants growing with us flowered and fruited in their third year from seed[K]. When well sited, suckers can be produced at some distance from the parent plant[233, K]. The roots of plants in this genus bear nitrogen-fixing nodules[218]. Whilst much of the nitrogen will be utilized by the growing plant, some of it will become available for other plants growing nearby[K].

#### 8.1.26 Coriaria sarmentosa

Гuhu

tfo2n 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Coriaria sarmentosa is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant, except the 'fruit' (actually the petals) are highly poisonous[61, 153, 173].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or used as a beverage[11, 46, 61, 105, 153]. The pressed fruit is drunk raw or fermented into a wine[2]. Use with great caution since most parts of the plant, including the seed[173], are very toxic and some reports suggest the fruit should not be used at all[11].

tcanta DyeA black ink is obtained from the leaves, it can also be used as a dye[46, 139, 153]. The bark can also be used, it is rich in tannin.

nrakta New Zealand. ksacta Open places, especially on debris slopes, from the coast to the upper montane areas on North, South and Stewart Islands[44].

propta Seed - sow February/March in a greenhouse[78]. The seed usually germinates in 1 - 3 months at 15°c[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse

for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7cm with a heel, July/August in a frame. Fair percentage[78].

nwatta Prefers a fairly good loamy soil in a sunny sheltered position[11, 164, 200. Succeeds in light shade[200]. This species is not very hardy in Britain, it tolerates temperatures down to about -5°c and succeeds outdoors from Sussex and westwards[200]. There is some confusion over the name of this species, some botanists unite this species with the S. American C. ruscifolia whilst others maintain that they are distinct[11, 200]. The roots of plants in this genus bear nitrogen-fixing nodules[218]. Whilst much of the nitrogen will be utilized by the growing plant, some of it will become available for other plants growing nearby[K].

# 8.1.27 Acacia saligna

Blue-Leaved Wattle, Orange wattle tfo2n 7 tlin 10 cyuc 1 kcak 5 tcan 0 dwat 6 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Acacia saligna is an evergreen Shrub growing to 6 m (19ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from February to May. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: FlowersEdible Uses: GumFlowers - cooked[144]. Rich in pollen, they are often used in fritters. The damaged bark exudes copious amounts of a very acidic gum that seems to show promise for use in pickles and other acidic foodstuffs[269].

tcanta Fodder Fuel Gum Hedge Hedge Soil stabilization TanninA yellow dye is obtained from the flowers[168]. A green dye is obtained from the seed pods[168]. On a 10% moisture basis, the bark contains 21.5% tannin[223]. A fast growing plant, it is used for reclaiming eroded hillsides and wastelands and for stabilizing drift sands as well as for fuel. This is one of the best woody species for binding moving sand. It is useful for windbreaks, amenity plantings, beautification projects, and roadside stabilization in semiarid regions[269]. Plants are heavily armed with thorns and make a good screen or hedge in warm temperate areas[200].

nrakta Australia - W. Australia . ksacta Sandy, coastal plains, but also in swampy sites and riverbanks to small, rocky hills (often granitic), on poor acid or calcareous sands, under the most dry and adverse soil conditions[269].

propta Seed best sown as soon as it is ripe in a sunny position in a warm greenhouse[1]. Stored seed should be scarified, pre-soaked for 12 hours in warm water and then sown in a warm greenhouse in March. The seed germinates in 3 - 4 weeks at 25°c[133]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in a sunny position in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in individual pots in a frame[78]. Overwinter in a greenhouse for the first winter and plant out in their permanent positions in late spring or early summer. Fair percentage[78].

nwatta Agroforestry Services: Nitrogen Agroforestry Services: Windbreak Fodder: Bank Fodder: Pod Industrial Crop: Biomass Industrial Crop: Gum Industrial Crop: Tannin Management: Coppice Management: Standard Minor Global CropPrefers a sandy loam and a very sunny position[1, 260], though it also succeeds in dry soils and is tolerant of wet conditions[260]. Succeeds in any good garden soil that is not excessively limey[11, 260]. Most species become chlorotic on limey soils[200]. Tolerates salt-laden winds and maritime exposure[200]. An extremely rugged tree, it grows rapidly, is adaptable to barren slopes, derelict land, and exceptionally arid conditions[269]. Reported from the Australian Centre of Diversity, orange wattle, or cvs thereof, is

reported to tolerate alkalinity, drought, heavy soil, poor soil, salinity, salt spray, sand, shade, slope, waterlogging, and weeds[269]. Trees are not very hardy outdoors in Britain, they tolerate occasional temperatures down to between -5 and -10°c, but even in the mildest areas of the country they are likely to be killed in excessively harsh winters[11]. Plants spread by means of suckers[200] and trees that have been killed in cold weather can sometimes regrow from the roots. Regrowth of established bushes is so good that Acacia saligna can be completely grazed off without harming the plants[269]. Because of its hardiness and profuse reproductive abilities. Acacia saligna has become a serious menace in parts of South Africa by invading and displacing indigenous vegetation[269]. It infests water courses (sometimes decreasing the water available for irrigation), and has proved difficult to eradicate[269]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. It also has a symbiotic relationship with ants[200].

# 8.1.28 Acacia verticillata

Prickly Moses

tfo2n 7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Acacia verticillata is an evergeen Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from February to May. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FlowersEdible Uses: Flowers - cooked[144]. Rich in pollen, they are often used in fritters.

tcanta Hedge HedgeA yellow dye is obtained from the flowers[168]. A green dye is obtained from the seed pods[168]. Plants are heavily armed with thorns and make a good screen or hedge in warm temperate areas[200].

nrakta Australia - New South Wales, Tasmania. ksacta Widespread in saline and submontane tracts[286].

propta Seed - best sown as soon as it is ripe in a sunny position in a warm greenhouse[1]. Stored seed should be scarified, pre-soaked for 12 hours in warm water and then sown in a warm greenhouse in March. The seed germinates in 3 - 4 weeks at 25°c[133]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in a sunny position in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in individual pots in a frame[78]. Overwinter in a greenhouse for the first winter and plant out in their permanent positions in late spring or early summer. Fair percentage[78].

nwatta Prefers a sandy loam and a very sunny position[1]. Another report says that it needs some shade[260]. Succeeds in dry soils. Succeeds in any good garden soil that is not excessively limey[11]. Most members of this genus become chlorotic on limey soils[200]. Trees are not very hardy outdoors in Britain, they tolerate occasional temperatures down to between -5 and -10°c, but even in the mildest areas of the country they are likely to be killed in excessively harsh winters[11]. A tree in Cornwall reached a height and width of 6 metres[11]. A fast-growing tree, frequently flowering in a few years from seed[200]. This species is notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

dwatta Antibacterial Antifungal Antipyretic Aromatic Cancer Carminative Diaphoretic Febrifuge Refrigerant StomachicKorean mint is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. Considered to be a "warming" herb, it is used in situations where there is "dampness" within the digestive system, resulting in poor digestion and reduced vitality[254]. The leaves and stems are antibacterial, antifungal, aromatic, carminative, diaphoretic, febrifuge and stomachic[147, 176, 218, 238, 2791. They are used internally to improve the appetite and strengthen the digestive system[238], they relieve symptoms such as abdominal bloating, indigestion, nausea and vomiting[254]. They are also used to treat morning sickness[254]. The leaves are also used in the treatment of chest congestion, diarrhoea and headaches[218]. An infusion of the leaves is used in the treatment of angina pains[222]. The plant is used as a folk remedy for cancer, extracts of the plant have shown anticancer activity[218].

nrakta E. Asia - China, Japan, Korea, Siberia ksacta Grassy places in mountains, especially by streams, and in valleys all over Japan[58]. Sunny, more or less stony meadows from the lowlands to elevations of 1500 metres

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed usually germinates in 1 · 3 months at 13°c(133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant out in late spring or early summer[K]. Division in spring. Fairly simple, if large divisions are used it is possible to plant them straight out into their permanent positions. Basal cuttings of young shoots in spring[111]. Harvest the young shoots when they are about 10 · 15cm tall and pot them up in a lightly shaded position in a greenhouse. They should root within 3 weeks and can be planted out in the summer or following spring.

nwatta Prefers a sunny sheltered position and a well-drained soil[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The flowers are very attractive to bees[244].

### 8.2.45 Canna indica

Indian Shot

7 tlin 10 cyuc 4 kcak 3 tcan 2 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Canna indica is a PERENNIAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from August to October, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Fruit RootEdible Uses: Root -cooked. The source of 'canna starrch', used as an arrowroot[97, 177]. The arrowroot is obtained by rasping the root to a pulp, then washing and straining to get rid of the fibres[2]. The very young tubers are eaten cooked, they are sweet but fibrousy[97, K]. Roots contain about 25% starch[61]. There is one report that this plant has an edible fruit[177] but this is somewhat dubious, the fruit is a dry capsule containing the very hard seeds[K].

tcanta Dye Fibre Insecticide PaperThe plant yields a fibre - from the stem? - it is a jute substitute[114]. A fibre obtained from the leaves is used for making paper[189]. The leaves are harvested in late summer after the plant has flowered, they are scraped to remove the outer skin and are then soaked in water for 2 hours prior to cooking. The fibres are cooked for 24 hours with lye and then beaten in a blender. They make a light tan brown paper[189]. A purple dye is obtained from the seed[114]. Smoke from the burning leaves is said to be insecticidal[218].

dwatta Demulcent Diaphoretic Diuretic VD Women's complaintsThe plant is used in the treatment of women's complaints[218]. A decoction of the root with fermented rice is used in the treatment of gonorrhoea and amenorrhoea[218]. The plant is also considered to be demulcent, diaphoretic and diuretic[218].

nrakta S. America. W. Indies. Locally naturalized in the warmest parts of S. Europe[50]. ksacta Original habitat is obscure, but it is found by the coast and in temperate valleys of the Andes[97].

propta Seed - pre-soak for 24 hours in warm water and sow February/March in a warm greenhouse at  $20^{\circ}$ c[1, 138]. Plant the seeds  $2 \cdot 5$ cm deep in individual pots[1]. Scarifying the seed can speed germination, especially if the seed has not swollen after being soaked[124, K]. The seed usually germinates in  $3 \cdot 9$  weeks[138]. Grow the plants on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of the root clump as the plant comes into growth in the spring. Each portion must have at least one growing point. Pot up the divisions and grow them on in the greenhouse until they are well established and then plant them out in the summer. Root cuttings.

nwatta Requires a deep rich well-drained soil in a sunny position[200]. The plant has large leaves and dislikes windy conditions since this can tear the leaves to shreds[200]. This species is probably hardy in the mildest areas of Britain but even then it should be given a good mulch if left in the ground overwinter[1, 200]. Plants have survived temperatures down to about -5°c overwinter with us[K]. This species is often grown as a summer bedding plant in Britain, especially in sub-tropical bedding schemes. In colder areas of the country the tubers can be harvested in late autumn after the top growth has been killed back by frost and stored over winter. They should be kept in a cool but frost-free place covered in moist soil or leaves[1]. Plants are cultivated for their edible root in the Tropics. Slugs love the young growth in spring and can cause serious damage to plants[233].

### 8.2.46 Ipomoea aquatica

Kangkong, Swamp Morning Glory 7 tlin 12 cyuc 4 kcak 0 tcan 2 dwat 0.5 m hkuc htut cyutli tcuphja7nhs6s hwicli hrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli fyif hjonli

drutta Ipomoea aquatica is an evergreen Annual/Perennial growing to 0.5 m (1ft 8in) by 0.3 m (1ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. The flowers are pollinated by Bees, Butterflies. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water

pcista Accumulation of heavy metals in the plant has been reported in Asia, mainly because the plants are often grown in polluted water[299 ].

kcakta Edible Parts: Leaves Root ShootsEdible Uses: Leaves and young shoots - raw or cooked[296], 298]. The tasty leaves are produced all year round[296]. The youngest shoot tips can be added to salads, older leaves are cooked and make a mild-flavoured spinach[298]. The leaves can be stir-fried, steamed, boiled for a few minutes or lightly fried in oil and eaten in various dishes. They are often mixed with hot peppers and garlic and prepared with a savoury dish[296]. Very nutritious, the leaves are a good source of protein as well as providing good quantities of vitamin A, iron, calcium and phosphorus[298]. Roots - occasionally cooked and eaten[29]. 301].

dwatta Antidote Antihaemorrhoidal Antitussive Febrifuge Hypoglycaemic Laxative Laxative Poultice Skin TonicThe young shoots are mildly laxative and are used by diabetic patients[272]. A decoction of the leaves is used to treat coughs[272]. The fried leaves are eaten to cool down a fever[310]. The crushed leaves are applied as a poultice on sores and boils[310, 348]. A paste made from the buds is used to treat ringworm[272, 299]. The roots are laxative, tonic and antidote[310]. They are used in the treatment of opium or arsenic poisoning, and also to counter the effects of drinking unhealthy water[310]. A decoction of the roots is used as a wash against haemorrhoids[310, 348]. The plant has shown oral hypoglycaemic activity in tests with diabetic humans; it was shown that an aqueous leaf extract can be as effective as tolbutamide in reducing blood glucose levels[299].

drutta Polymnia edulis is a PERENNIAL growing to 1 m trees[K]. (3ft 3in) by 0.6 m (2ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Leaves RootEdible Uses: Drink SweetenerRoot - raw or cooked[1, 22, 46, 61]. When first harvested, the root can taste somewhat starchy[K], but it soon becomes sweet, crisp and juicy and is delicious eaten raw[196, K]. The flavour is further improved by exposure to the sun although some of the crispness will be lost[97, 183. K1. The root can be eaten like a fruit or diced and added to salads[183]. The skin has a somewhat resinous taste so it is usually removed[196]. The cooked root retains is sweetness and crispness[196]. Individual roots can weigh up to 500g[196]. The nutritional value is low because the root contains a high quantity of inulin, a carbohydrate that the human body cannot utilize[196]. The grated pulp of the root is squeezed through a cloth to yield a sweet refreshing drink[183]. This juice can be concentrated to form dark brown blocks of sugar called 'chancaca' in S. America[183, 196]. Leaves and stems - cooked as a vegetable[183, 196]. They contain 11 - 17% protein, dry weight[196].

nrakta S. America - Colombia, Ecuador, Peru in the Andes. ksacta Not known

propta Seed - sow mid winter in a warm greenhouse and only just cover the seed[1]. Prick out the seedlings into individual pots as soon as they are large enough to handle and plant them out after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away well. Plants do not usually produce flowers in Britain and therefore seed has to be obtained from other countries[K]. Division in autumn. The plant forms 2 distinct types of tuber. Large tubers, usually on thin roots 2 - 5cm long, are used as storage organs and do not have the capacity to form new shoots. These are the tubers that are usually eaten. Smaller tubers are formed in a cluster around the stem. These form the shoots for the following year's growth and so are the ones that should be stored. Dig up the plants in the autumn once the top growth has been cut down by frost. Remove the large tubers for food, cut the main stems back to about 10cm long and store these stems with their cluster of small tubers in a cool frost-free place. Do not let them dry out. Pot them up in early spring in a greenhouse. When they come into active growth divide each cluster into individual shoots with their tubers attached and repot these. Plant them out in late spring after the last expected frosts[K]. Cuttings of basal shoots in early spring in a warm greenhouse[1]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta For best results, this plant requires a warm position in a deep rich soil[1], though it survives even when growing in poor soils[196]. Plants are fast-growing[196]. In S. America, they succeed in areas with annual rainfall varying from 900 - 3500mm[196], though are likely to succeed with less rain in temperate zones. The yacon is cultivated for its edible tuber in the Andes, and is sometimes used in sub-tropical summer bedding schemes in Britain, though it is not very hardy[1]. The top growth is killed back by frost but the tubers can tolerate at least light frosts[196]. Plants are unaffected by day-length and so can produce good yields of roots in temperate zones[196]. One report says that plants take 6 - 7 months to produce a crop from planting out[196], though on our Cornwall trial ground they have cropped guite well with a 5 month growing period[K]. The roots are brittle and must be harvested with care to avoid damage[196]. Yields of 38 tonnes per hectare have been recorded in South America[196], whilst yields of over 2 kilos per plant have been achieved outdoors in Cornwall[K]. The harvested roots can be stored for several months[196]. Plants have not been selected for flavour or yield, some roots can be exceedingly sweet whilst others are fairly bland[196]. Plants might be useful in agroforestry because they succeed under trees[196], though in the relatively sunless climes of Britain the plants are not likely to do well in the shade of

## 8.2.43 Physalis ixocarpa

7 tlin 10 cyuc 4 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Physalis ixocarpa is a ANNUAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to September. and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista All parts of the plant, except the fruit, are poisonous[19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 38, 61]. The fruit is a berry that is 2.5cm or more in diameter[200]. When not fully ripe, the fruit can be cooked and used in curries, sauces, soups, stews etc[183]. A delicious flavouring when used like a tomato and added to soups, stews etc[K]. The fully ripe fruit is sweeter and can be eaten out of hand, added to salads or used in pies, preserves etc[183]. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten. The fruit can be stored for up to a year if picked before they are fully ripe and left inside their calyx.

nrakta Southern and Central N. America as far north as southern Quebec. ksacta Waste places[43].

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away well. Diurnal temperature fluctuations assist germination[170].

nwatta Succeeds in any well-drained soil in full sun or light shade[200]. Prefers a rich light soil[33, 38]. Tolerates hot dry weather[160]. One report suggests that the plant is a perennial but, if this is true, it is not winter hardy in Britain though it can be cultivated as an annual for its edible fruit in much the same way that tomatoes are grown[34]. There are some named varieties[183]. Some botanists unite this species with P. philadelphica[50], saying that it arose from P. philadelphica through cultivation. A slow growing plant[160]. Insect resistant[160].

## 8.2.44 Agastache rugosa

7 tlin 10 cyuc 4 kcak 2 tcan 3 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Agastache rugosa is a PERENNIAL growing to 1 m (3ft 3in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from July to September, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Condiment TeaYoung leaves - raw or cooked[177]. A strong aniselike fragrance, they are normally used as a flavouring[183] or as an addition to the salad bowl[238]. We find them a bit coarse and too strong for use as a salad[K]. The leaves can be used as a tea substitute[183]. A pleasant flavour[238]. The seed is possibly edible[177]. No further details. The seed certainly should not be poisonous, but it is very small and its use would be very fiddly[K].

tcanta Attracts wildlife. The flowers are very attractive to bees[244].

# 8.1.29 Acacia paradoxa

Kangaroo Thorn, Paradox acacia tfo2n 7 tlin 10 cvuc 1 kcak 2 tcan 0 dwat 5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Acacia paradoxa is an evergreen Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from February to May. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: FlowersEdible Uses: Flowers cooked[144]. Rich in pollen, they are often used in fritters.

tcanta Hedge HedgeA vellow dve is obtained from the flowers[168]. A green dye is obtained from the seed pods[168]. Plants are heavily armed with thorns and make a good screen or hedge in warm temperate areas[200].

nrakta Australia - New South Wales, Victoria. ksacta Grows in dry sclerophyl forests[265].

propta Seed - best sown as soon as it is ripe in a sunny position in a warm greenhouse[1]. Stored seed should be scarified, pre-soaked for 12 hours in warm water and then sown in a warm greenhouse in March. The seed germinates in 3 - 4 weeks at 25°c[133]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in a sunny position in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in individual pots in a frame[78]. Overwinter in a greenhouse for the first winter and plant out in their permanent positions in late spring or early summer. Fair percentage[78].

nwatta A very tough plant that stands both wet and drought well, it is lime-tolerant and also withstands saltladen winds[260]. Prefers a sandy loam and a very sunny position[1]. Succeeds in dry soils. Succeeds in any good garden soil that is not excessively limey[11]. Most members of this genus become chlorotic when grown on limey soils [200]. Trees are not very hardy outdoors in Britain, they tolerate occasional temperatures down to between -5 and -10°c, but even in the mildest areas of the country they are likely to be killed in excessively harsh winters[11]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 8.1.30 Acacia podalyriifolia

Queensland Silver Wattle, Pearl wattle tfo2n 7 tlin 10 cvuc 1 kcak 3 tcan 0 dwat 3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Acacia podalyriifolia is an evergreen Tree growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from January to May. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers cooked[144]. Rich in pollen, they are often used in fritters[183]. The flowers have a delicate sweet perfume[245].

tcanta Dye Soil stabilizationA yellow dye is obtained from the flowers[168]. A green dye is obtained from the seed pods[168]. When planted on steep slopes or other fragile soil systems, the extensive root system of this plant binds the soil together and helps to prevent erosion[200].

nrakta Australia - New South Wales, Oueensland, ksacta In the N of its range it is more or less restricted to sandstone hills in open Eucalyptus forest, but in the south it occurs on rocks of various types[286].

propta Seed - best sown as soon as it is ripe in a sunny position in a warm greenhouse[1]. Stored seed should be scarified, pre-soaked for 12 hours in warm water and then sown in a warm greenhouse in March. The seed germinates in 3 - 4 weeks at 25°c[133]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in a sunny position in the greenhouse for their first winter. Plant them out in late spring or early summer, after the last expected frosts, and consider giving them some protection from the cold for their first winter outdoors. Cuttings of half-ripe wood with a heel, July/August in individual pots in a frame[78]. Overwinter in a greenhouse for the first winter and plant out in their permanent positions in late spring or early summer. Fair percentage[78].

nwatta Prefers a sandy loam and a very sunny position[1]. Succeeds in any good garden soil that is not excessively limey[11, 167]. Many members of this genus become chlorotic on limey soils[200]. Can succeed in a hot dry position in a mixed border[166]. Plants are not very cold-hardy. tolerating temperatures down to about -3°c[260]. They succeed outdoors in the mildest areas of Britain, though even there they can be cut back to the ground in severe winters[1, 11]. A very ornamental tree[1], it can be pruned back hard after flowering in order to induce good flowering the following year[260]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 8.1.31 Wisteria iaponica

tfo2n 7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hna7tmwatli xre7t hionli

drutta Wisteria japonica is a deciduous Climber. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista The seed of all members of this genus is poisonous[200].

kcakta Edible Parts: Leaves SeedEdible Uses: Seed cooked[105]. A famine food, used when all else fails[177]. Some caution is advised, see the notes on toxicity at the top of the page. Young leaves - cooked[105]. A famine food, they are only used when all else fails[177].

nrakta E. Asia - Japan, Korea. ksacta Clambering over cliffs and trees on woodland edges and in thickets in lowland, C. and S. Japan.

propta The seed does not exhibit any dormancy habits. It can be sown as soon as it is ripe in a cold frame and should germinate in the spring. Pre-soak stored seed for 24 hours in warm water and then sow in a greenhouse in early spring. The seed can also be sown in an outdoor seedbed in late spring[126]. Germination should take place in the first spring, though it can sometimes be delayed for another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in late spring or early summer. Plants are very slow from seed and can take up to 20 years to come into flower[200]. Basal cuttings of side-shoots in early to mid summer in a frame[200]. Take the cuttings as soon as the new growth has hardened sufficiently, each cutting should have 2 - 3 leaves[249]. It can also help to remove a shallow slice of bark from the bottom 15mm of the cutting to expose extra cambium, since this will encourage more callusing and better rooting[249]. When kept in a mist frame with a bottom heat of 27 - 30°c, they will root within 4 weeks and produce well-established plants by the autumn[249]. Layering in spring. Simply lay any convenient long shoot along the ground and cover it with a shallow layer of soil. The shoot will readily produce roots at intervals along the stem. When these are well formed, the shoot can be divided up into a number of plants. These should be potted up and kept in a lightly shaded position in a greenhouse until well established and can then be planted out as required.

nwatta Prefers a good loamy soil in a sunny south or south-west facing position, sheltered from cold winds and from early morning sun on frosty mornings[11, 200]. Plants can become chlorotic on alkaline soils[200]. A soil that is too rich results in excessive foliage at the expense of flowering[200]. This species is not hardy in the colder areas of the country[200]. There is some confusion over the correct name of this species, many authorities referring it to a separate genus as Millettia japonica (Sieb. and Zucc.)A.Grav.[249]. Plants can take a few years to settle down after planting out[219]. Too much shade or too rich a soil are normally the culprits, some form of root restriction can be beneficial[219]. A climbing plant, attaching itself to branches or whatever by twining in a clockwise direction[249]. Plants in this genus are notably susceptible to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. The plants also form a symbiotic relationship with a mycorrhizal fungus which makes more water, phosphorus and other minerals available to the plants[249].

## 8.1.32 Sophora mollis

tfo2n 7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sophora mollis is a deciduous Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The plant contains cytosine, which resembles nicotine and is similarly toxic[238].

kcakta Edible Parts: LeavesEdible Uses: One report says that the plant has edible qualities but does not say what part of the plant is eaten[145].

tcanta Miscellany WoodThe seed is considered useful for destroying vermin[240]. Wood - hard. Mainly used as a fuel[146, 158].

nrakta E. Asia - Himalayas. ksacta Rocks in dry valleys, 1200 - 2000 metres[184]. Often gregarious on hillsides[146].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Pre-soak stored seed for 12 hours in hot (not hotiling) water and sow in late winter in a greenhouse[78]. Prick out the seedlings as soon as they are large enough to handle into individual pots in the greenhouse, and grow them on for 2 years under protected conditions. Plant them out into their permanent positions in early summer of their third year. Cuttings of young shoots with a heel, July/August in a frame[11]. Air-layering[200].

nwatta Succeeds in a well-drained moderately fertile dry soil in full sun[184]. Requires a hot dry position, succeeding outdoors only in the warmer areas of the country[182] where its wood will be better ripened and more able to withstand winter cold[219]. Hardy to about -15°c[184]. Plants should be container-grown and planted out whilst young, older plants do not transplant well[219]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

### 8.1.33 Erythrina herbacea

Cardinal Spear, Redcardinal

tfo2n 7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Erythrina herbacea is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains alkaloids that have powerful narcotic and purgative effects[200]. The seeds contain numerous toxic alkaloids, including erysodine and erysopine. They have an action similar to curare and have been used as a rat poison[274].

kcakta Edible Parts: Flowers LeavesEdible Uses: Flowers - cooked. An acceptable vegetable when boiled[183]. Some caution is advised, see the notes above on toxicity. Young leaves - occasionally cooked and eaten[183].

dwatta Antiemetic Diuretic Narcotic Purgative TonicThe plant is narcotic and purgative[200]. A cold infusion of the root has been used to treat bowel pain in women[257]. A decoction of the roots or berries has been used to treat nausea, constipation and blocked urination[257]. A decoction of the 'beans' or inner bark has been used as a body rub and steam for numb, painful limbs and joints[257]. A decoction of the leaves has been used as a general tonic[257].

nrakta South-eastern N. America - North Carolina to Texas. ksacta Sandy soils in hummocks, the coastal plain and pinelands[229].

propta Seed - pre-soak for 12 hours in warm water and sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-righ wood, July/August in a frame[200]. Overwinter in a greenhouse and plant out in late spring or early summer. Heeled cuttings of young growth in the spring in a frame[200]. Overwinter in a greenhouse and plant out in late spring or early summer.

nwatta Requires a moderately fertile well-drained soil in a very sunny position[200]. Best if given the protection of an east, south or south-west facing wall[200]. Becoming a tree in the south of its range, this species is shrubby or even herbaceous towards the limits of its northerly range[229]. It is not very hardy outdoors in Britain though the rootstock can tolerate temperatures down to about -10°c provided the stem bases are thickly mulched with organic matter such as leaf litter or sawdust and covered with bracken[200]. Alternatively, the roots can be lifted in the autumn and stored in a cool frost-free place, replanting in the spring. Plants take 3 - 4 years to flower from seed[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [200].

# 8.1.34 Indigofera hebepetala

tfo2n 7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Indigofera hebepetala is a deciduous Shrub growing to 1.2 m (4th). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Flowers SeedpodEdible Uses: The flowers and tender fruits (probably the immature seed pods[K]) are coked as a vegetable or are pickled[272].

tcanta FuelUsed as a fuel[158].

nrakta E. Asia - N.W. Himalayas. ksacta Shady places, 2100 - 3000 metres in Jaunsar, Uttar Pradesh[158]. Open places at elevations of 1600 - 2800 metres in Nepal[272].

propta Pre-soak the seed for 12 hours in warm water and sow February in a warm greenhouse. The germination can be variable. Prick out the seedlings when large enough to handle and overwinter the young plants in a greenhouse for the first winter, planting out in late spring or early summer after the last expected frosts[78]. Cuttings of half-ripe wood, 5 - 8cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Overwinter the young plants in a greenhouse for the first winter and plant out in late spring or early summer[11]. Root cuttings 3cm long in December. Good percentage[78]. Suckers. Remove

well in exposed positions[49]. Plants growing in a very exposed position on our trial grounds in Cornwall are flowering and fruiting well, they are rather slow growing but are looking very happy and healthy[K]. A very ornamental plant, it is hardy to about -15°c[184]. A good bee plant[108]. Birds love this fruit and will happily eat it all before it is fully ripe[K]. If you want to experience the fully ripe fruit then it might be necessary to find ways of keep the birds off the plants[K]. Hybridizes freely with other members of this genus[1]. Plants can be pruned back quite severely, they resprout well from the base[200]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native.

# 8.2.40 Tropaeolum tuberosum

Δnii

7 tlin 10 cyuc 4 kcak 2 tcan 2 dwat 2 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Tropaeolum tuberosum is a PERENNIAL CLIMBER growing to 2 m (6ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from June to October, and the seeds ripen from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Tubers - cooked[1, 2]. A peppery flavour, it is rather unpleasant to many tastes[27, 34, 37]. The flavour can be improved somewhat by freezing the tubers after they have been cooked, they are then considered to be a delicacy by many people[183]. We have also noticed an improvement in the flavour if the tubers are harvested after they have been frosted, though if the frost is too heavy they can damage the tubers[K]. Other reports suggest half-drying the tubers before use[27, 34, 97, 183]. The tubers can be up to 10cm long and 5cm thick[260]. They are high in vitamin C[196]. The dried tuber contains up to 16% protein[196]. Leaves - raw or cooked as a vegetable[183, 196]. Flowers - raw[183, 196].

tcanta RepellentThe growing plant is very resistant to diseases and insects, it contains nematocidal, bactericidal and insecticidal compounds[196].

dwatta Anaphrodisiac Vitamin CThe tuber is considered to be an anaphrodisiac in the Andes, reducing sexual desire. Many men, therefore, refuse to eat it, whilst recommending it for use by women![196]. Clinical trials have indicated a reduction of up to 45% in some male hormones when the tuber forms a considerable part of the diet, but no loss in fertility has been observed[196].

nrakta S. America - Peru, Bolivia. ksacta Mountain slopes and valleys[90]. Moist wooded scrubby areas around 3000 metres in Peru and Ecuador[196].

propta Seed - sow early spring in a greenhouse. Prick the seedlings out into individual pots once they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer, after the last expected frosts. So far we have been unable to obtain seed from plants grown in this country. Division of the tubers in the autumn or spring. In cold winter areas the tubers can be harvested in the autumn after top-growth has died down and they can then be stored in a cool frost-free position until planting them out in the spring. Cuttings of basal stems in the spring[200]. Pot them up into individual pots and place them in light shade in a frame until they are established. Plant out in early summer.

nwatta Requires a well-drained lime-free soil in a warm sunny position[1, 33, 200]. Grows best with its roots in the shade and top growth in the sun[202]. Plants can become dormant in hot dry summers[90]. Grows best in a pH range from 5.3 to 7.5[196]. Prefers a turfy loam or a sandy peaty roil[1]. This species is not very hardy when grown outdoors in Britain. The top growth will survive light frosts, whilst the tubers, if well mulched, will survive to at least  $-5^{\circ}c[1, 200]$ . Anu is sensitive to the number of hours of daylight in a day and most forms will not flower or form new tubers until late in the season (from September), so a mild autumn is required for good yields[33]. The variety 'Ken Aslet', however, is not affected by daylight hours, it flowers from June to October and

produces larger tubers than the species from mid-summer onwards[90, 104, 200]. The tubers are formed very near the surface of the soil[90] and so will require some protection, such as a mulch, if they are to be left in the ground over the winter[K]. The tubers can also be stored in a cool dry frost-free place over the winter and then planted out in April[200]. Long cultivated in the Andes for its edible root, there are many named varieties[2, 61, 90, 104, 196]. A potentially very high-yielding species, individual plants can produce up to 4 kilos of tubers - yields of 50 tonnes per hectare are possible[196]. A climbing plant, it supports itself by twisting its leaf stalks around other plants etc[219]. The caterpillars of the cabbage white butterfly can be a nuisance and often cause considerable damage to the leaves[219].

# 8.2.41 Oryza hybrids

Perennial Rice

7 tlin 12 cvuc 4 kcak 2 tcan 2 dwat 2 m hkuc

htut cyutli tcuphja7nhs6s hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Oryza hybrids is a PERENNIAL growing to 2 m (6ft) by 0.3 m (1ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: SeedEdible Uses: Carbon Farming Solutions - Staple Crop: balanced carb (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Under development as new cereal, annual O. sativa crossed with its perennial ancestors, O. longistaminata and O. rufipogon.

tcanta The straw, which may attain considerable length if the plant has grown in flood water, is valued for thatching[299 , 332 ]. Because they are a source of resistance to or tolerance of biotic and abiotic stresses, the most important use of the various species of wild rice is probably in breeding programmes to improve the species of cultivated rice[1040  $\,$ 

dwatta UrinaryRice is a nutritive, soothing, tonic herb that is diuretic, reduces lactation, improves digestion and controls sweating[238 ]. The seeds are taken internally in the treatment of urinary dysfunction[238 ]. The seeds, or the germinated seeds, are taken to treat excessive lactation[238 ]. The grains desired in the seeds are used to treat poor appetite, indigestion abdominal discomfort and bloating[238 ]. The grains are often cooked with herbs to make a medicinal gruel[238 ]. The rhizome is taken internally in the treatment of night sweats, especially in cases of tuberculosis and chronic pneumonia[238 ]. The rhizomes are harvested at the end of the growing season and dried for use in decoctions[238 ].

nrakta Origin: hypothetical hybrid. ksacta Various depending on the species.

propta Seed. The seed of wild rice less than 12 months old often exhibits strong dormancy, which implies (though this has not been established) that the seed retains its viability for a considerable period[1040]. Heat treatment is generally effective in breaking dormancy - alternating temperatures between 34°c for 16 hours then 11°c for 8 hours is usually effective, though the time taken varies between species[1040]. Surface sow the seed in light shade and do not allow to dry out. Seed should germinate within 7 days at 30°c[1040]. Prick out 2 - 3 seedlings into individual pots when large enough to handle and, after a few days, move to a sunny position. Grow on until large enough to plant out. Division.

nwatta Staple Crop: Balanced carb Under DevelopmentClimate: cold temperate to tropical, tropical highlands. Humidity: humid, aquatic. Succeeds in full sun and in moderate shade[1040]. Requires a wet soil or shallow water[1040].

# 8.2.42 Polymnia edulis

Yacon Strawberry

7 tlin 10 cyuc 4 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

name. Any pruning is best carried out in the spring[219]. This species is notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

#### 8.2.38 Berberis asiatica

Chutro, Rasanjan (Nep); marpyashi (Newa); Daruharidra, Darbi (Sans)

7 tlin 10 cyuc 4 kcak 2 tcan 3 dwat 3.5 m hkuc pcimhmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis asiatica is an evergreen Shrub growing to 3.5 m (11ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Édible Parts: FruitEdible Uses: Fruit - raw or dried and used like raisins[2, 3, 51, 105, 158, 183]. This species is said to make the best Indian raisins[183]. Fully ripe fruits are fairly juicy with a pleasantly acid flavour, though there are rather a lot of seeds[K]. The fruit is abundantly produced in Britain[2]. The fruit is about 8mm long[200].

tcanta DyeA yellow dye is obtained from the roots and stems[272]. The spiny branches are used to make fencing around fields in Nepal[272].

dwatta Antibacterial Cancer Dysentery Laxative Odontalgic Ophthalmic TonicThe roots are used in treating ulcers. urethral discharges, ophthalmia, jaundice, fevers etc[240]. The roots contain 2.1% berbering, the stems 1.3%[240]. The bark and wood are crushed in Nepal then boiled in water, strained and the liquid evaporated until a viscous mass is obtained. This is antibacterial, laxative and tonic[272]. It is taken internally to treat fevers and is used externally to treat conjuctivitis and other inflammations of the eyes[272]. Tender leaf buds are chewed and held against affected teeth for 15 minutes to treat dental caries[272]. The fruit is cooling and laxative[272]. Berberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - Himalayas (Nepal) ksacta Shrubberies, grassy and rocky slopes up to 2500 metres[51]. Found in heavy shade, on north-facing slopes[67] and on open hillsides in the drier areas[146].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel. October/November in a frame[78]

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants are often found growing in dense shade in the wild[67]. Plants are generally very hardy and fruit abundantly in

Britain[2]. They grow very well in Cornwall[11, 59]. In colder areas of the country they are apt to be cut to the ground in severe winters, though they resprout well from the base[1, 67]. Hybridizes freely with other members of this genus[1]. This species is often offered under the names of B. chitria or B. glaucocarpa[200]. Plants can be pruned back quite severely, they resprout well from the base[200].

### 8.2.39 Berberis darwinii

Darwin's Barberry, Darwin's berberis 7 tlin 9 cyuc 4 kcak 3 tcan 2 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli frusflatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis darwini is an evergreen Shrub growing to 3 m (9ft) by 3.5 m (11ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Paris: FruitEdible Uses: Fruit - raw or cooked and used in preserves[2, 3, 105, 183]. An acid but very pleasant flavour, children seem particularly fond of the fruit[2, K]. When fully ripe, the fruit loses most of its acidity and makes very pleasant eating[K]. Unfortunately there is a lot of seed compared to the amount of flesh and this does detract somewhat from the pleasure of eating it[K]. The fruit goes very well raw in a muesli or cooked in a porridge[K]. The fruits are about 7mm long[200].

tcanta Dye Hedge HedgePlants are very amenable to trimming and can be used as a formal hedge. They also make a very good informal hedge, their long arching branches looking especially attractive when in flower or bearing fruit. The plants tolerate maritime exposure though they are slow growing[75]. A yellow dye is obtained from the root and bark[46, 61].

dwatta Antibacterial Cancer Dysentery Tonic Urinary-The root bark is tonic[46, 61]. Berberine, universally present in all parts of Berberis species but especially the rhizomes, has marked antibacterial effects, especially upon the urinary system. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta S. America - S. Argentina, S. Chile. ksacta Moist shady woodland in the Patagonian mountains [67].

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78].

nwatta Landscape Uses:Border, Erosion control, Pest tolerant, Hedge, Massing, Seashore. Prefers a warm moist loamy soil in full sun or light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds on chalky soils if other conditions are suitable but prefers an acid soil[184]. Dislikes exposure to strong winds according to one report[11], whilst others say that it is a very wind hardy plant, tolerating maritime exposure[49, 75, 200]. Does not flower

them in the dormant season, preferably towards the end of winter, and plant out into their permanent positions.

nwatta Requires a light or medium well-drained soil and a sunny position[11, 200]. Succeeds on chalk[11]. Except in warm sheltered gardens the plant is cut back to the ground by winter cold, though it usually resprouts from the base and flowers in late summer[182]. Plants grow much taller in milder climates where they do not get cut back by winter cold[1]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 8.1.35 Trifolium subterraneum

Subterranean Clover

tfo2n 7 tlin 10 cyuc 1 kcak 4 tcan 0 dwat 0.2 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trifolium subterraneum is a ANNUAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked.

tcanta Green manureThis plant can be grown as a ground cover green manure under tomatoes in the greenhouse. The seed should be sown before planting the tomatoes[87]. It can also be sown under soft fruit and cut once or twice in the summer[87]. Nitrogen Fixer.

nrakta Southern and western Europe, including Britain. ksacta Sandy and gravelly pastures, also on cliff tops, avoiding acid soils and shady positions[17].

propta Pre-soak the seed for 12 hours in warm water and then sow in spring in situ. If the seed is in short supply it might be better to sow it in pots in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in late spring.

nwatta Succeeds in a moist, well-drained circum-neutral soil in full sun[200]. Succeeds in poor soils. Plants are partially winter hardy[87]. After flowering, the fruiting head grows into the ground, thereby planting the seed. This species grows well in an apple orchard, the trees will produce tastier fruit that stores better[201]. It should not be grown with camellias or gooseberries, however, because it harbours a mite that can cause fruit drop in the gooseberries and premature budding in the camellias[201]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Buttercups growing nearby depress the growth of the nitrogen bacteria by means of a root exudate[201]. When removing plant remains at the end of the growing season, it is best to only remove the aerial parts of the plant, leaving the roots in the ground to decay and release their nitrogen.

### 8.1.36 Alnus nitida

tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 30 m hkuc hmimhtut cyutli kyuctcuphja7n hwicli hyisjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Alnus nitida is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. It can fix Nitrogen. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry moist or wet soil.

tcanta Dye WoodTannin is obtained from the bark, it is used in dyeing[146, 158, 272]. Wood - soft, even grained, hard to cut. Used for construction and furniture[146, 158, 272].

dwatta AstringentA decoction of the bark is applied externally to treat swellings and body pains[272].

nrakta E. Asia - Himalayas. ksacta By rivers and streams, 600 - 1200 metres, occasionally to 2700 metres[146].

propta Seed - best sown in a cold frame as soon as it is ripe and only just covered[200]. Spring sown seed should also germinate successfully so long as it is not covered[200, K]. The seed should germinate in the spring as the weather warms up. When large enough to handle, prick the seedlings out into individual pots. If growth is sufficient, it is possible to plant them out into their permanent positions in the summer, otherwise keep them in pots outdoors and plant them out in the spring. If you have sufficient quantity of seed, it can be sown thinly in an outdoor seed bed in the spring[78]. The seedlings can either be planted out into their permanent positions in the autumn/winter, or they can be allowed to grow on in the seed bed for a further season before planting them. Cuttings of mature wood, taken as soon as the leaves fall in autumn, outdoors in sandy soil.

nwatta Prefers a heavy soil and a damp situation[1, 11]. Grows well in heavy clay soils[11]. Tolerates drier soils than most members of this genus[200]. Succeeds in very infertile sites[200]. Trees probably tolerate temperatures down to between -5 and -10°c and so will not succeed outdoors in the colder areas of the country. A very ornamental tree[1]. This species has a symbiotic relationship with certain soil microorganisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 8.1.37 Alnus jorullensis

Mexican alder, Evergreen Alder tfo2n 7 tlin 12 cyuc 0 kcak 3 tcan 0 dwat 25 m hkuc hmimhtut cyutli tcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli hjonli

drutta Alnus jorullensis is an evergreen Tree growing to 25 m (82ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. The flowers are pollinated by Wind. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

tcanta Charcoal Fuel Hedge Soil conditioner Tannin WoodAgroforestry Uses: Alnus jorullensis is an early successional species that regenerates and colonizes on open disturbed ground where other forest types have been destroyed though natural processes, such as landslides, or as a result of anthropogenic activities. It is used extensively in reforestation on disturbed sites and is widely grown in plantations throughout MesoAmerica and South America as a timber and fuel wood species[338]. In agroforestry it is used in silvopastures to provide nitrogen for increasing forage availability and quality, to improve soil fertility, and it is grown in association with crops such as corn and beans, coffee and wild blackberries[338]. Other Uses: The wood and bark is rich in tannin, which is used to impart a red colour[331, 338 1. Woodland guides select this species for marking new trails through the mountain forests. The red marks of the bark cut by their machetes re as effective as red paint in marking the way[331]. The wood is rather light and soft but firm. straight-grained, rather fine-textured, easy to work, tough and strong, finishes smoothly, is not durable in contact with the ground[331]. It is used for the manufacture of boxes for transporting vegetables, shoe trees, matchsticks, post poles, broom handles, domestic implements, plywood cores and particle board. It is also locally harvested for firewood,

and charcoal production[338]. Used for ornamental planting in warm temperate areas such as southern California. Good for hedging and screening.

nrakta C. America - Honduras, Guatemala, Mexico ksate Moist soil habitats, such as stream and river banks, swamps and moist montane slopes, often in very dense stands, at moderate to high elevations[338].

propta Seed

nwatta Agroforestry Services: Crop shade Agroforestry Services: Nitrogen Management: Coppice Management: Standard Regional CropAlnus jorullensis is a plant of tropical montane forests, where temperatures are cool, with abundant rainfall. They are also found in high-elevation, open, oak-pine and fir woodlands in Mexico[338]. Grows best in a sunny position, but is somewhat shade tolerant[310 ]. Prefers a heavy soil and a damp situation, but it succeeds in ordinary garden soil[11]. Grows well in heavy clay soils[11] 1. Tolerates very infertile sites[200]. The tree responds well to coppicing[303]. This species has a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200 ]. Semideciduous in cool climates. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

### 8.1.38 Sophora tetraptera

Kowhai

tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 0 dwat 10 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sophora tetraptera is an evergreen Tree growing to 10 m (32ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The plant contains cytosine, which resembles nicotine and is similarly toxic[238].

tcanta WoodWood - compact, dense, heavy, of great strength, tough, elastic, extremely durable. Used for bearings, turnery, cabinet work, ornamental uses etc[46, 61, 139].

nrakta New Zealand and S. America - Chile. ksacta Streamsides, forest margins and lowland on North Island in New Zealand, from East Cape to latitude 40° 30's[44].

propta Seed - best sown as soon as it is ripe in a greenhouse[200]. Pre-soak stored seed for 12 hours in hot (not boiling) water and sow in late winter in a greenhouse[78]. Prick out the seedlings as soon as they are large enough to handle into individual pots in the greenhouse, and grow them on for 2 years under protected conditions. Plant them out into their permanent positions in early summer of their third year. Cuttings of young shoots with a heel, July/August in a frame[11]. Air-layering[200].

nwatta Succeeds in a well-drained moderately fertile soil in full sun[200]. Requires a warm sheltered position[202]. It grows best in the warmer areas of the country where the wood will be more readily ripened and better able to withstand winter cold[219]. Hardy to about -10°c[200], it succeeds in the open in southern and south-western Britain but is best grown against a wall elsewhere[11, 184]. Plants are of slow to moderate growth[202]. In good summers plants set abundant seed in this country[219]. Plants should be container-grown and planted out whilst young, older plants do not transplant well[219]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

## 8.1.39 Sophora secundiflora

Mescal Bean, Texas Mountain Laurel tfo2n 7 tlin 10 cyuc 0 kcak 3 tcan 1 dwat 10 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sophora secundiflora is an evergreen Tree growing to 10 m (32ft 10in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It brefers dry or moist soil.

pcista The plant, and especially the seeds, contains the poisonous alkaloid cytosine (or sophorin according to another report[82]), which resembles nicotine in its action and is similarly toxic[238].

tcanta Dye WoodLandscape Uses: Border, Espalier, Pest tolerant, Massing, Standard, Specimen, Street tree. A yellow dye is obtained from the wood[227]. Wood - very heavy, hard, close grained[82]. Of no commercial importance[227].

dwatta Hallucinogenic NarcoticHallucinogenic, narcotic[82, 161, 192]. An infusion of the seeds is used[192, 200], half a seed is enough to produce intoxication[192]. An infusion of the ground up seed has also been applied to ears in the treatment of earaches[213, 257]. The seeds contain the highly poisonous alkaloid cytosine (or sophorine) - this substance is related to nicotine and acts violently in the human system[213].

nrakta Southern N. America - Texas, New Mexico and Northern Mexico. ksacta Borders of streams, forming thickets or small groves in low rather moist limestone soils[82].

propta Šeed - best sown as soon as it is ripe in a greenhouse[200]. Pre-soak stored seed for 12 hours in hot (not boiling) water and sow in late winter in a greenhouse[78]. Prick out the seedlings as soon as they are large enough to handle into individual pots in the greenhouse, and grow them on for 2 years under protected conditions. Plant them out into their permanent positions in early summer of their third year. Cuttings of young shoots with a heel, July/August in a frame[11]. Air-layering[200].

nwatta Succeeds in a well-drained moderately fertile soil in full sun[200]. Succeeds in a hot dry position. Rather slowgrowing and difficult to transplant[227]. A very ornamental plant[274]. This species has not been tried outdoors in Britain, it is possibly hardy if grown in the sunniest mildest areas of the country, or against a sunny wall in less mild areas[11]. It grows best in the warmer areas of the country where the wood will be more readily ripened and better able to withstand winter cold[219]. Plants should be containergrown and planted out whilst young, older plants do not transplant well[219]. The flowers have a powerful and delicious fragrance[82, 200], though some people find them offensive[227]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200]. Special Features: North American native, Fragrant flowers, Attractive flowers

# 8.1.40 Millettia reticulata

Ji Xue Teng

tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 3 dwat 5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Millettia reticulata is a deciduous Climber growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August, and the seeds ripen from August to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers

dwatta Antispasmodic Aromatherapy Febrifuge Sedative StomachicAn undervalued medicinal herb, lemon verbena contains a strong lemon-scented essential oil that has calming and digestive qualities[254]. The plant has a gentle sedative action and a reputation for soothing abdominal discomfort. It has a mildly tonic effect upon the nervous system and helps to lift the spirits and counter depression[254]. The leaves and the flowering tops are antispasmodic, febrifuge, sedative and stomachic[4, 7, 238, 240]. A tea made from the leaves has a deliciously refreshing lemon flavour and is used mainly in treating digestive disorders[4] such as flatulence, indigestion and acidity[244]. Some caution is advisable though, since prolonged use or large internal doses can cause gastric irritation[268]. The herb is also useful as a stimulant for treating lethargy or depression[244] whilst it is also used to treat feverish colds[238]. The essential oil is used in aromatherapy in the treatment of nervous and digestive problems and also for acne, boils and cysts[238].

nrakta S. America - Argentina, Chile, Peru, Uruguay. Locally naturalized in the Mediterranean[50]. ksacta Fields and roadsides[238]. Open scrub[260].

propta Seed - we have no information for this species but suggest sowing the seed in a greenhouse in late spring. Only just cover the seed and keep in a light position, making sure the compost does not dry out. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out in early summer and give some protection from the cold for at least their first winter outdoors. Cuttings of softwood, May/June in a frame. Grow on for at least their first winter in a greenhouse and plant out in late spring after the last expected frosts[K]. The cuttings root quickly and easily, though there can be losses in the first winter[K]. Cuttings of half-ripe wood. August in a frame. Grow on for at least their first winter in a greenhouse and plant out in late spring after the last expected frosts[K]. The cuttings root quickly and easily, though there can be losses in the first winter[K].

nwatta Succeeds in most moderately fertile soils if they are well-drained[200]. Prefers a light soil[219]. Requires a sunny sheltered position[166, 200]. Requires a warm damp climate[7]. A very ornamental plant[1], lemon verbena is only hardy in the milder areas of Britain[1, 11, 14], growing well in Cornwall[59]. It can withstand about 10°c of frost[184] and survives outdoors on a wall at Kew[K]. It generally survives most winters outdoors if growing in a suitable position, though it is often cut back to ground level and then resprouts from the base in late spring[120] or early summer[238]. Giving the roots a good, thick organic mulch will confer extra protection from winter cold[244]. The plant succeeds outdoors at Howick, a garden on the coast of Northumberland. The leaves are very aromatic with a lemon scent[182], they are often used to make a drink or for their essential oils[4]. There has been considerable confusion over the naming of this species. We are following the treatment used in [11] and [200], which is also the current treatment in the 1999 edition of The Plant Finder. However, the book 'World Economic Plants' uses the name A. citrodora Palau (a different author to the one we cite) as the correct name. Any pruning is best carried out in the spring[219]. This species is notably resistant to honey fungus[200]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [2-1].

# 8.2.37 Aloysia citriodora

Lemon Verbena, Lemon beebrush 7 tlin 10 cyuc 4 kcak 3 tcan 3 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Aloysia citriodora is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf from May to November, in flower in August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable

pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The essential oil from the plant might sensitise the skin to sunlight[238]. Large doses of the tea can cause gastric irritation [301].

kcakta Edible Parts: LeavesEdible Uses: Leaves - occasionally cooked as a spinach[177] but more commonly used as a flavouring in salads, fruit salads etc[14, 21, 104, 183]. A delicious lemon-like flavour, it is adored by most people who try it[K]. A delicious and refreshing tea is made from the leaves[14, 21, 103, 183]. The dried leaves will retain their lemon aroma for many years[4].

tcanta An essential oil obtained from the leaves is extensively used in perfumery[7, 61]. An average yield of 0.5% is obtained[7]. There is some evidence that the use of this oil can sensitise the skin to sunlight and so its use has been largely replaced by the tropical plant lemongrass, Cymbogon spp\_[238]. The dried leaves retain their fragrance well and so are used in pot-pourri[238]. The growing plant repels midges, flies and other insects[201]. The essential oil is an effective insecticide in 1 - 2% concentration[240]. Landscape: Flower borders and beds Wall-side Borders City and Courtyard Gardens Cottage and Informal Garden Mediterranean Climate Plants.

dwatta An undervalued medicinal herb, lemon verbena contains a strong lemon-scented essential oil that has calming and digestive qualities [254]. The plant has a gentle sedative action and a reputation for soothing abdominal discomfort. It has a mildly tonic effect upon the nervous system and helps to lift the spirits and counter depression[254]. The leaves and the flowering tops are antispasmodic, febrifuge, sedative and stomachic[4, 7, 238, 240]. A tea made from the leaves has a deliciously refreshing lemon flavour and is used mainly in treating digestive disorders[4] such as flatulence, indigestion and acidity[244]. Some caution is advisable though, since prolonged use or large internal doses can cause gastric irritation[268]. The herb is also useful as a stimulant for treating lethargy or depression[244] whilst it is also used to treat feverish colds[238]. The essential oil is used in aromatherapy in the treatment of nervous and digestive problems and also for acne, boils and cysts[238].

nrakta S. America - Argentina, Chile, Peru, Uruguay. Locally naturalized in the Mediterranean[50]. ksacta Fields and roadsides[238]. Open scrub[260].

propta Seed - we have no information for this species but suggest sowing the seed in a greenhouse in late spring. Only just cover the seed and keep in a light position, making sure the compost does not dry out. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out in early summer and give some protection from the cold for at least their first winter outdoors. Cuttings of softwood. May/June in a frame. Grow on for at least their first winter in a greenhouse and plant out in late spring after the last expected frosts[K]. The cuttings root guickly and easily. though there can be losses in the first winter[K]. Cuttings of half-ripe wood, August in a frame. Grow on for at least their first winter in a greenhouse and plant out in late spring after the last expected frosts[K]. The cuttings root quickly and easily, though there can be losses in the first winter[K].

nwatta Succeeds in most moderately fertile soils if they are well-drained[200]. Prefers a light soil[219]. Requires a sunny sheltered position[166, 200]. Requires a warm damp climate[7]. A very ornamental plant[1], lemon verbena is only hardy in the milder areas of Britain[1, 11, 14], growing well in Cornwall[59]. It can withstand about 10°c of frost[184] and survives outdoors on a wall at Kew[K]. It generally survives most winters outdoors if growing in a suitable position, though it is often cut back to ground level and then resprouts from the base in late spring[120] or early summer[238]. Giving the roots a good, thick organic mulch will confer extra protection from winter cold[244]. The plant succeeds outdoors at Howick, a garden on the coast of Northumberland. The leaves are very aromatic with a lemon scent[182], they are often used to make a drink or for their essential oils[4]. There has been considerable confusion over the naming of this species. We are following the treatment used in [11] and [200], which is also the current treatment in the 1999 edition of The Plant Finder. However, the book 'World Economic Plants' uses the name A. citrodora Palau (a different author to the one we cite) as the correct

of biomass with yields of up to 19 tonnes per hectare[269]. Sorghum bicolor has been used as Biomass, Brooms, and for Weaving. The flowering panicles are used as brushes brooms and whisks etc[1, 2, 4, 46, 57]. Stems are used for weaving fences, mats, wattle houses etc[178]. The plant is an excellent source of biomass[269].

dwatta Possible. For example Sorghum bicolor is Astringent, Demulcent, Diuretic, and Haemostatic. Sorghum halepense is Demulcent and Diuretic.

nrakta Origin: Hypothetical hybrid. Sorghum species range extend to Australia, Africa, Asia, Mesoamerica, and certain islands in the Indian and Pacific Oceans. ksacta Not known in the wild. Under development

propta Seed - sow April in a greenhouse and only just cover the seed. Germination should take place within 2 weeks. Prick out the seedlings into individual pots once they are large enough to handle and plant them out after the last expected frosts. Division in mid spring as the plant comes into new growth. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Management: Hay Management: Standard Staple Crop: Balanced carb Staple Crop: Sugar Under DevelopmentClimate: cold temperate to tropical, tropical highlands. Humidity: semi-arid to humid. Sorghum is well suited for dry conditions, areas with uneven rainfall distribution that may adversely affect the growing season of other crops, and high year to year variation in rainfall and water supplies. Carbon Farming Solutions - Cultivation: under development. Management: standard, hay (Describes the non-destructive management systems that are used in cultivation) [1-1]. Sorghum is already weakly perennial in the tropics. It "rattoons", or resprouts for several years. Perennial breeding at the Land Institution focused on crosses with Johnsongrass (Sorghum halepense), while other breeders focus on Ni gao liang (Sorghum propinguum). Perennial sorghum could be bread for grain and sweet syrup. Sorghum is particularly suited to dry regions and some promising hybrids have been trialed [1-1]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2].

#### 8.2.35 Dioscorea iaponica

Glutinous Yam, Japanese vam 7 tlin 12 cvuc 4 kcak 0 tcan 2 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Dioscorea japonica is a PERENNIAL CLIMBER growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Edible species of Dioscorea have opposite leaves whilst poisonous species have alternate leaves[174].

kcakta Edible Parts: Leaves RootEdible Uses: Tuber cooked[174, 177, 179]. A very pleasant mild flavour with a floury texture, the roots can be eaten as a potato substitute[2]. The starch can be used as a binding agent for other foods[183]. Roots contain about 1.9% protein, 20% carbohydrate, 0.1% fat and 1% ash[179]. Leaf tips - cooked[183]. Tubercles - cooked[183].

dwatta Contraceptive Miscellany TonicThe tubers are prescribed in the treatment of diarrhoea, enteritis, enuresis and spermatorrhoea[218]. They are also dried and cut into shavings then used as a tonic[218]. The roots of most, if not all, members of this genus, contains diosgenin[222, 240]. This is widely used in modern medicine in order to manufacture progesterone and other steroid drugs. These are used as contraceptives and in the treatment of various disorders

1312

of the genitary organs as well as in a host of other diseases such as asthma and arthritis[222].

nrakta E. Asia - China, C. and S. Japan. ksacta Wooded foothills[58]. Mixed forests and margins, scrub forests, herb communities, mountain slopes, valleys, along rivers and streams, roadsides; 100 - 1200 metres[266].

propta Seed - sow March to April in a sunny position in a warm greenhouse and only just cover. It germinates in 1 -3 weeks at 20°c[175]. Prick out the seedlings as soon as they are large enough to handle and grow on in a greenhouse for their first year. Plant out in late spring as the plant comes into new growth. Basal stem cuttings in the summer[37]. Division in the dormant season, never when in growth[1]. The plant will often produce a number of shoots, the top 5 - 10 cm of the root below each shoot can be potted up to form a new plant whilst the lower part of the root can be eaten[K]. Tubercles (baby tubers) are formed in the leaf axils. These are harvested in late summer and early autumn when about the size of a pea and coming away easily from the plant. They should be potted up immediately in individual pots in a greenhouse or cold frame. Plant out in early summer when in active growth[K]

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it could succeed outdoors at least in the mildest areas of this country. The following notes are based on the general needs of the genus. Easily grown in a fertile well-drained soil in a sunny position or light shade[200]. Prefers a rich light soil[1]. Plants produce tubercles (small tubers that are formed in the leaf axils of the stems), and can be propagated by this means[K]. A climbing plant that supports itself by twining around the branches of other plants[219]. Dioecious. Male and female plants must be grown if seed is required. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern. is also useful and given here if available. Growth habit is a single or multiple shooting vine from a crown [1-2]. Herbaceous. The root pattern is tuberous with swollen potato-like

# 8.2.36 Aloysia triphylla

Lemon Verbena, Lemon beebrush 7 tlin 10 cyuc 4 kcak 3 tcan 3 dwat 3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Alovsia triphylla is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf from May to November, in flower in August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The essential oil from the plant might sensitise the skin to sunlight[238]. Large doses of the tea can cause gastric irritation [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves - occasionally cooked as a spinach[177] but more commonly used as a flavouring in salads, fruit salads etc[14. 21, 104, 183]. A delicious lemon-like flavour, it is adored by most people who try it[K]. A delicious and refreshing tea is made from the leaves [14, 21, 103, 183]. The dried leaves will retain their lemon aroma for many years[4].

tcanta Essential Insecticide Pot-pourri RepellentAn essential oil obtained from the leaves is extensively used in perfumery [7, 61]. An average yield of 0.5% is obtained [7]. There is some evidence that the use of this oil can sensitise the skin to sunlight and so its use has been largely replaced by the tropical plant lemongrass, Cymbopogon spp.[238]. The dried leaves retain their fragrance well and so are used in pot-pourri[238]. The growing plant repels midges, flies and other insects[201]. The essential oil is an effective insecticide in 1 - 2% concentration[240]. Landscape: Flower borders and beds Wall-side Borders City and Courtyard Gardens Cottage and Informal Garden Mediterranean Climate Plants.

tcanta Insecticide MiscellanyThe plant contains 8.1.42 Coriaria microphylla rotenone, which is used as an insecticide[218].

dwatta Emmenagogue Miscellany Oxytoxic Stomachic TonicJi Xue Teng is classified in Chinese herbalism as a plant that invigorates the blood. It is used mainly to treat menstrual problems, relieving pain and normalizing an irregular or absent cycle[254]. The roots and the vines are emmenagogue and stomachic[147]. A decoction is used in the treatment of stomach aches, breathlessness, anaemia in women, menstrual irregularities, vaginal discharge (bloody discharge and leucorrhoea), numbness and paralysis, backache and pain in the knees, seminal emission, gonorrhoea and stomach ache[147, 176]. The plant is used as a tonic to induce the growth of red blood cells[147, 218]. The plant contains the antitumour compound rotenone[218].

nrakta E. Asia - S. China. ksacta Damp shady places[147]. Thickets on slopes and in valleys at elevations of 100 - 950 metres[266].

propta Pre-soak the seed for 12 hours in warm water and sow in a greenhouse in spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in spring. Cuttings of half-ripe wood with the leaves removed, July/August in moist sand in a frame[200].

nwatta Succeeds in full sun in a fertile moistureretentive but well-drained soil[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c and down to about -15°c when given the protection of a warm sunny wall[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

# 8.1.41 Caesalpinia gilliesii

Bird Of Paradise, Bird-of-paradise shrub tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Caesalpinia gilliesii is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista The green seed pods are severely irritating to the digestive tract[274].

dwatta AntitumorThe seeds are reported to have antitumour activity[274].

nrakta Southern South America - Argentina and Uruguay. ksacta Escaped from cultivation where it grows wild in pastures and dry habitats in Texas[274].

propta Seed - pre-soak for 12 - 24 hours in warm water and sow in a greenhouse in early spring[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings in sand in a frame[200].

nwatta Requires a sunny position[11], succeeding in any moderately fertile well-drained soil[200] including limy soils[182]. This species is on the borderline of hardiness in Britain. It can tolerate occasional lows down to about -12°c, so long as it is not too wet. It is best grown against a warm, sheltered sunny wall[200]. The plant succeeds against a warm wall at Kew Gardens, where it has grown to a height of 8 metres, it also succeeds in more open conditions on the Isle of Wight[11]. The plant is often cultivated for its very ornamental, showy flowers[274]. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

tfo2n 7 tlin 10 cvuc 0 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Coriaria microphylla is a deciduous Shrub growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen, Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The seed is poisonous[1]. The plant is toxic to grazing mammals[192]. Most, if not all members of this genus are poisonous, though it is said that the fruit is safe to eat[K].

tcanta Dye Ink TanninA black ink is obtained from the leaves, it can also be used as a dye[61, 128]. The bark can also be used, it is rich in tannin. An effective ground cover plant, spreading by rhizomes to form a fern-like colony[200].

dwatta HallucinogenicThe fruits are hallucinogenic[192]. When taken internally they provide sensations of flying[192].

nrakta Southern S. America. New Zealand. ksacta Steep cliffs or terraces in the Andes[192]

propta Seed - sow February/March in a greenhouse[78] The seed usually germinates in 1 - 3 months at 15°c[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7cm with a heel, July/August in a frame. Fair percentage[78]. Division in spring[200].

nwatta Prefers a fairly good loamy soil in a sunny sheltered position[164, 200]. Succeeds in light shade[200]. A very ornamental plant[1], it is only hardy in the milder areas of the country, such as S.W. England[1], where it tolerates temperatures down to about -5°c[200]. The roots of plants in this genus bear nitrogen-fixing nodules[218]. Whilst much of the nitrogen will be utilized by the growing plant, some of it will become available for other plants growing nearby[K].

#### 8.1.43 Ceanothus thyrsiflorus

Blue Brush, Blueblossom

1289

tfo2n 7 tlin 9 cyuc 0 kcak 0 tcan 0 dwat 4.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ceanothus thyrsiflorus is an evergreen Shrub growing to 4.5 m (14ft) by 4.5 m (14ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from May to June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen, Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

tcanta Dye Hedge Hedge SoapA green dye is obtained from the flowers[168]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K]. The sub-species C. thyrsiflorus repens is a good ground cover plant for sunny positions, growing well on banks and reaching a height of 90cm[197, 2001. Plants can be grown as a hedge in exposed maritime areas though they do not succeed in the most exposed positions and can be slow to establish[75]. Wood - close-grained. rather soft[82].

nrakta South-western N. America - California to Oregon ksacta Wooded slopes and canyons below 600 metres, often

in the neighbourhood of streams, in evergreen forests in California [71, 82].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place within 1 -2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Landscape Uses: Erosion control, Ground cover. Hedge, Massing. Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[1]. Tolerant of maritime exposure[75]. A very ornamental plant[1] it is hardy to about -10°c[184, 200]. The sub-species C. thyrsiflorus repens. McMinn. is somewhat hardier, to about -15°c[184]. There are several named forms selected for their ornamental value[200]. A plant has reached 6 metres tall at Kew in an exposed position, but is damaged in severe winters[11]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. A fast-growing plant, it flowers well when young[11]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Plants flower on the previous year's growth, if any pruning is necessary it is best carried out immediately after flowering has finished[200, 219]. Constant pruning to keep a plant small can shorten its life[200]. There are a number of named varieties developed for their ornamental value[182]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212]. Special Features: North American native, Attractive flowers or blooms.

### 8.1.44 Ceanothus maritimus

Maritime Ceanothus

tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ceanothus maritimus is an evergreen Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Dye SoapA green dye is obtained from the flowers[168]. A god ground cover plant for maritime conditions[260]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin(K]. The developing seed cases are also a very good source of saponins[K].

nrakta South-western N. America - California. ksacta Coastal bluffs[260].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place within 1 -2 months at 20°c[138]. Another report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. It then requires a period of chilling below 5°c for up to 84 days before it will germinate[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node [200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good per-

mwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. Requires a well-drained soil. This species is hardy to about -5°c and so succeeds outdoors in the milder areas of Britain[260]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Any runing is best carried out in the spring[219]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200, 212].

# 8.1.45 Erythrina x bidwillii

tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Erythrina x bidwillii is a deciduous Shrub growing to 4 m (13ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains alkaloids that have powerful narcotic and purgative effects[200].

dwatta Narcotic PurgativeThe plant is narcotic and purgative[200].

nrakta A garden hybrid, E. crista-galli x E. herbacea. ksacta Not known in the wild.

propta Seed - pre-soak for 12 hours in warm water and sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Overwinter in a greenhouse and plant out in late spring or early summer. Heeled cuttings of young growth in the spring in a frame[200]. Overwinter in a greenhouse and plant out in late spring or early summer.

nwatta Requires a moderately fertile well-drained soil in a very sunny position[200]. Best if given the protection of an east, south or south-west facing wall[200]. Plants are not very hardy outdoors in Britain though the rootstock can tolerate temperatures down to about  $-10^{\circ}\mathrm{c}$  provided the stem bases are thickly mulched with organic matter such as leaf

Tea contains polyphenols, these are antioxidants that help to protect the body against heart diseases, stroke and cancer[238]. It also contains the stimulant caffeine which, when taken in excess, can cause sleeplessness and irritability and also, through its action as a diuretic, act to remove nutrients from the body. Tea is also rich in tannin and is a possible cause of oesophageal cancer[238]. Cold tea is sometimes used as a soaking liquid to flavour dried fruit[238]. One report says that the leaves are used as a boiled vegetable[179]. The leaves contain about 25.7% protein, 6.5% fat, 40.8% carbohydrate, 5% ash, 3.3% caffeine, 12.9% tannin[179]. Terminal sprouts with 2-3 leaves are usually handplucked, 10 kg of green shoots (75-80% water) produce about 2.5 kg dried tea[269]. The bushes are plucked every 7-15 days, depending on the development of the tender shoots. Leaves that are slow in development always make a better flavoured product[269]. Various techniques are used to produce black teas, usually during July and August when solar heat is most intense. Freshly picked leaves are spread very thinly and evenly on trays and placed in the sun until the leaves become very flaccid, requiring 13 hours or more, depending on heat and humidity. Other types of black teas are made by withering the leaves, rolling them into a ball and allowing to ferment in a damp place for 3-6 hours, at which time the ball turns a yellowish copper colour, with an agreeable fruity one[269]. If this stage goes too far, the leaves become sour and unfit for tea. After fermenting, the ball is broken up and the leaves spread out on trays and dried in oven until leaves are brittle and have slight odour of tea[269]. Tea is then stored in air-tight tin boxes or cans. As soon as harvested, leaves are steamed or heated to dry the natural sap and prevent oxidation to produce green tea. Still soft and pliable after the initial treatment, the leaves are then rolled and subjected to further firing. Thus dried, the leaves are sorted into various grades of green tea[269]. The flowers are made into 'tempura' using the edible oil that is obtained from the seed[183]. A clear golden-yellow edible oil resembling sasanqua oil is obtained from the seed[183, 269]. The oil needs to be refined before it is eaten. An essential oil distilled from the fermented dried leaves is used as a commercial food flavouring[238]. Tea extract is used as a flavour in alcoholic beverages, frozen dairy desserts, candy, baked goods, gelatines, and puddings[269]. Tea is a potential source of food colours (black, green, orange, yellow, etc.)[269].

tcanta Dve Essential Oil Oil Tannin WoodAn essential oil is distilled from the fermented and dried leaves[238]. It is used in perfumery and in commercial food flavouring[238]. A non-drying oil is obtained from the seeds. Refined teaseed oil, made by removing the free fatty acids with caustic soda, then bleaching the oil with Fuller's earth and a sprinkling of bone black, makes an oil suitable for use in manufacture of sanctuary or signal oil for burning purposes, and in all respects is considered a favourable substitute for rapeseed olive, or lard oils. The oil is different from cottonseed, corn, or sesame oils in that it is a non-drying oil and is not subject to oxidation changes, thus making it very suitable for use in the textile industry; it remains liquid below -18deq.C[269]. A grey dye is obtained from the pink or red petals[168]. The leaves contain 13 - 18% tannin[223]. The leaves also contain quercetin, a dyestuff that, when found in other plants, is much used as a dye[223]. The quantity of quercetin is not given[K]. Wood - moderately hard, close and even grained. It is very good for walking sticks[158].

dwatta Antidiarrhoeal Antiemetic Astringent Cardiotonic Diuretic Dysentery StimulantThe tea plant is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. Modern research has shown that there are many health benefits to drinking tea, including its ability to protect the drinker from certain heart diseases. It has also been shown that drinking tea can protect the teeth from decay[254], because of the fluoride naturally occurring in the tea[K]. However, the tea also contains some tannin, which is suspected of being carcinogenic[269]. The leaves are cardiotonic, diuretic, expectorant, stimulant and astringent[4, 174, 192, 218, 240, 2691. They exert a decided influence over the nervous system, giving a feeling of comfort and exhilaration, but also producing an unnatural wakefulness when taken in large doses[4]. They are used internally in the treatment of diarrhoea, dysentery, hepatitis and gastro-enteritis[218, 238]. Tea is reportedly effective in clinical treatment of amoebic dysentery, bacterial dysentery, gastro-enteritis, and hepatitis. It has also been reported to have antiatherosclerotic effects and vitamin P activity[269]. Excessive use, however, can lead to dizziness, constipation, constipation, indigestion, palpitations and insomnia[238]. Externally, they are used as a poultice or wash to treat cuts, burns, bruises, insect bites, ophthalmia, swellings etc[218, 238, 257]. Only the very young leaves and leaf buds are used, these can be harvested throughout the growing season from plants over three years old and are dried for later use[238]. Teabags have been poulticed onto baggy or tired eyes, compressed onto headache, or used to bathe sunburn[269].

nrakta E. Asia - China? Exact origin is uncertain. ksacta Shaded areas[192] at an elevation of 2100 - 2700 metres in Vinnar[11]

propta Seed - can be sown as soon as it is ripe in a greenhouse[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Seedlings take 4 - 12 years before they start to produce seed[269]. There are approximately 500 seeds per kilo[269]. Cuttings of almost ripe wood, 10 - 15cm with a heel, August/September in a shaded frame. High percentage but slow[78]. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leaf-bud cuttings, July/August in a frame.

nwatta Landscape Uses: Specimen. Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1, 11, 200]. A calcifuge plant, preferring a pH between 5 and 7[11, 200]. Prefers the partial shade of a light woodland or a woodland clearing[166, 200]. Forms grown in this country are slow-growing[219]. Tea is reported to tolerate an annual precipitation of 70 to 310cm, an average annual temperature range of 14 to 27°C and a pH in the range of 4.5 to 7.3[269]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It prefers a wet summer and a cool but not very frosty dry winter[200]. The fragrant flowers are very attractive to insects, particularly moths[219]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200]. A very ornamental plant[1], it is widely cultivated in tropical and warm temperate areas for its leaves which are used to make China tea[1]. There are many named varieties[183] and new hardier forms are being produced in China for growing in colder areas of the country[260]. The Chinese form, known as 'Hsüeh-ch'a', is said to grow in areas within the snow limit on the mountains of Lingchiangfu in Yunnan province[178]. The subspecies C. sinensis assamica. (Mast.) Kitam, is a larger plant. growing up to 17 metres tall. It is a more tropical form of the species, is intolerant of frost and does not succeed outdoors in Britain[11, 260]. Special Features: Not North American native. Blooms are very showy.

# 8.2.34 Sorghum hybrids

Perennial Sorghum

7 tlin 12 cyuc 4 kcak 3 tcan 1 dwat 3 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Sorghum hybrids is a PERENNIAL growing to 3 m (9ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The pollen can induce hay fever[269].

kcakta Edible Parts: Seed StemEdible Uses: Carbon Farming Solutions - Staple Crop: balanced carb, sugar (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta Possible but not reported. Sorghum halepense is a good biomass plant. The plant is a potential source

basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - raw or cooked. A delicious flavour[266]. Of excellent quality, they are only slightly acrid raw[195], boiling them for a short time makes them suitable for salads[183]. The shoots, which are 2 - 4cm in diameter[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta Plant support WoodThe canes have thick walls and, whilst not of the highest quality, can be used for many purposes including plant supports, all-round farm use, umbrella shafts, desk and chair legs[195]. The hard culms are usually used as handles of farm implements[266].

nrakta E. Asia - China, ksacta Mountains of Jiangsu, Zheijang. Anhui and Hunan.

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly guickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Industrial Crop: Biomass Management: Managed Multistem Minor Global Crop Other Systems: MultistrataRequires a rich damp soil in a sheltered position and plenty of moisture in the growing season[200]. Dislikes prolonged exposure to hard frosts[200], but plants have tolerated temperatures down to -22°c and are among the hardiest members of this genus[195]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2].

#### 8.2.32 Quercus aucheri

Boz-Pirnal Oak

7 tlin 10 cyuc 4 kcak 1 tcan 2 dwat 5 m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus aucheri is an evergreen Shrub growing to 5 m (16ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked. A sweet flavour[200]. The seed is about 2cm long and 1.5cm wide[200]. It is low in tannin and needs little if any leaching. Any bitter tannins can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in

a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The seed can be roasted and then eaten, its taste is something like a cross between sunflower seeds and popcorn[183]. The roasted seed is a coffee substitute.

tcanta Repellent TanninThe following uses are for the closely related Q. coccifera, they should also be applicable here[K]. A mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dvestuff[4]. The bark is rich in tannin[148]. A black dye can be obtained from the bark[89] and also from the seeds[148].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta S. Europe - Mediterranean around Greece, ks-

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Plants are lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, but trees usually grow well in Britain[200]. The seed takes two years to ripen but is seldom produced in this country[11]. This species is closely related to O. coccifera and considered to be no more than a synonym of that species by some authorities[11]. Hybridizes freely with other members of the genus[200]. Many species in this genus are notably resistant to honey fungus[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11].

#### 8.2.33 Camellia sinensis

Tea Plant, Assam tea, Tea Tree Camellia 7 tlin 9 cyuc 4 kcak 3 tcan 4 dwat 4 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli dyatxre7t hjonli

drutta Camellia sinensis is an evergreen Shrub growing to 4 m (13ft) by 2.5 m (8ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil

pcista Care in patients with heart disease and in those with increased thyroid gland activity. Do not exceed 300mg/day if Pregnant (5 cups). Children may develop anaemia if excessive amounts. Hapatitis possible if products have high doses of green tea extract. Long-term intake over 1.5g caffeine per day can lead to: restlessness, irritability, sleeplessness, palpitations, vertigo, headaches, loss of appetite, vomiting and diarrhoea [301].

kcakta Edible Parts: Leaves Oil OilEdible Uses: Colouring Condiment Oil Oil TeaThe leaves are infused in hot water and used as the drink that is commonly known as tea. It is widely drunk in many areas of the world. Green tea is made from the steamed and dried leaves, whilst black tea (the form most commonly drunk in the west) is made from leaves that have been fermented and then dried[183, 238].

litter or sawdust and covered with bracken[200]. The top growth will be killed by the frost but new growth from the rootstock will flower in late summer[200]. Plants take 3 - 4 years to flower from seed[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 8.1.46 Coriaria myrtifolia

tfo2n 7 tlin 10 cvuc 0 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Coriaria myrtifolia is a deciduous Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista This plant is very poisonous[1, 11], the poison having the same effect as alcoholic intoxication.[89].

tcanta Dve Ink Insecticide TanninA black dve and an ink is obtained from the leaves[11, 103]. The bark can also be used[89], both the bark and the leaves are rich in tannin[46, 61, 1231. A fly poison is made from the crushed fruits[103].

nrakta Europe - Mediterranean. ksacta Dry woods, hedges and rocky places[50, 89].

propta Seed - sow February/March in a greenhouse[78]. The seed usually germinates in 1 - 3 months at 15°c[164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7cm with a heel, July/August in a frame. Fair percentage[78].

nwatta Prefers a fairly good loamy soil in a sunny sheltered position[11, 200]. Succeeds in light shade[200]. Plants are hardy to about -5°c, succeeding outdoors in Britain from London and south-westwards[11, 200]. The stems are often cut back by winter cold but the plants usually resprout from the base. This new growth does not flower in its first year[182]. The roots of plants in this genus bear nitrogenfixing nodules[218]. Whilst much of the nitrogen will be utilized by the growing plant, some of it will become available for other plants growing nearby[K].

#### 8.1.47 Calicotome spinosa

tfo2n 7 tlin 10 cvuc 0 kcak 0 tcan 0 dwat 3 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Calicotome spinosa is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Hedge HedgePlants can be used for low hedging[200].

nrakta Europe - W. Mediterranean, ksacta Dry stony habitats in evergreen scrub near the coast. It is especially common in areas after woodland clearance[200].

propta Seed - we have no information on this species but suggest pre-soaking the seed for 12 - 24 hours (by which time it should have swollen up) in warm water and sowing it in a greenhouse in early spring. Pot up the seedlings as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse, planting out in late spring or early summer in their permanent positions. Cuttings of half ripe wood. July/August in a frame. It is probably best to put each cutting in its own pot.

nwatta Succeeds in a very well-drained soil in a sunny position[200]. This species is not hardy in the colder areas

of Britain, it tolerates temperatures down to between -5 and -10°c if it is given perfect drainage[200]. Plants dislike root disturbance[200], they should be planted out into their permanent positions whilst young. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 8.1.48 Calicotome villosa

tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 0 dwat 3 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Calicotome villosa is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Hedge HedgePlants can be used for low hedging[200].

nrakta Europe - Mediterranean. ksacta Dry stony habitats in evergreen scrub near the coast. It is especially common in areas after woodland clearance[200].

propta Seed - we have no information on this species but suggest pre-soaking the seed for 12 - 24 hours (by which time it should have swollen up) in warm water and sowing it in a greenhouse in early spring. Pot up the seedlings as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse, planting out in late spring or early summer in their permanent positions. Cuttings of half ripe wood, July/August in a frame. It is probably best to put each cutting in its own pot.

nwatta Succeeds in a very well-drained soil in a sunny position[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c if it is given perfect drainage[200]. Plants dislike root disturbance[200] and should be put into their final positions as soon as possible. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 8.1.49 Erythrina crista

Coral Tree, Crybabytree

tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Erythrina crista-galli is a deciduous Shrub growing to 3 m (9ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It

and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. pcista The plant contains alkaloids that have powerful narcotic and purgative effects[200]. The seeds of all mem-

can fix Nitrogen. Suitable for: light (sandy), medium (loamy)

bers of this genus are said to be poisonous[274]. dwatta Narcotic PurgativeThe plant is narcotic and

purgative[200]. nrakta S. America - Brazil, Argentina, Uruguay. ksacta

Not known

propta Seed - pre-soak for 12 hours in warm water and sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Overwinter in a greenhouse and plant out in late spring or early summer. Heeled

cuttings of young growth in the spring in a frame[200]. Overwinter in a greenhouse and plant out in late spring or early summer.

nwatta Requires a moderately fertile well-drained soil in a very sunny position[200]. Best if given the protection of an east, south or south-west facing wall[200]. Plants are not very hardy outdoors in Britain though the rootstock can tolerate temperatures down to about -10°c provided the stem bases are thickly mulched with organic matter such as leaf litter or sawdust and covered with bracken[200]. The top growth will be killed by the frost but new growth from the rootstock will flower in late summer[200]. A plant growing outdoors at the RHS Gardens in Wisley, Surrey, grows and flowers well in a warm sheltered corner[260]. Its root is mulched each winter to protect it from the cold[260]. A form called 'Compacta' is said to flower more freely than the type[233]. Plants take 3 - 4 years to flower from seed[200]. Plants are difficult to establish, taking some years to flower[202]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 8.1.50 Caesalpinia decapetala

Mysore Thorn, Shoofly tfo2n 7 tlin 10 cyuc 0 kcak 2 tcan 2 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Caesalpinia decapetala is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It can fix Nitrogen. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

tcanta Hedge Hedge Tannin WoodThe bark is a rich source of tannin[158, 272]. Plants are often grown as field boundaries in Nepal[272]. An excellent hedge plant[240]. However, due to its doubtful hardiness it is not a good candidate for this use in Britain. Wood - moderately hard[146]. Environmental Uses include: Agroforestry; Boundary, barrier or support; Soil improvement. It is used as an Ornamental

dwatta Anthelmintic Antiperiodic Astringent Emmenagogue Febrifuge Laxative PurgativeAnthelmintic, antiperiodic, astringent, febrifuge[158, 178]. The leaves are emmenagogue and laxative[240, 243]. They are applied externally to burns[240, 243]. The root is purgative[240, 243].

nrakta E. Asia - Himalayas to China. ksacta Hedges and open bushy places [146]. Swampy localities and ravines to 1800 metres [158].

propta Seed - pre-soak for 12 - 24 hours in warm water and sow in a greenhouse in early spring[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings in sand in a frame[200].

nwatta Requires a sunny position[11], succeeding in any moderately fertile well-drained soil[200] including limy soils[182]. This species is on the borderline of hardiness in Britain. However, C. japonica, which is considered to be no more than a variety of this species by many botanists, succeeds on a wall at Wisley to the west of London and is said to be hardy to about -10°c[184]. Its natural range is Japan where it grows at heights up to 2000 metres on rocky mountain slopes in the cooler regions of the country[11. 2001. Plants in this genus are notably resistant to honey fungus[200]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [200]. It has a special soil tolerance for shallow soils.

#### 8.1.51 Ceanothus purpureus

Hollyleaf Ceanothus

tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ceanothus purpureus is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Dye SoapA green dye is obtained from the flowers[168]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K]. The spreading forms of this species make a useful ground cover, especially on warm sunny slopes[2001.

nrakta South-western N. America - California. ksacta Dry rocky hills below 550 metres[71].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place within 1 -2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Plants usually produce an abundance of seed in British gardens[11]. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. This species is difficult to root[200]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. This species is difficult to root[200].

nwatta Prefers a warm sunny position but tolerates light shade[11, 200]. Requires a well-drained soil[11]. Tolerates some lime, but will not succeed on shallow chalk[200]. Plants are not fully hardy at Kew Botanical Gardens, though they succeed outdoors to the south and west of London[11]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Plants flower on the previous year's growth, if any pruning is necessary it is best carried out immediately after flowering has finished[200]. Constant pruning to keep a plant small can shorten its life[200, 219]. Fast growing, it flowers well when young, often in its second year from seed[11]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200,

# 8.1.52 Ceanothus divergens

Cropleaf Ceanothus, Calistoga ceanothus tfo2n 7 tlin 10 cyuc 0 kcak 0 tcan 0 dwat 1.5 m hkuc valleys at elevations of 1100 - 1200 metres[266].

propta Seed - surface sow as soon as it is ripe in a green-house at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Landscape Uses: Container, Massing, Specimen. Requires a rich damp soil in a sheltered sunny position[200, 238] and plenty of moisture in the growing season[1]. A very hardy plant, tolerating temperatures down to at least -7°c, but it dislikes prolonged exposure to hard frosts[200]. Another report says that it is hardy to about -18°c[195]. A very ornamental plant[1]. There are many named forms of this species, some of them are given specific status by some botanists[11, 200]. These forms include 'Boryana', 'Fulva', 'Henonis' and 'Punctata'. It is the form 'Henonis' that is normally used medicinally in China[176]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. This species is notably resistant to honey fungus[200]. The plant has a running rootstock, though not aggressively so in the cooler climate of Britain[200]. and it produces new shoots from May[25]. Cultivated for its edible young shoots in China[61]. This species has been widely planted for ornament in the Mediterranean and is becoming established[50]. The ssp. P. nigra boryana and P. nigra henonis are also mentioned for their edible young shoots, they are both cultivated for their edible shoots which are similar in all respects to P. nigra. Dead stems can be removed at any time of the year[238]. It is also possible to thin the clumps in spring, leaving only the strongest stems and thus creating an open grove-like effect[238]. Special Features: Attractive foliage.

#### 8.2.29 Schisandra grandiflora

7 tlin 10 cyuc 4 kcak 0 tcan 0 dwat 6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Schisandra grandiflora is a deciduous Climber growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from April to May, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 177]. A pleasantly acid flavour[2], they make a nice dessert fruit[K]. The fruit is about 6mm in diameter and is borne in a grape-like bunch about 12cm long[200].

nrakta E. Asia - China to the Himalayas. ksacta Mixed forests and shrubberies at elevations of 1700 - 3300 metres in the Himalayas[51, 272].

propta Seed - best sown in the autumn in a cold frame[200, 238]. Pre-soak stored seed for 12 hours in warm water and sow in a greenhouse in the spring[238]. Germination can be slow and erratic. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first 2 years. Plant them out into their permanent positions in

early summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame. Overwinter in the greenhouse and plant out in late spring[11, 78]. Good percentage[78]. Layering of long shoots in the autumn[200].

nwatta Prefers a rich well-drained moisture retentive soil[11, 200]. Prefers a slightly acid soil but tolerates some alkalinity if plenty of organic matter is added to the soil[200]. Requires some protection from the most intense sunlight[200]. Prefers light shade but tolerates full sun if the soil is reliably moist and the roots are in shade[202]. Plants are intolerant of drought[K]. The fully dormant plant is hardy to about -15°c[184], though the young growth in spring can be damaged by late frosts. Plants are of slow to moderate growth rate[202]. The shoots are semi-twining, but plants often require some support by tying the plant in[202]. Diocious. Male and female plants must be grown if seed is required. Another report says that the plants are monoecious (male and female flowers are separate but are found on the same plant)[182].

#### 8.2.30 Schisandra rubriflora

7 tlin 10 cyuc 4 kcak 0 tcan 0 dwat 6 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Schisandra rubriflora is a deciduous Climber growing to 6 m (19ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from April to May, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 105, 177]. Delicious[K]. The fruit is about 6mm in diameter and is borne in a grape-like bunch about 12cm long[200].

nrakta E. Asia - China to the Himalayas. ksacta Forests and shrubberies to 3300 metres. in the Himalayas[51].

propta Seed - best sown in the autumn in a cold frame[200, 238]. Pre-soak stored seed for 12 hours in warm water and sow in a greenhouse in the spring[238]. Germination can be slow and erratic. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first 2 years. Plant them out into their permanent positions in early summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame. Overwinter in the greenhouse and plant out in late spring[11, 78]. Good percentage[78]. Layering of long shoots in the autumn[2001].

nwatta Prefers a rich well-drained moisture retentive soil[11, 200]. Prefers a slightly acid soil but tolerates some alkalinity if plenty of organic matter is added to the soil[200]. Requires some protection from the most intense sunlight[200]. Prefers light shade but tolerates full sun if the soil is reliably moist and the roots are in shade[202]. Plants are intolerant of drought[K]. The fully dormant plant is hardy to about -15°c[184], though the young growth in spring can be damaged by late frosts. Plants are of slow to moderate growth rate[202]. The shoots are semi-twining, but plants often require some support buy tying the plant in[202]. Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.31 Phyllostachys nuda

7 tlin 10 cyuc 4 kcak 2 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys nuda is an evergreen Bamboo growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and

nrakta E. Asia - China - N.W. Yunnan. ksacta An understorey shrub in woodlands[200]. Scattered in broad-leaved forests at elevations around 1900 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[113], it should then germinate in the following spring[K]. A hard seedcoat can delay germination, especially in if the seed is not sown as soon as it is ripe[81, K]. Stored seed should be cold-stratified and sown in a cold frame in the spring[200]. Germination can take 18 months or more. Prick out the seedlings as soon as they are large enough to handle and grow them on for at least their first winter under cover. Plant out in late spring after the last expected frosts. Greenwood cuttings of terminal shoots, August/September in a humid cold frame[1, 200]. Difficult[113].

nwatta Prefers a moist well-drained sandy soil but succeeds in most soils though it dislikes dry gravelly or chalky soils[1, 200]. Prefers a position in semi-shade but tolerates full shade[11, 81] and it also succeeds but does not usually thrive in full sun[200]. It grows very well in the mild wet coastal region of W. Scotland where it succeeds even in full sun[200]. Requires a humid sheltered site[200], strongly disliking very exposed positions[1]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This plant has become very rare in its native range and is designated an endangered species[266]. Plants are dioecious, but female plants sometimes produce fruits and infertile seeds in the absence of any male plants[11]. However, at least one male plant for every five females should be grown if you are growing the plants for fruit and seed. Plants have also been known to change sex[81]. Male cones are produced in the axils of the previous year's leaves, whilst female cones are borne at the base of branchlets[200].

# 8.2.27 Phyllostachys dulcis

Sweetshoot Bamboo

7 tlin 10 cyuc 4 kcak 2 tcan 0 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phyllostachys dulcis is an evergreen Bamboo growing to 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: midble acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots -raw or cooked. Free of any acridity, they make excellent eating[183]. Used in salads, soups, stews etc, this is one of the most highly esteemed edible bamboos in China[183, 195]. The shoots, which are 4 - 6cm in diameter[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta WoodCanes can be used for industrial purposes but are weaker than many other members of this genus[195]. The culms are used as handles of farm tools[266].

nrakta E. Asia - China. ksacta Not known

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position. Dislikes drought[195]. A fairly hardy species, but it dislikes prolonged exposure to hard frosts. One report says that it tolerates temperatures down to about -10°c[200], down to

-20°c in another report, though this report also says that this species does not like growing in areas with frequent low temperatures[195]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The new growth emerges in early spring. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. Cultivated in China for its edible young shoots[183, 266]. The plant is heat tolerant in zones 10 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. The plant growth habit is a runner spreading indefinitely by rhizomes or stolons [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length

#### 8.2.28 Phyllostachys nigra

Black Bamboo, Kuro-Chiku

7 tlin 10 cyuc 4 kcak 0 tcan 3 dwat 7.5 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phyllostachys nigra is an evergreen Bamboo growing to 7.5 m (24ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked[25, 46, 105, 177]. Somewhat acrid when raw[61], they are prepared for eating by boiling in one change of water, the water being changed after 8 - 10 minutes[183]. A distinctive taste and aroma[183]. The shoots, which are about 5cm in diameter[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta Basketry Plant support WoodThe canes make good plant supports. Thin walled but durable, the canes are also used for cabinet work and for decorative panels and inlays[195]. The rhizome is used in making umbrella handles, wickerwork, canes, musical instruments and various kinds of handicrafts[25.74].

dwatta Antiemetic Antitussive Astringent Depurative Diuretic Expectorant Febrifuge Sedative StypticThe leaves are antipyretic and diuretic[218]. They are used internally in the treatment of fevers (especially infantile convulsions), vomiting and nosebleeds[238]. The leave are harvested during the growing season and dried for later use[238]. The juice of the stems is antipyretic, antitussive, expectorant and sedative[147, 176, 218]. It is taken internally in the treatment of lung infections with cough and phlegm[238]. The sap is pressed from young stems in the summer and then dried for later use[238]. The epidermis of the stem bark is antiemetic, depurative and sedative[147, 176, 218]. It is used internally in the treatment of vomiting, nosebleeds, coughs etc[238]. The epidermis is collected from young stems in the summer and is dried for later use[238]. The root is astringent, antipyretic, diuretic and styptic[147, 176, 218]. It has been used in the treatment of rabies [238]. The roots are harvested in the winter and dried for later use[238].

nrakta E. Asia - E. and C. China. ksacta Fertile and moist places, also by streams[147]. In open forests, on slopes or in

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ceanothus divergens is an evergreen Shrub growing to 1.5 m (5ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH. mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Dye SoapA green dye is obtained from the flowers[168]. All parts of the plant are rich in saponins - when crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K]. A useful ground cover plant, especially on warm sunny slopes[208].

nrakta South-western N. America - California. ksacta A very rare plant in the wild where it grows in serpentine volcanic substrates in Chapparal plant communities at elevations of 900 - 1800 metres[276].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place in 1 - 2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel. October in a cold frame[78]. The roots are guite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Requires a well-drained soil and prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. A difficult plant to cultivate, it might do well in a lime-free soil in full sun and occasionally does well on heavier soils[208]. Plants are hardy to about -10°c[200]. This species is closely related to C. purpureus[11]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Plants flower on the previous year's growth, if any pruning is necessary it is best done immediately after the plant has finished flowering[200, 219]. Constant pruning to keep a plant small can shorten its life[200]. Fast growing, it flowers well when young[11]. There are some named forms selected for their ornamental value[200]. Hybridizes freely with other members of this genus[200]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200,

#### 8.1.53 Lupinus arboreus

Tree Lupin, Yellow bush lupine tf02n 7 tlin 10 cyuc 0 kcak 5 tcan 0 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lupinus arboreus is an evergreen Shrub growing to 1.5 m (5ft) by 1.2 m (4ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The seed of many lupin species contain bittertasting toxic alkaloids, though there are often sweet varieties within that species that are completely wholesome[65, 76]. Taste is a very clear indicator. These toxic alkaloids can be leeched out of the seed by soaking it overnight and discarding the soak water. It may also be necessary to change the water once during cooking. Fungal toxins also readily invade the crushed seed and can cause chronic illness[65].

tcanta Dye Pioneer Soil reclamation StringA bright yellow dye is obtained from the flowers[168]. The root fibres have been used to make a string for making nets etc[257]. Plants are used in land reclamation schemes to stabilize sandy soils and dunes[200]. Because they are fast growing and tolerant of maritime exposure, they quickly provide shelter for other plants as well as enriching the soil with nitrogen[K]. An excellent pioneering plant in permaculture, even in exposed areas it grows rapidly to its maximum height of about 1.5 metres and will give shelter to enable other less tolerant plants to become established. It is especially useful for helping the establishment of shrubs and herbaceous perennials in small gardens[K].

nrakta South-western N. America - California to Oregon. Naturalized in S. England. ksacta Stable sand dunes, coastal scrub and pine forest close to the coast. Naturalized by the sea in S. England [184].

propta Pre-soak the seed for 24 hours in warm water and then sow in early spring in a greenhouse[1, 200]. Germination should take place within a couple of weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. It should also be possible to sow the seed in situ in mid to late spring. Protect the seed from mice. Cuttings of short side-shoots with a heel, July/August in a frame[11].

nwatta Requires a well-drained dry or moist soil in a sunny position[11, 182]. Prefers an alkaline soil[188]. Grows well near the coast[11], resisting maritime exposure. Established plants are drought tolerant[190]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Hardy to about -15°c[184, 200]. Plants are hardy in all but severe winters in Britain[200], though they become less hardy with age[11]. A fast-growing but shortlived plant[182], especially when growing in rich soils[11]. Plants have reached 2.7 metres tall and wide within 4 years from seed in a rich soil, flowering and producing seed prolifically[11]. Plants self-sow when in a suitable position[200]. The flowers bear the fragrance of white clover[245]. This species has a symbiotic relationship with certain soil bacteria, these bacteria form nodules on the roots and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby[200].

#### 8.1.54 Ceanothus impressus

Santa Barbara Ceanothus

tfo2n 7 tlin 9 cyuc 0 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ceanothus impressus is an evergreen Shrub growing to 1.5 m (5ft) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs). It can fix Nitrogen. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil.

tcanta Dye SoapA green dye is obtained from the flowers[168]. All parts of the plant are rich in saponins - when

crushed and mixed with water they produce a good lather which is an effective and gentle soap[168, 169]. This soap is very good at removing dirt, though it does not remove oils very well. This means that when used on the skin it will not remove the natural body oils, but nor will it remove engine oil etc[K] The flowers are a very good source, when used as a body soap they leave behind a pleasant perfume on the skin[K]. The developing seed cases are also a very good source of saponins[K].

nrakta South-western N. America - coastal California. ksacta Grows in chapparal plant communities from sea level to elevations of 200 metres [276].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed should be pre-soaked for 12 hours in warm water and then given 1 - 3 months stratification at 1°c[138, 200]. Germination usually takes place in 1 - 2 months at 20°c[138]. One report says that the seed is best given boiling water treatment, or heated in 4 times its volume of sand at 90 - 120°c for 4 - 5 minutes and then soaked in warm water for 12 hours before sowing it[214]. The seed exhibits considerable longevity, when stored for 15 years in an air-tight dry container at 1 - 5°c it has shown little deterioration in viability[214]. The seed is ejected from its capsule with some force when fully ripe, timing the collection of seed can be difficult because unless collected just prior to dehiscence the seed is difficult to extract and rarely germinates satisfactorily[214]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, taken at a node[200], July/August in a frame[11]. Cuttings of mature wood of the current year's growth, 7 - 12 cm with a heel, October in a cold frame[78]. The roots are quite brittle and it is best to pot up the callused cuttings in spring, just before the roots break[78]. Good percentage.

nwatta Landscape Uses:Border, Container, Foundation, Pest tolerant, Hedge, Massing, Rock garden, Screen. Prefers a warm sunny position but tolerates light shade[11, 200]. Tolerates some lime, but will not succeed on shallow chalk[200]. Plants are hardy to about -10°c[200], they succeed in the open in the milder parts of the country but are best grown by a sunny wall in colder areas[11]. This is one of the hardiest and most satisfactory of the evergreen members of the genus in Britain[11]. It is a fast-growing species that can flower in 2 years from seed[200]. The cultivar 'Puget Blue' is very vigorous and flowers freely, though it is likely to be of hybrid origin. This species is closely related to C. dentatus[11]. Hybridizes freely with other members of this genus[200]. Plants dislike root disturbance, they should be planted out into their permanent positions whilst still small[182]. Dislikes heavy pruning, it is best not to cut out any wood thicker than a pencil[182]. Some members of this genus have a symbiotic relationship with certain soil micro-organisms, these form nodules on the roots of the plants and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby [200, 212]. Special Features: North American native, Blooms are very showy.

#### **8.2** mran

#### 8.2.1 Araucaria araucana

Monkey Puzzle Tree 7 tlin 11 cyuc 5 kcak 3 tcan 1 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Araucaria araucana is an evergreen Tree growing to 30 m (98ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade

(light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked. Rich in starch[183]. The seed is soft like a cashew nut and has a slight flavour of pine nuts. This is a delicious seed and it makes very pleasant eating. It is a food that can easily be eaten in quantity and can be used as a staple food in the diet(K). Fairly large, the seeds are about the size of an almond and can be 3cm long x 1cm wide. They are harvested in the autumn and, when kept in cool, dry conditions will store for at least 9 months(K).

tcanta Resin Shelterbelt WoodVery tolerant of maritime exposure, trees can be grown as part of a shelterbelt, though they are very slow growing and have an open canopy and so do not give a lot of shelter[75, 81]. A resin is obtained from incisions in the trunk. This is used mainly for medicinal purposes[46, 61, 139]. Wood - pale yellowish, good quality, takes a beautiful polish. Used for joinery and carpentry[1, 46, 61, 139].

dwatta VulneraryA resin obtained from incisions in the trunk is used in the treatment of ulcers and wounds[46, 61, 120]

nrakta S. America - S. Chile ksacta Mountain slopes in deep sandy soils in coniferous woodland, usually with Nothofagus spp[139].

projta Seed - best sown as soon as it is ripe in a cold frame [134] or it can be stored cool and moist then sown February in a greenhouse[78, 80]. Although the plants are quite cold-tolerant, the root systems of seedling plants can be damaged in spells of very cold weather so give some extra protection at this time if necessary. The seed usually germinates in 1 - 2 months at 15°c[134]. As soon as they are large enough to handle, prick the seedlings out into individual pots. The plants have a rather sparse root system and are best placed in their final positions as soon as possible. Give them some protection for their first winter[K]. Cuttings of half-ripe wood, May to July in a cold frame. Only epicormic side-shoots should be used, normal side-shoots do tot develop properly[81]. An epicormic shoot is one that develops from a dormant bud on the main trunk of the tree[K].

nwatta Management: Standard Regional Crop Staple Crop: Balanced carbLandscape Uses:Pest tolerant, Aggressive surface roots possible, Specimen. Prefers a deep welldrained soil[11, 200]. Dislikes hot dry soils[1]. Dislikes atmospheric pollution[166]. Very tolerant of maritime exposure and salt laden winds[75, 81]. The monkey puzzle is a very slow growing tree that can take 5 - 10 years before it even gets above grass height and then grows around 35cm a year [185]. New growth takes place from late June to September[185]. The seed forms a staple food for the native Indians in regions where it grows in Chile, it is also sold in local markets there[46, 139]. This tree has an excellent potential to become a commercial crop in the western parts of Britain, it is high yielding, has large tasty seeds and is easily harvested. Its main disadvantages are its slow rate of growth and the time it takes before the first crop is produced - this can be up to 40 years from seed though we have often seen plants less than 20 years old produce cones[K]. The plant is dioecious so at least one male plant needs to be grown for every 5 -6 females - unfortunately there is no way of telling the sex of the tree until it flowers. There are means of vegetative reproduction and it might be possible to produce clones of known sex in the future - these will probably come into bearing at an earlier age. If you have the space to plant at least 5 trees, and the foresight, this is a tree that will be a very valuable food crop in the future[K]. It is said that 18 goodsized trees can provide enough for an adult's sustenance all year round[2]. Plants grow best in S.W. England and along the west coast of Britain where they produce seed regularly and abundantly[11, 80]. Female cones take 2 - 3 years to mature and break up at the end of the year [185]. They contain up to 200 large seeds. Plants self-sow in Cornwall[80]. We have records of trees regularly producing good crops of seeds in various sites in Cornwall, Devon and the west coast of Scotland. We also have one report of an excellent crop in 1997 from trees at Alvaston Castle near Derby and of a tree in Bedfordshire producing a heavy crop[K]. Trees are notably susceptible to honey fungus[81, 200]. Unlike most conifers, this tree can be coppiced[81]. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 12 through 6. (Plant Hardiness Zones show how well plants withstand cold

and had more than 15 mature cones[K]. A very old specimen at Kew was carrying lots of 1st and 2nd year cones in July 1996[K]. The cones ripen in their third year and can then remain unopened on the tree for several years[1, 81, 200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. This species does not hybridize with other members of this genus[117]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow under the trees[18]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native, Inconspicuous flowers or blooms.

#### 8.2.25 Arbutus unedo

Strawberry Tree

7 tlin 11 cyuc 4 kcak 2 tcan 2 dwat 9 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Arbutus unedo is an evergreen Tree growing to 9 m (29ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from October to December, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Sweet but insipid[2, 3, 5]. The Latin name 'unedo' means 'I eat one (only)' and suggests that the fruit is not very palatable[K], though another report says that the fruit is so delicious that a person only needs to eat one[245]. It does have a somewhat gritty skin, but the fruit itself has the texture of a lush tropical fruit and has a delicate pleasant flavour. For those people with sensitive taste buds, this is a fruit that can be enjoyed when eaten in moderate quantities[K]. The fruit contains about 20% sugars and can be used to make delicious and nourishing jams and preserves[7]. It is ripe in November/December and is about 15mm in diameter. When fully ripe it falls from the tree and so it is advisable to grow the plant in short grass in order to cushion the fall of the fruitfKl.

tcanta Tannin WoodTannin is obtained from the leaves, bark and fruit[46, 61]. The bark contains 45% tannin[46]. Wood - used for turning, Greek flutes etc[89, 148]. It makes a good charcoal[4, 89, 148].

dwatta Antiseptic Astringent Diuretic Dysentery UrinaryThe strawberry tree is little used in herbalism, though it does deserve modern investigation[268]. All parts of the plant contain ethyl gallate, a substance that possesses strong antibiotic activity against the Mycobacterium bacteria[268]. The leaves, bark and root are astringent and diuretic[7, 46, 268]. They are also a renal antiseptic[7] and so are of use in the treatment of affections of the urinary system such as cystitis and urethritis[254]. Their astringent action makes them of use in the treatment of diarrhoea and dysentery and, like many other astringent plants, a gargle can be made for treating sore and irritated throats[254]. The leaves are gathered in the summer and dried for later use[7]. The flowers are weakly diaphoretic[268].

nrakta S. Europe and S.W. Ireland. ksacta Woodland, scrub and rocky hillsides, often on limestone and sand-stone[17, 45].

propta Seed - best surface sown in a cold frame as soon as it is ripe. Stored seed should be soaked for 5 - 6 days in warm water and then surface sown in a shady position in a greenhouse[78]. Do not allow the compost to become dry. 6 weeks cold stratification helps[134]. The seed usually germinates well in 2 - 3 months at 20°c[134]. Seedlings are prone to damp off[184], they are best transplanted to individual pots as soon as they are large enough to handle and should be kept well ventilated. Grow them on in a greenhouse for their first winter and then plant out in late spring after the last expected frosts[K]. Basal cuttings in late winter[200]. Cuttings of mature wood of the current season's growth, November/December in a frame. Poor percentage[78]. Layering of

young wood - can take 2 years[1, 200].

nwatta Landscape Uses:Container, Espalier, Pest tolerant, Hedge, Standard, Specimen. Requires a nutrient-rich well-drained moisture-retentive soil in sun or semi-shade and shelter from cold drying winds, especially when young[11, 2001. Grows well in heavy clay soils and in dry soils. Most species in this genus require a lime-free soil but this species is fairly lime tolerant[11, 200]. Succeeds in fairly exposed maritime positions[166, 200]. A tree in a very exposed position at Rosewarne in N. Cornwall was looking rather tattered in April 1987 but it was 4.5 metres tall and carrying a very good crop of immature fruit[K]. Tolerates industrial pollution[200]. Plants have withstood temperatures down to -16°c without injury at Kew[11]. They grow very well in S.W. England, fruiting well in Cornwall[49, 59]. Plants resent root disturbance and are best placed in their final positions whilst young[11, 134]. Give them some protection in their first winter. The strawberry tree flowers in November and December, the fruit takes 12 months to ripen and so the tree carries both mature fruit and flowers at the same time and is incredibly beautiful at this time[K]. The flowers have a soft honey scent[245]. There are a number of named varieties[183] developed for their ornamental value. 'Elfin King', 'Croomei' and 'Rubra' are all small forms that fruit well when small[182]. The variety 'Rubra' was 1.2 metres tall at Kew in late 1990 and was laden down with fruits and flowers[K]. 'Elfin King' only reaches a height of 1 metre, comes into bearing when young and fruits well[183]. It is ideal for container culture[183], 'Croomei' is said to be a more reliable fruiting form[49]. Special Features: Attracts birds, Not North American native, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 6. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching; a heart root, dividing from the crown into several primary roots going down and out [2-1].

#### 8.2.26 Cephalotaxus lanceolata

Yunnan Plum Yew

7 tlin 10 cyuc 4 kcak 2 tcan 0 dwat 8 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cephalotaxus lanceolata is an evergreen Shrub growing to 8 m (26ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit SeedEdible Uses: We have no details for this species but it is closely related to C. fortunei and so it is quite likely to have edible seed and fruit[K]. The fruit is up to 4.5cm long and 2cm wide[200]. It is certainly worthy of more research[K]. The fruit does not always ripen in Britain, before full ripeness it has a disgusting resinous flavour that coats the mouth and refuses to go away for hours[K].

tcanta Hedge HedgeVery tolerant of pruning, this plant makes a very good hedge in shady positions[200].

drutta Cephalotaxus wilsoniana is an evergreen Tree growing to 10 m (32ft 10in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[81]. Fairly large, about 30mm x 15mm[200]. We have no more details, though this plant is closely related to C. harringtonia, the fruit of which is edible raw if fully ripe[K]. The fruit does not always ripen in Britain, before full ripeness it has a disgusting resinous flavour that coats the mouth and refuses to go away for hours[K]. It is quite likely that the seed of this species is also edible. More research is required[K].

nrakta E. Asia - Taiwan ksacta An understorey tree in woodlands[200].

propta Seed - best sown as soon as it is ripe in a cold frame[113], it should then germinate in the following spring[K]. A hard seedcoat can delay germination, especially in if the seed is not sown as soon as it is ripe[81, K]. Stored seed should be cold-stratified and sown in a cold frame in the spring[200]. Germination can take 18 months or more. Prick out the seedlings as soon as they are large enough to handle and grow them on for at least their first winter under cover. Plant out in late spring after the last expected frosts. Greenwood cuttings of terminal shoots, August/September in a humid cold frame[1, 200]. Difficult[113].

nwatta Prefers a moist well-drained sandy soil but succeeds in most soils though it dislikes dry gravelly or chalky soils[1, 200]. Prefers a position in semi-shade but tolerates full shade[11, 81] and it also succeeds but does not usually thrive in full sun[200]. It grows very well in the mild wet coastal region of W. Scotland where it succeeds even in full sun[200]. Requires a humid sheltered site[200], strongly disliking very exposed positions[1]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Closely related to C. fortunei[11, 200]. Plants are dioecious, but female plants sometimes produce fruits and infertile seeds in the absence of any male plants[11]. However, at least one male plant for every five females should be grown if you are growing the plants for fruit and seed. Plants have also been known to change sex[81]. Male cones are produced in the axils of the previous year's leaves, whilst female cones are borne at the base of branch-

#### 8.2.24 Pinus pinea

Italian Stone Pine, Umbrella Pine, Stone Pine
7 tlin 11 cyuc 4 kcak 4 tcan 2 dwat 10 m hkuc
htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli dyat hionli

drutta Pinus pinea is an evergreen Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June, and the seeds ripen in April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222]. kcakta Edible Parts: SeedEdible Uses: CondimentSeed - raw or cooked[1, 2, 4, 11, 34, 63]. Rich in oil, the seed has a soft texture with a hint of resin in the flavour. It makes a delicious snack and can also be used as a staple food[K].

The seeds are often added to ice cream, cakes, puddings etc[183]. They can also be ground into a powder and used as a thickener and flavouring in soups etc[K]. The seed is a good size, up to 20mm x 10mm, and is a major source of pine nuts in commerce[200]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200]. Young pine cones can be ground into a powder and used as a flavouring.[183]

tcanta Dve Herbicide Resin WoodA tan or green dve is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Yields a resin and turpentine[57, 64, 171]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood. Used for carpentry, furniture making etc[100].

dwatta The turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta S. Europe around the Mediterranean. ksacta Maritime sands and alluvium[89].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also hadly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Management: Standard Minor Global Crop Staple Crop: Protein-oilLandscape Uses:Aggressive surface roots possible. Screen, Seashore, Specimen, Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1] and shady positions[160]. Established plants tolerate drought[200]. Succeeds in a chalky soil[11]. This species is hardy to about -18°c[160]. Although sometimes thought to be somewhat tender in this country, it is perfectly hardy as far north as south-east Scotland[185]. The trees transplant very badly if they are allowed to stay in one position for more than 2 years. This is usually a short-lived tree, rarely surviving for much more than 100 years[185]. The Italian stone pine is extensively planted for its edible seeds in Europe[81, 200]. The variety 'Fragilis' has thin shelled seeds and is the form most widely cultivated[200]. Trees take between 10 and 20 years to produce cones from seed[160]. One of our plants produced its first young female cone when 7 years old, though this did not mature because it was not fertilised[K]. A 20 year old plant at Kew was about 4.5 metres tall with a number of trunks

winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. An evergreen.

#### 8.2.2 Diospyros lotus

Date Plum

7 tlin 9 cyuc 5 kcak 2 tcan 1 dwat 9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Diospyros lotus is a deciduous Tree growing to 9 m (29ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in July, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3]. The fruit has an exquisitely rich flavour when it is fully ripe (almost at the point of going bad), but it is very harsh and astringent before then[K]. The fruit may not ripen properly in a cool summer, though if it is frosted it normally develops a very good flavour[K]. The fruit can be dried, when it acquires a date-like flavour[61, 183]. The fruit can also be harvested in the autumn, preferably after a frost, and bletted[183]. (This is a process where the fruit is kept in a cool place and only eaten when it is very soft and almost at the point of going rotten). The fruit of trees in a fairly sunny position at Kew ripens on the tree in most years and produces fertile seed[K]. The fruit contains about 1.9% protein, 0.2% fat, 47.7% carbohydrate, 1% ash[179]. Fruits are about the size of a large cherry, they turn from yellow to blue-black when fully ripe[183]. The fruit is about 20mm in diameter[200].

tcanta Rootstock WoodSometimes used as a rootstock for D. kaki[183]. Wood - durable, pliable, resists rot. Used for construction, general carpentry etc[74].

dwatta Febrifuge SedativeThe fruit is febrifuge[178, 240]. It is also used to promote secretions[240]. The seed is regarded in China as being sedative[240].

nrakta E. Asia - China, Japan. Himalayas. ksacta Mixed mountain forests to 1500 metres in China[74].

propta Seed - best sown in a cold frame as soon as it is ripe[113, 200]. Stored seed requires a period of cold-stratification and should be sown as early in the year as possible[78]. It usually germinates in 1 - 6 months at 15°c[175]. Pot up the young seedlings as soon as they are large enough to handle into fairly deep pots and plant them out into their permanent positions in early summer. Give them some protection from winter cold for their first year or two outdoors. Cuttings of half-ripe wood, July/August in a frame[200]. Layering in spring[200].

nwatta Requires a good deep loamy soil in sun or light be discovered by When being grown for its fruit, the tree should be given a warm, sheltered, sunny position[K]. It dislikes very acid or wet and poorly drained soils[200]. Dormant plants are very cold-hardy, but the young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Dioecious, but the female tree can produce seedless fruits in the absence of a pollinator[1]. It is likely that unfertilized fruits are more astringent than fertilized fruits since this is the case with D. kaki[K]. Plants have a long tap root and are difficult to transplant[200], it is best to plant them out in their permanent position as soon as possible and to give protection

overwinter for the first year or two[K]. This species is sometimes cultivated for its edible fruit in Italy and E. Asia, there are some named varieties[142, 183].

#### 8.2.3 Atriplex halimus

Sea Orach, Saltbush

7 tlin 10 cyuc 5 kcak 3 tcan 1 dwat 2 m hkuc

htut cyutli ngatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli

drutta Atriplex halimus is an evergreen Shrub growing to 2 m (6ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year, in flower in July. The species is monoccious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves.

kcakta Edible Parts: Leaves Manna SeedEdible Uses: Leaves - raw or cooked[2, 46, 61, 177]. Some forms are eaten raw[177]. A famine food according to one report[177], but in our opinion it is far from being a famine food, in fact this is one of the more popular crops being grown at 'The Field' at present (1993)[K]. The leaves have a very nice rather salty flavour, they go well in salads or can be cooked like spinach[K]. When lightly steamed, the leaves retain their crispness and are a delicious spinach substitute[K]. The leaves retain their salty flavour even when grow inland in non-salty soils[K]. The leaves can be used at any time of the year though winter harvesting must be light because the plant is not growing much at this time[K]. Seed - cooked[85]. It can be ground into a meal and used as a thickener in soups, or mixed with cereals in making bread. The seed is small and fiddly. The plant is said to yield an edible manna[183].

tcanta Hedge Hedge Soap making Soil reclamationThe ash from the burnt plant is used as the alkali in making soap[46, 61]. The plant makes a superb wind-resistant low-growing hedge that can be allowed to grow untrimmed or can be trimmed[K]. It is especially valuable in maritime areas, succeeding right on the coast, though can also be used inland[75, 182, K]. The plant is extremely tolerant of pruning and can regrow even when cut back into old wood[K]. The plant draws salt out of the soil and so has been used in soil-reclamation projects to de-salinate the soil[K].

dwatta CarminativeThe shoots are burnt to produce an antacid powder[238].

nrakta S. Europe. Occasionally naturalized in Britain[200]. ksacta Coastal sands by the sea[1, 100]. Saltmarshes[200].

propta Seed - sow April/May in a cold frame in a compost of peat and sand. The seed usually germinates in 1 3 weeks at 13°c[134]. Pot up the seedlings when still small into individual pots, grow on in a greenhouse for the first winter and plant out in late spring or early summer after the last expected frosts. The seed is seldom formed[200]. Cuttings of half-ripe wood, July/August in a frame. Very easy. Pot up as soon as they start to root (about 3 weeks) and plant out in their permanent positions late in the following spring[K]. Cuttings of mature wood of the current season's growth, November/December in a frame. Very easy. Pot up in early spring and plant out in their permanent position in early summer[K].

nwatta An easily grown plant, it succeeds in full sun in any well-drained but not too fertile soil[182, 200]. Tolerates saline and very alkaline soils[200]. Succeeds in dry soils including pure sands[49, 75]. Plants will grow in semi-shade, though they will soon become leggy in such a position, they are really best in full sun[K]. A very wind hardy plant, it is resistant to salt-laden gales[75], and can be used as a hedge in maritime areas[182]. Plants dislike very wet climates[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5

and -10°c[200]. This plant is hardier than the foregoing report suggests, it grows well at Hilliers Arboretum in Hampshire where temperatures can fall somewhat lower than -10°c[K]. Plants can be damaged by severe frosts but they soon recover[11]. Resents root disturbance when large[134]. Plants are apt to succumb to winter wet when grown on heavy or rich soils[182]. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc., and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is branching: a heart root, dividing from the crown into several primary roots going down and out [2-1].

# 8.2.4 Rubus loganobaccus

Loganberry

7 tlin 10 cyuc 5 kcak 1 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rubus loganobaccus is a deciduous Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Apomictic (reproduce by seeds formed without sexual fusion). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 3, 34, 61, 171]. A pleasant acid flavour, it usually crops heavily[K]. The fruit is up to 4cm in diameter[200].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168].

nrakta Probably a hybrid between R. ursinus and the raspberry 'Red Antwerp'. Rarely naturalized in Britain. ksacta Not known in a truly wild situation.

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Tolerates all but the most alkaline soils[202]. Plants dislike exposed windy situations[K]. Hardy to about -18°c[202]. Often cultivated for its edible fruit in temperate countries, there are some named varieties[61], including forms with thornless stems[200]. 'LY654' is a thornless form with good flavour[200]. This species has fast-growing biennial stems[202], it produces a number of new stems each year from the perennial rootstock, these stems fruit in their second year and then die[200]. The plant produces apomictic flowers, these produce fruit and viable seed without fertilization, each seedling is a genetic copy of the parent[200]. Plants in this genus are notably susceptible to honey fungus[200]. Closely related to R. ursinus[200]. Plants are liable to attacks of raspberry cane spot and mildew, otherwise they are one of the most reliable of the fruiting members of this genus[202].

#### 8.2.5 Campanula versicolor

7 tlin 10 cyuc 5 kcak 0 tcan 0 dwat 1.2 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli fyifxre7t hjonli

drutta Campanula versicolor is a PERENNIAL growing to 1.2 m (4ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beethes, Lepidoptera (Moths and Butterflies). The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves - raw or cooked[46, 61, 105]. Rich in vitamin C. A delicious mild flavour with a slight sweetness that reminds people of freshly-picked garden peas, they can be added in quantity to salads and are usually available in winter[K]. They are liked by most people who try them[K]. Flowers - raw. Very pleasant with a slight sweetness, they make a tasty and decorative addition to salads[K].

nrakta Europe - Greece. ksacta Rocky places[50] in the lower wood region[221].

propta Seed - surface sow spring in a cold frame. The seed usually germinates in 2 - 4 weeks at 18°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer. Basal cuttings in spring[200]. Once they are a few years old, plants produce a number of rosettes and these can be carefully removed in the spring and used as cuttings[221]. Harvest the shoots when they are about 10 -15cm long with plenty of underground stem. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Root cuttings are said to work[221]. The plant has a thick fleshy root with a number of crowns. Whilst this can be divided if great care is taken not to damage the root, it is not really recommended because the divisions take a long time to become established[221].

nwatta Succeeds in most fertile well-drained soils[233], though it prefers a sunny position in a moist but welldrained rich sandy loam and a neutral or alkaline soil[1, 200]. Strongly resents winter wet[1]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Plants may require protection in severe winters[1], though they have proved reliable in Cornwall[K]. This species provides some of the nicest salad leaves that we have tried to date, it has an excellent potential as an edible ornamental in the garden, though it is not really suitable for commercial cultivation[K]. The plants have a basal rosette in winter and continue to grow slowly in all but the coldest weather, providing edible leaves most winters[K]. The species in this genus do not often hybridize and so seed can generally be relied upon to come true[221]. The plants are self-fertile[221]. A very ornamental plant[1]. It is closely related to C. pyramidalis, but is more reliably perennial[221]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.6 Ugni molinae

Uñi, Chilean guava

7 tlin 11 cyuc 5 kcak 3 tcan 0 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ugni molinae is an evergreen Shrub growing to 2 m (6ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from May to July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pff: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

drutta Abutilon megapotamicum is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers-cooked. Used as a vegetable[183]. A pleasant sweet flavour, we find them delicious to eat raw[K]. The flowers are produced from mid spring until the autumn - they produce nectar all the time they are open so, assuming the plant is grown indoors and is not visited by pollinating insects, the sweetness increases the longer the flower is open[K].

nrakta S. America - Brazil. ksacta Widely cultivated in the Tropics and not known in a truly wild situation.

propta Seed - sow spring in a greenhouse[200]. Germination should take place within a few weeks. Once the seedlings are large enough to handle, prick them out into individual pots. Grow them on for at least the first winter in a greenhouse and plant out in late spring or early summer, after the last expected frosts. Cuttings of young shoots, June in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts.

nwatta Requires a sunny position or part day shade in a fertile well-drained soil[200]. Dislikes drought[200]. This species is only hardy in the mildest areas of Britain, tolerating temperatures down to between -5 to -10°c when given the protection of a south or south-west facing wall[11, 184, 200]. A deep mulch in winter and tving in growth to the wall will maximise protection in winter[200]. If the plant is cut back by cold weather, it will normally resprout from the base in the spring and can flower on the current year's growth[202]. Dead-heading plants to prevent seeding can enhance longevity[200]. Tip-prune young plants to promote a bushy habit, older plants can be cut back hard annually in spring if required[200]. There are some named forms, selected for their ornamental value [200]. There is a variegated form in cultivation, this variegation is as a result of infection by abutilon mosaic virus[184, 200]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.21 Arbutus x andrachnoides

7 tlin 10 cyuc 4 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Arbutus x andrachnoides is an evergreen Tree growing to 10 m (32ft) by 8 m (26ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year, in flower from October to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[K]. A pleasant texture with a sweet but delicate flavour, the fruit is considered to be insipid by many people[K]. Very similar in size and taste to the strawberry tree, A. unedo[K], though it is not usually borne very freely[200].

nrakta S.E. Europe to W. Asia. ksacta Not known

propta Seed - best surface sown in a cold frame as soon as it is ripe. Stored seed should be soaked for 5 - 6 days in warm water and then surface sown in a shady position in a greenhouse[78]. Do not allow the compost to become dry. 6 weeks cold stratification helps[134]. The seed usually germinates well in 2 - 3 months at 20°c[134]. Seedlings are prone to damp off[184], they are best transplanted to individual pots as soon as they are large enough to handle and should be kept well ventilated. Grow them on in a greenhouse for their first winter and then plant out in late spring after the last expected frosts[K]. This species is a hybrid and is unlikely to breed true from seed. Basal cuttings in late

winter[200]. Cuttings of mature wood of the current season's growth, November/December in a frame. Poor percentage[78]. Layering of young wood - can take 2 years[1, 200].

nwatta Prefers a lime-free nutrient-rich well-drained moisture-retentive soil in a sunny position with shelter from cold drying winds, especially when young[200]. Unlike most members of this genus, this species thrives on a limy soil[184, 200]. Plants are hardy to about -15°c[184]. A naturally occurring hybrid between A. unedo and A. andrachne[200]. There are some named forms, selected for their ornamental value[200]. Trees rarely produce fruit in Britain[200]. Plants resent root disturbance and are best placed in their final positions whilst young[11, 134]. Give them some protection in their first winter. Plants sometimes flower in the spring, but more usually in the late autumn and early winter.

#### 8.2.22 Cornus elliptica

wisslip hpa7tmwatli xre7t hionli

7 tlin 10 cyuc 4 kcak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprikl-

drutta Cornus elliptica is an evergreen Tree growing to 10 m (32ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pfr. mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: The fully ripe fruit is sweet and edible[266]. The fruit is up to 25mm in diameter[266].

tcanta WoodWood - hard. It is used for making tools[266].

nrakta E. Asia - western China. ksacta Forests, slopes, streamsides at elevations of 300 - 2200 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80. 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta We have very little information on this species and so are not sure how hardy it is in the temperate zone. It is, however, very closely related to C. capitata and is likely to be of similar hardyness. The following notes are for C. capitata. An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. Prefers semi-shade[219]. This species is hardy to between -5 and -10°c[184], it grows very well in S.W. England, self-sowing and fruiting prolifically in Cornish woodland gardens[11, 49, 59, , 104, 182] and doing well by the coast where it tolerates sea winds[182]. Plants are not hardy in the London area, being killed even when on a south-facing wall[11]. Another report says that it succeeds as far north as Edinburgh. Squirrels are very fond of this fruit[166]. Plants in this genus are notably resistant to honey fungus[200]

# 8.2.23 Cephalotaxus wilsoniana

7 tlin 10 cyuc 4 kcak 0 tcan 0 dwat 10 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

These non-astringent forms require a warmer climate and do not ripen in cooler areas[183]. The astringent cultivars are somewhat hardier and ripen well in cooler climates than the non-astringent forms[183]. The fruit colours better and is sweeter in warmer areas but in hot conditions has a poor texture and deep black spots develop[183]. If allowed to become very ripe (almost to the point of going rotten), they develop a better flavour than non-astringent forms[183]. Dioecious, but the female tree can produce seedless fruits in the absence of a pollinator. However, unfertilized fruit tends to be smaller and more astringent[200]. This astringency is due to the high content of tannin but once the fruit is fully ripe it loses this astringency and becomes sweet[132]. If fertilized fruit is required, then growing one male for every 8 - 10 females is usually adequate [238]. Special Features: Edible, Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 10 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a nonsuckering single trunk [1-2]. The root pattern is a tap root similar to a carrot going directly down [1-2].

#### 8.2.18 Cornus capitata

Bentham's Cornel

7 tlin 10 cyuc 4 kcak 3 tcan 1 dwat 12 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslio hpa7tmwatli xre7t hionli

drutta Cornus capitata is an evergreen Tree growing to 12 m (39ft) by 12 m (39ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A bitter-sweet flavour[2, 105, 183], tasting like an over-ripe banana[166]. The fruit can also be used in preserves[51, 146]. The fruit is about 25mm in diameter[200], it is fleshy with a number of seeds and a tough slightly bitter skin[K]. Our experience is that some trees can produce quite pleasant tasting fruits, but many others produce fruit with a distinct and unpleasant bitterness[K]. The fruit ripens in late autumn to early winter and will fail to ripe properly if the weather is very cold[K].

tcanta Fuel Tannin WoodThe branches and leaves are a source of tannin[266]. Wood - very hard, close grained but warps when being seasoned. Used mainly for fuel[158, 272] and for making tools[266].

dwatta AstringentThe bark is used medicinally[266]. No further information is given, though the bark is a source of tannin which is used as an astringent[K].

nrakta E. Asia - China to the Himalayas. ksacta Forests and shrubberies to 3400 metres in the Himalayas[51]. Moist hillsides at elevations of 1700 - 2600 metres in Nepal[272]. Evergreen and mixed forests, 1000 - 3200 metres

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 113]. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the

seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage[78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. Prefers semi-shade[219]. This species is hardy to between -5 and -10°c[184], it grows very well in S.W. England, self-sowing and fruiting prolifically in Cornish woodland gardens[11, 49, 59, , 104, 182] and doing well by the coast where it tolerates sea winds[182]. Plants are not hardy in the London area, being killed even when on a south-facing wall[11]. Another report says that it succeeds as far north as Edinburgh. Squirrels are very fond of this fruit[166]. This species has been known to hybridize with C. kousa, the cultivar 'Norman Hadden' could be such a hybrid[182]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.19 Wyethia mollis

Woolly Wyethia, Woolly mule-ears 7 tlin 10 cyuc 4 kcak 0 tcan 1 dwat m hkuc

htut cyutli hgattcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Wyethia mollis is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate droudht.

pcista One report suggests that the leaves might be poisonous[94].

kcakta Edible Parts: Root SeedEdible Uses: Root -cooked. A sweet and agreeable flavour[94]. The N. American Indians dug pits in the ground which they lined with large stones. They then burnt a fire on top of the stones until the stones were hot. The roots were placed on these hot stones, sealed in with fern leaves and earth and then fermented for one or two days[94]. Seed - raw or cooked[257]. The seed can be used as a mush or mixed with cereals flours to make bread etr[257]

dwatta Antiphlogistic Blood tonic Diaphoretic Emetic Febrifuge PoulticeThe root is antiphlogistic, diaphoretic, emetic and febrifuge[94, 257]. A decoction has been used as a blood tonic and also in the treatment of tuberculosis, venereal diseases, colds and fevers[257]. A poultice of the crushed roots has been applied to swellings[257]. A poultice of the crushed leaves has been applied to sprains, swellings and broken bones[257].

nrakta South-western N. America - Oregon to California. ksacta Dry wooded slopes and rocky openings, 1500 - 3000 metres in California[71].

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse or cold frame in early spring. Use a very freely-draining compost, prick out the seedlings into individual pots as soon as they are large enough to handle and plant out into their permanent positions when they are large enough. Careful division of the crown as the plants come into growth in spring[200].

nwatta Requires a free-draining, gritty but moistureretentive soil in a sunny position[200]. This species is more tolerant of drought than other members of the genus[200]. Plants are not hardy in the colder areas of Britain[200].

# 8.2.20 Abutilon megapotamicum

Trailing Abutilon

77 tlin 10 cyuc 4 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli kcakta Edible Parts: Fruit Leaves SeedEdible Uses: Coffee TeaFruit - raw or cooked[2, 3]. An absolutely delicious flavour, it is very aromatic and tastes of wild strawberries[11, 15, K]. The fruit is about 15mm in diameter[196] and is freely borne even on small plants[K]. Leaves are a tea substitute[177, 183]. The roasted seeds are a coffee substitute[183].

tcanta Hedge HedgeTolerant of trimming, it can be grown as a small hedge in the milder parts of Britain[11].

nrakta S. America - Chile. ksacta Woodland edges and scrub[11, 184].

propta Pre-soak the seed for 24 hours in warm water and then sow it in late winter in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Pot up in the autumn and overwinter in a cold frame. Plant out in late spring. High percentage[78]. Cuttings of mature wood of the current seasons growth, 7 - 12cm with a heel, November in a shaded and frost free frame. Plant out in late spring or early autumn. High percentage[78]. Layering.

nwatta Succeeds in any reasonably good soil including[1] dry ones. Prefers a moderately fertile well-drained loam in a sunny position[11, 200]. Fairly tolerant of maritime exposure[K]. Established plants are drought resistant[196]. A very ornamental plant[1], it is only hardy in the milder parts of Britain[3], tolerating temperatures down to about -10°c when fully dormant[184]. The young growth in spring can be damaged by late frosts. Plants grow and fruit very well in Cornwall, indeed, in the past it has been cultivated commercially for its fruit there[11, 59] (it was one of Queen Victoria's favourite fruits), but is now normally only grown as an ornamental plant. This is a much underused plant that highly merits cultivation on a commercial scale for its fruit[K]. Flowers and fruits well even when the plants are young[11, 166]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.7 Rubus nepalensis

Nepalese Raspberry

7 tlin 10 cyuc 5 kcak 3 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tl

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Rubus nepalensis is an evergreen Shrub growing to 0.2 m (0ft 8in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1, 105]. A very well flavoured and reasonably sized raspberry with just a little sourness[K]. It generally fruits well in the garden, though there are some forms that produce very little fruit, or poorly shaped fruits[K].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]. An excellent ground-cover plant, forming a quite effective weed-suppressing mulch[K].

nrakta E. Asia - Himalayas. ksacta Rocks, banks and shrubberies to 3300 metres[51].

propta Seed - requires stratification, is best sown in early autumn in a cold frame. Sow stored seed as early as possible in the year in a cold frame and stratify for a month at 3°c if sowing later than February. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Tip layering in July. Plant out in autumn. Division in early spring. Very easy, the plants can be divided successfully at almost any time of the year. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a

cold frame, planting them out once they are well established in the summer.

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Prefers a sheltered semishady position[11]. Plants survive considerable neglect, they can grow and spread in long grass though they do not fruit well in such a position[K]. Plants are not very drought tolerant[K]. The Nepalese raspberry is a very ornamental plant, though it loses some of its leaves in a cold winter and can look a little bedraggled at this time[K]. It is also unhappy in exposed maritime situations and in a sunny position in very hot summers. A report that this species is not hardy in zones colder than 9 is very questionable, the plant has survived guite hard frosts with us in Cornwall and grows happily at Kew Gardens[K]. There is also a clump growing successfully in a sheltered position in the semi-shade of trees at Cambridge Botanical gardens, this fruited guite well in the summer of 1996[K]. Plants in this genus are notably susceptible to honey fungus[200]. In garden design, as well as the aboveground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is suckering with new plants from runners away from the plant [2-1].

# 8.2.8 Allium triquetrum

Three-Cornered Leek

7 tlin 10 cvuc 5 kcak 0 tcan 2 dwat 0.4 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Allium triquetrum is a BULB growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf from February to July, in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. The rather small bulb is up to 20mm in diameter[200], it has a mild garlic flavour and can be used as a flavouring in salads and cooked foods. It is harvested in early summer when the plant has died down and will store for at least 6 months[K]. Leaves - raw or cooked. A leek substitute[22]. The leaves are available from late autumn until the spring, they are nice in salads when they are young, or cooked as a vegetable or flavouring as they get older[K]. The leaves have a milder and more delicate flavour than onions[183]. Flowers - raw. Juicy with a mild garlic flavour, they make a tasty and decorative garnish on salads[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta S. Europe. Naturalized in Britain in S.W. England[17]. ksacta Hedge banks and waste places on damp soils[17, 90].

propta Seed - best sown as soon as it is ripe in a greenhouse or cold frame. It germinates quickly and can be grown on in the greenhouse for the first year, planting out the dormant bulbs in the late summer of the following year if they have developed sufficiently, otherwise grow on in pots for a further year. Stored seed can be sown in spring in a greenhouse. Division in summer after the plants have died down. Very easy, the divisions can be planted straight out into their permanent positions.

nwatta Prefers a rich moist but well-drained soil[1, 42]. Shade tolerant[31], it is easily grown in a cool leafy soil[90] and grows well in light moist woodland[203]. Plants are not very hardy outside the milder areas of Britain, they tolerate temperatures down to between -5 and -10°c. The bulbs should be planted fairly deeply[1]. The seeds have an oilbearing appendage which is attractive to ants. The ants carry the seed away to eat the oil and then discard the seed, thus aiding dispersal of the plant[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a had companion for alfalfa, each species negatively affecting the other[201]. The flowers are sweetly scented[245]. The picked flowers can remain fresh for several weeks[89]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.9 Allium sativum ophioscorodon

Sernent Garlic

7 tlin 10 cyuc 5 kcak 4 tcan 5 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Allium sativum ophioscorodon is a BULB growing to  $0.6\ m$  (2ft) by  $0.2\ m$  (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista There have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of this species. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Bulb - raw or cooked. Widely used, especially in southern Europe, as a flavouring in a wide range of foods, both raw and cooked[244]. Garlic is a wonderfully nutritious and health giving addition to the diet, but it has a very strong flavour and so is mainly used in very small quantities as a flavouring in salads and cooked foods[2, 9, 14, 27, 33]. A nutritional analysis is available[218]. The bulbs can be up to 6cm in diameter[200]. Bulbils - raw or cooked[K]. An excellent strong garlic flavour, though they are rather small and therefore fiddly to peel[K]. Leaves - raw or cooked. Chopped and used in salads, they are rather milder than the bulbs[200, K]. The Chinese often cultivate garlic especially for the leaves, these can be produced in the middle of winter in mild winters[206]. The flowering stems are used as a flavouring and are sometimes sold in Chinese shops[183]. The sprouted seed is added to salads[183].

tcanta Adhesive Fungicide RepellentThe juice from the bulb is used as an insect repellent[7, 14]. It has a very strong smell and some people would prefer to be bitten[K]. The juice can also be applied to any stings in order to ease the pain[7, 14]. 3 - 4 tablespoons of chopped garlic and 2 tablespoons of grated soap can be infused in 1 litre of boiling water, allowed to cool and then used as an insecticide[201]. An excellent glue can be made from the juice[7], when this is spread on glass it enables a person to cut clean holes in the glass[7], The juice is also used as a glue in mending glass and china[46]. An extract of the plant can be used as a fungicide[18]. It is used in the treatment of blight and mould or fungal diseases of tomatoes and potatoes[201]. If a few cloves of garlic are spread amongst stored fruit, they will act to delay the fruit from rotting[7]. The growing plant is said to repel insects, rabbits and moles[14, 20].

dwatta Anthelmintic Antiasthmatic Anticholesterolemic Antiseptic Antispasmodic Cancer Cholagogue Diaphoretic Diuretic Dysentery Expectorant Febrifuge Stimulant Stings Stomachic Tonic VasodilatorGarlic has a very long folk history of use in a wide range of ailments, particularly ailments such as ringworm, Candida and vaginitis where its fungicidal, antiseptic, tonic and parasiticidal properties have proved of benefit[218]. The plant produces inhibitory effects on gram-negative germs of the typhoid-paratyphoid-enteritis group, indeed it possesses outstanding germicidal properties[240] and can keep amoebic dysentery at bay[244]. It is also said to have anticancer activity[218]. It has also been

shown that garlic aids detoxification of chronic lead poisoning[244]. Daily use of garlic in the diet has been shown to have a very beneficial effect on the body, especially the blood system and the heart. For example, demographic studies suggest that garlic is responsible for the low incidence of arteriosclerosis in areas of Italy and Spain where consumption of the bulb is heavy[222]. Recent research has also indicated that garlic reduces glucose metabolism in diabetics, slows the development of arteriosclerosis and lowers the risk of further heart attacks in myocardial infarct patients[238, 254]. Externally, the expressed juice is an excellent antiseptic for treating wounds[244]. The fresh bulb is much more effective medicinally than stored bulbs, extended storage greatly reduces the anti-bacterial action[244]. The bulb is said to be anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, cholagogue, diaphoretic, diuretic, expectorant, febrifuge, stimulant, stings, stomachic, tonic, vasodilator[4, 9, 14, 21, 46, 165].

nrakta C. Asia? Original habitat is obscure. ksacta Not known in a truly wild situation.

propta Plant out the cloves in late autumn for an early summer crop[33, 200]. They can also be planted in late winter to early spring though yields may not be so good. Plant the cloves with their noses just below the soil surface[200]. If the bulbs are left in the ground all year, they will often produce tender young leaves in the winter[Kl. Bulbils, harvested in late summer, are best sown immediately in pots in a cold greenhouse, planting out in late spring after the last expected frosts[Kl. They can also be stored in a cool place over the winter and then be planted outdoors like onion sets. They will not make such a big plant in their first year, however[Kl.

nwatta Succeeds in most soils but prefers a sunny position in a moist light well-drained soil[1, 14, 16, 37]. Dislikes very acid soils[206]. Tolerates a pH in the range 4.5 to 8.3. The bulb is liable to rot if grown in a wet soil[27, 52]. Hardy to at least -10°c[206]. The bulbs should be planted fairly deeply[1]. Garlic is widely cultivated in most parts of the world for its edible bulb, which is used mainly as a flavouring in foods. This sub-species differs mainly in forming more bulbils on the flowering head, and this flowering head usually coils into 1-2 loops before opening[200]. Since it produces these bulbils (which make an excellent garlic, though they are rather on the small side) as well as underground cloves, it can be more productive[K]. We often grow this plant for a number of years before digging it up - it forms larger and larger clumps each year, with an abundance of bulbils[K]. There are a number of named varieties[183]. Bulb formation occurs in response to increasing daylength and temperature[200]. It is also influenced by the temperature at which the cloves were stored prior to planting. Cool storage at temperatures between 0 and 10°c will hasten subsequent bulb formation, storage at above 25°c will delay or prevent bulb formation[200, 206]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing

# 8.2.10 Allium sativum

Garlic, Cultivated garlic

7 tlin 10 cyuc 5 kcak 4 tcan 5 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Allium sativum is a BULB growing to 0.6 m (2ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista There have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of this species. Dogs seem to be particularly susceptible[76]. Avoid with anticlotting medication. Breastfeeding may worsen baby's colic. Avoid several weeks prior to surgery. Bad breath!! [301]. of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc, for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - soft, light, close-grained[82].

dwatta PoulticeThe gum exuding from damaged areas of the tree is used to treat sore throats[92, 117]. The turpenine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta Southern N. America. ksacta Hot arid mountain slopes above 2000 metres, with juniper and scrub oak[82, 181]

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are guite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

mwatta Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought, succeeding in hot dry positions[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between 5 and -10°c[200]. Leaf secretions inhibit the germination of seeds, thereby inhibiting the growth of other plants below the tree[18]. Slow growing[81, 120], it takes 25 years from seed before cones are formed[117]. The tree takes 250 - 350 years to reach full maturity[181]. The cones open and shed their seed whilst still attached to the tree[226]. This sub-species has larger seeds than the type[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Plants in this genus are notably susceptible to honey fungus[200].

# 8.2.17 Diospyros kaki

Persimmon, Japanese persimmon

7 tlin 10 cyuc 4 kcak 3 tcan 3 dwat 12 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Diospyros kaki is a deciduous Tree growing to 12 m (39ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to August, and the seeds ripen in November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Coffee Condiment SweetenerFruit - raw or cooked[1, 2, 3, 7, 46, 61]. The fruit has an exquisitely rich flavour when it is very soft and fully ripe (almost at the point of going bad), but the fruit of many cultivars is very harsh and astringent before then[K] In Britain, the fruit needs to be harvested whilst it is still very hard. This is done very late in the season (in December or even January if possible), it is then stored in a cool but frost-free place until very soft and fully ripe[K]. The fruit can also be used in pies, cakes, bread, desserts etc[183]. It contains 25% sugars[74]. A fuller nutritional analysis is available[218]. The fruit can also be dried for later use[183]. The fruit is about 7.5cm in diameter[200]. The peel of the fruit can be powdered and used as a sweetener[183]. The leaves are used to improve the flavour of pickled radishes [183]. The roasted seeds are a coffee substitute[183, 240].

tcanta Cosmetic WoodThe pulp of unripe fruits is used in cosmetics to make face-packs because of its firming qualities[7]. Wood - hard and durable with a beautiful grain. Used for making fine furniture[266].

dwatta Anthelmintic Antitussive Antivinous Appetizer Astringent Demulcent Expectorant Febrifuge Hypotensive Laxative Sialagogue Stomachic StypticAppetizer, sialagoque[116, 176, 178]. The stem bark is astringent and styptic[218]. The fruit is said to have different properties depending on its stage of ripeness, though it is generally antitussive, astringent, laxative, nutritive and stomachic[218, 238]. The fresh fully ripe fruit is used raw in the treatment of constipation and haemorrhoids[238] and when cooked is used to treat diarrhoea[238].. The dried ripe fruit is used in the treatment of bronchial complaints[238], whilst when ground into a powder it is used to treat dry coughs[238]. Juice from the unripe fruit is used in the treatment of hypertension[218, 238]. The fruits, picked green and ripened in containers with the leaves, become very sweet and are considered to be antifebrile, antivinous and demulcent[218]. The fruits are also peeled and then exposed to sunlight by day and dew by night. They become encrusted with a white powder and are then considered to be anthelmintic, antihaemorrhagic, antivinous, expectorant, febrifuge and restorative[218]. The peduncle is used to treat coughs and hiccups[218]. The calyx is used to treat hiccups[176].

nrakta E. Asia - China, Japan. ksacta Not known in a truly wild situation, it is found in broad leafed woodland but probably as an escape from cultivation[74, 200].

propta Seed - best sown in a cold frame as soon as it is ripe[113, 200]. Stored seed requires a period of cold-stratification and should be sown as early in the year as possible[78]. It usually germinates in 1 - 6 months at 15°c[175]. Pot up the young seedlings as soon as they are large enough to handle into fairly deep pots and plant them out into their permanent positions in early summer. Give them some protection from winter cold for their first year or two outdoors. Cuttings of half-ripe wood, July/August in a frame[200]. Layering in spring[200].

nwatta Landscape Uses: Pest tolerant. Prefers a good deep loamy soil in sun or light shade but succeeds in most soils[11, 132, 200]. Dislikes very acid or wet and poorly drained soils[200]. Requires a sheltered position[200]. Dormant plants are quite hardy in Britain, tolerating temperatures down to about -14°c[74], but they require warmer summers than are normally experienced in Britain in order to ripen their fruit and wood[3]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A warm sunny wall improves the chance of producing ripe fruit[3] and trees fruit freely when grown under glass[1]. Fruits are frequently produced outdoors at Kew[11, K]. A tree seen in a open position with afternoon shade at Kew in November 1993 (after a cool summer) had about 200 almost ripe fruits around 8cm in diameter[K]. The same tree, after a fairly warm summer in 1996, had a large quantity of fruit just about ready for harvesting in the middle of December[K]. Trees produce a long taproot and should be planted out into their permanent positions as soon as possible[200]. The young trees require some winter protection for their first winter or two[K]. The persimmon is widely cultivated for its edible fruit in warm temperate areas of the world, especially in Japan and China, there are many named varieties[183]. Some cultivars, such as 'Fuyu', lack the usual astringency and can be eaten whilst still firm, though they develop a richer flavour if allowed to become soft[183, 200].

ative, anthelmintic, anti-inflammatory, astringent and depurative[9, 218]. They are used internally the treatment of constipation, chronic coughs, asthma, diarrhoea, dyspepsia etc[9]. The leaves are also used to treat skin ailments and purify the blood[9, 218]. They are considered to be specific in the treatment of strumous sores[240]. Male inflorescences are made into a broth and used in the treatment of coughs and vertigo[218]. The rind is anodyne and astringent[147]. It is used in the treatment of diarrhoea and anaemia[238]. The seeds are antilithic, diuretic and stimulant[218]. They are used internally in the treatment of low back pain, frequent urination, weakness of both legs, chronic cough, asthma, constipation due to dryness or anaemia and stones in the urinary tract[176]. Externally, they are made into a paste and applied as a poultice to areas of dermatitis and eczema[176]. The oil from the seed is anthelmintic[218]. It is also used in the treatment of menstrual problems and dry skin conditions[238]. The cotyledons are used in the treatment of cancer[218]. Walnut has a long history of folk use in the treatment of cancer, some extracts from the plant have shown anticancer activity[218]. The bark and root bark are anthelmintic, astringent and detergent[218, 240]. The plant is used in Bach flower remedies - the keywords for prescribing it are 'Oversensitive to ideas and influences' and 'The link-breaker'[209].

nrakta E. Europe to N. Asia. More or less naturalized in S. Britain. ksacta Forests in the Himalayas, preferring a northerly aspect in the west but a southerly or westerly aspect in the east of the range[144].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80, 113]. Named varieties are propagated by budding

nwatta Global Crop Management: Standard Other Systems: Irreg. Intercrop Other Systems: Strip intercrop Staple Crop: Protein-oilLandscape Uses:Aggressive surface roots possible, Specimen. Requires a deep welldrained loam[11] and a sunny position sheltered from strong winds. Prefers a slightly alkaline heavy loam but succeeds in most soils[1, 63]. The walnut tree is reported to tolerate an annual precipitation of 31 to 147cm, an annual temperature in the range of 7.0 to 21.1°C and a pH in the range of 4.5 to 8.2[269]. The dormant plant is very cold tolerant, tolerating temperatures down to about -27°C without serious damage, but the young spring growth is rather tender and can be damaged by late frosts[269]. Some late-leafing cultivars have been developed, these often avoid damage from spring frosts and can produce a better quality timber tree. The walnut tree is frequently cultivated for its edible seed in temperate zones of the world, there are many named varieties[63, 183]. Newer cultivars begin producing nuts in 5 - 6 years; by 7 - 8 years, they produce about 2.5 tons of nuts per hectare[269]. Orchards on relatively poor, unirrigated mountain soil report 1.5 - 2.25 tonnes per hectare, orchards in well cultivated valleys, 6.5 - 7.5 tonnes per hectare[269]. According to the Wealth of India, a fully grown individual can yield about 185 kg, but 37 kg is more likely[269]. Trees grow well in most areas of Britain but they often fail to fully ripen their fruits or their wood in our cooler and damper climate[63, 200], they prefer a more continental climate. There are some very fine trees in Cornwall[59]. Walnuts can produce large healthy trees in many parts of Britain, but seedling trees often do not fruit reliably. Some European varieties have been developed that succeed in colder areas[200]. Seedling trees are said to take from 6 to 15 years to come into fruit from seed[200], but these cultivars usually start cropping within 5 years. Plants produce a deep taproot and they are intolerant of root disturbance. Seedlings should be planted out into their permanent positions as soon as possible and given some protection for their first winter or two since they are somewhat tender when young. Flower initiation depends upon suitable conditions in the previous summer. The flowers and young growths can be destroyed by even short periods down to -2°c[63], but fortunately plants are usually late coming into leaf. Some cultivars are self-fertile, though it is generally best to grow at least two different cultivars to assist in cross-pollination. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise wounds will bleed profusely and this will severely weaken the tree. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots also produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. Trees have a dense canopy which tends to reduce plant growth below them[20]. All in all, not the best of companion trees, it is also suggested that the trees do not like growing together in clumps [37]. Trees are said to inhibit the growth of potatoes and tomatoes[18]. Hybridizes with J. nigra[149]. This species is notably susceptible to honey fungus[200]. The bruised leaves have a pleasant sweet though resinous smell[245]. Special Features: Not North American native, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 7 through 1. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone, 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 8.2.16 Pinus cembroides orizabensis

Mexican Pine Nut

7 tlin 10 cyuc 4 kcak 3 tcan 2 dwat 15 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dyat hionli

drutta Pinus cembroides orizabensis is an evergreen Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222].

kcakta Edible Parts: Inner bark SeedEdible Uses: CondimentSeed - the oily seed kernel is eaten raw, roasted, ground into a powder for making bread, cakes etc or made into a nut butter[1, 2, 11, 34, 62, 63, 92, 94, 183]. A very good size, the seed is up to 20mm long[200]. Said to be the highest in protein and lowest in starch of all the piñons[183]. The seed contains about 14.6% protein, 62% fat. 17.3% carbohydrate[85]. This species provides a major source of seeds for sale in America[200]. Inner bark - only used in times of dire need[85]. There are no more details but inner bark is often dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dye Herbicide Pitch WoodA tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. A gum pitch is used as a glue for waterproofing and repairing pottery[117]. Oleoresins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile[64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Bulb - raw or cooked. Widely used, especially in southern Europe, as a flavouring in a wide range of foods, both raw and cooked[244]. Garlic is a wonderfully nutritious and health giving addition to the diet, but it has a very strong flavour and so is mainly used in very small quantities as a flavouring in salads and cooked foods[2, 9, 14, 27, 33]. A nutritional analysis is available[218]. The bulbs can be up to 6cm in diameter[200]. Leaves - raw or cooked. Chopped and used in salads, they are rather milder than the bulbs[200, K]. The Chinese often cultivate garlic especially for the leaves, these can be produced in the middle of winter in mild winters[206]. The flowering stems are used as a flavouring and are sometimes sold in Chinese shops[183]. The sprouted seed is added to salads[183].

tcanta Adhesive Fungicide RepellentThe juice from the bulb is used as an insect repellent [7, 14]. It has a very strong smell and some people would prefer to be bitten[K]. The juice can also be applied to any stings in order to ease the pain[7, 14]. 3 - 4 tablespoons of chopped garlic and 2 tablespoons of grated soap can be infused in 1 litre of boiling water, allowed to cool and then used as an insecticide[201]. An excellent glue can be made from the juice[7], when this is spread on glass it enables a person to cut clean holes in the glass[7]. The juice is also used as a glue in mending glass and china[46]. An extract of the plant can be used as a fungicide[18]. It is used in the treatment of blight and mould or fungal diseases of tomatoes and potatoes [201]. If a few cloves of garlic are spread amongst stored fruit, they will act to delay the fruit from rotting[7]. The growing plant is said to repel insects, rabbits and moles[14, 20].

dwatta Anthelmintic Antiasthmatic Anticholesterolemic Antiseptic Antispasmodic Cancer Cholagogue Diaphoretic Diuretic Dysentery Expectorant Febrifuge Hypoglycaemic Stimulant Stings Stomachic Tonic VasodilatorGarlic has a very long folk history of use in a wide range of ailments, particularly ailments such as ringworm, Candida and vaginitis where its fungicidal, antiseptic, tonic and parasiticidal properties have proved of benefit[218]. The plant produces inhibitory effects on gram-negative germs of the typhoidparatyphoid-enteritis group, indeed it possesses outstanding germicidal properties[240] and can keep amoebic dysentery at bay[244]. It is also said to have anticancer activity[218]. It has also been shown that garlic aids detoxification of chronic lead poisoning[244]. Daily use of garlic in the diet has been shown to have a very beneficial effect on the body, especially the blood system and the heart. For example, demographic studies suggest that garlic is responsible for the low incidence of arteriosclerosis in areas of Italy and Spain where consumption of the bulb is heavy[222]. Recent research has also indicated that garlic reduces glucose metabolism in diabetics, slows the development of arteriosclerosis and lowers the risk of further heart attacks in my ocardial infarct patients[238, 254]. Externally, the expressed juice is an excellent antiseptic for treating wounds[244]. The fresh bulb is much more effective medicinally than stored bulbs, extended storage greatly reduces the anti-bacterial action[244]. The bulb is said to be anthelmintic, antiasthmatic, anticholesterolemic, antiseptic, antispasmodic, cholagoque, diaphoretic, diuretic, expectorant, febrifuge, stimulant, stings, stomachic, tonic, vasodilator[4, 9, 14, 21, 46, 165]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Allium sativum for arteriosclerosis, hypertension, high cholesterol levels (see [302] for critics of commission E)

nrakta C. Asia? Original habitat is obscure. An occasional garden escape in Britain[17]. ksacta Not known in a truly wild situation.

propta Plant out the cloves in late autumn for an early summer crop[33, 200]. They can also be planted in late winter to early spring though yields may not be so good. Plant the cloves with their noses just below the soil surface[200]. If the bulbs are left in the ground all year, they will often produce tender young leaves in the winter[K].

nwatta Succeeds in most soils but prefers a sunny position in a moist light well-drained soil[1, 14, 16, 37]. Dislikes very acid soils[206]. Tolerates a pH in the range 4.5 to 8.3. The bulb is liable to rot if grown in a wet soil[27, 52]. Hardy to at least -10°c[206]. The bulbs should be planted fairly deeply[1]. Garlic has a very long history of use as a food and a medicine[244]. It was given to the Egyptian labourers when building the pyramids because it was believed to confer strength and protect from disease, it was also widely used by the Romans[244]. It is widely cultivated in most parts of the world for its edible bulb, which is used mainly as a flavouring in foods. There are a number of named varieties[200]. Bulb formation occurs in response to increasing daylength and temperature[200]. It is also influenced by the temperature at which the cloves were stored prior to planting. Cool storage at temperatures between 0 and 10°c will hasten subsequent bulb formation, storage at above 25°c will delay or prevent bulb formation[200, 206]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 8.2.11 Allium neapolitanum

Daffodil Garlic, White garlic

7 tlin 10 cyuc 5 kcak 2 tcan 2 dwat 0.3 m hkuc

htut cyutlı kyuctcup hwicli hrasjlut hpa7tlı flatpriklwis hpa7tmwatlı xre7t hjonlı

drutta Allium neapolitanum is a BULB growing to  $0.3~\mathrm{m}$  (1ft) by  $0.1~\mathrm{m}$  (0ft 4in). See above for USA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf from October to July, in flower from March to May, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw or cooked. Delicious in salads, they start off being sweet and then develop a fairly strong garlic-like flavour, they are liked by most people who try them[K]. The leaves are available from late autumn until early spring and are greatly appreciated at this time of year[K]. Bulb - raw or cooked[2, 105]. Rather small but a very nice mild garlic flavour[K]. Sliced up, they make a delicious addition to salads and can also be used as a vegetable or as a flavouring in cooked foods. They are harvested in mid summer once the plant dies down and will store for 6 months or more[K]. The bulbs are 10 - 20mm in diameter[200]. Flowers - raw or cooked. Excellent in salads, making them look attractive as well as adding a strong onion flavour[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Europe - Mediterranean area in Europe, Africa and W. Asia ksacta Dry grassy places and fields[45, 90, 203].

propta Seed - sow spring in a greenhouse[200]. The seed can also be sown in a cold frame as soon as it is ripe in early summer. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow on for the first winter in a greenhouse and plant out in late summer whilst the bulbs are dormant. Division in summer once the plant has died down. Very easy, the bulbs divide freely and can be planted straight out into their permanent positions if required.

nwatta An easily grown plant, it prefers a sheltered sunny position in a light well-drained soil[1, 90]. Established plants are reasonably drought tolerant[190]. Plants are said to be rather frost tender[90]. They probably tolerate temperatures down to between -5 and -10°c and can only be grown outdoors in the milder areas of the country[200, K]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least -5°c[214]. The bulbs should

be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. A very ornamental plant, it is sometimes grown as a decorative indoor plant[1]. There is at least one named variety, 'Grandi-florum' has a richer display of flowers than the type[233]. In sunny weather the flowers develop a sweet scent[245]. Plants come into new growth in late autumn and provide edible leaves throughout most winters[K]. When well-sited, plants can sometimes self-sow to the point of nuisance[190]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.12 Allium paradoxum

Few-Flowered Leek

7 tlin 10 cyuc 5 kcak 0 tcan 2 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Allium paradoxum is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf from November to June, in flower from April to May, and the seeds ripen in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. The rather small bulb is up to 10mm in diameter[200], it has a mild garlic flavour and can be used as a flavouring in salads and cooked foods. It is harvested in early summer when the plant has died down and will store for at least 6 months[K]. Leaves - raw or cooked. A leek substitute[K]. The leaves are available from late autumn until the spring, they are nice in salads when they are young or cooked as a vegetable or flavouring as they get older[K]. The leaves have a milder and more delicate flavour than onions[K]. Flowers - raw. Juicy with a mild garlic flavour, they make a tasty and decorative garnish on salads[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Anticholesterolemic Digestive TonicAlthough no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta W. Asia - Iran. Naturalized in a number of places in Britain[17]. ksacta Hedge banks and waste places on damp soils[17, 90].

propta Seed - best sown as soon as it is ripe in a greenhouse or cold frame. It germinates quickly and can be grown on in the greenhouse for the first year, planting out the dormant bulbs in the late summer of the following year if they have developed sufficiently, otherwise grow on in pots for a further year. Stored seed can be sown in spring in a greenhouse. Bulbils, harvested in mid to late spring, can either be planted immediately or be stored and then planted in late summer. Division in summer after the plants have died down. Very easy, the bulbs divide fairly freely and can be dug up then replanted direct into their permanent positions if remired.

nwatta Prefers a rich moist but well-drained soil[1, 42]. Plants grow well in a heavy wet clay soil in north-west England, where they are self-sowing[203]. Plants are shade tolerant[31], they are easily grown in a cool leafy soil[90] and grow well in light moist woodland[203]. Plants are not very

hardy outside the milder areas of Britain, they tolerate temperatures down to between -5 and -10°c[200]. The bulbs should be planted fairly deeply[1]. There are two forms of this species. The sub-species A. paradoxum paradoxum produces mainly bulbils instead of flowers, this form is naturalized in Britain and can spread quite invasively[K]. The subspecies A. paradoxum normale does not form bulbils. It produces a large umbel of flowers in the spring and is very ornamental at this time. It is not invasive[200, Kl. The seeds have an oil-bearing appendage which is attractive to ants. The ants carry the seed away to eat the oil and then discard the seed, thus aiding dispersal of the plant[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes [18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. The picked flowers can remain fresh for several weeks[89]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.13 Reichardia picroides

French Scorzonera, Common brighteyes 7 tlin 10 cyuc 5 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Reichardia picroides is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from April to August, and the seeds ripen from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves - raw or cooked[2, 27, 37, 52, 105]. Mild and good[37]. A pleasant agreeable flavour with a slight sweetness and very little fibre, it makes a very acceptable lettuce substitute and we use it in large quantities in salads[K]. The older leaves seem to be even nicer, even when the plant is in flower[K]. Root - raw or cooked[2, 177, 183].

nrakta S. Europe. ksacta Cultivated soil and waste places[50]

propta Seed - sow March/April in a warm position outdoors and then in succession if required until the autumn. Only just cover the seed. Germination is usually very good and quick. We usually make a sowing in the spring in the greenhouse, pricking out the seedlings into individual pots as soon as they are large enough to handle, and then planting them out in late spring or early summer. Established plants can self-sow quite freely in disturbed ground.

nwatta Easily grown in any moderately fertile welldrained soil in a sunny position[200]. Grows best in a shady position in summer[37], where it will produce better quality leaves[K]. It prefers plenty of moisture in the growing season[200], though it is fairly drought tolerant once established[K]. Plants are very tolerant of poor soils[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It is likely to be hardier when grown in a soil on the poor soil, though the leaves will not be so tender nor so freely produced[K]. Plants are also likely to be hardier in well-drained soils and dislike very wet weather[K]. Plants are often shortlived, though they are self-sowing quite freely in Cornwall[K]. A very easily grown plant, it has also proved to be almost totally slug-proof, even in a very heavily slug-infested garden[K]. Formerly cultivated as a cut and come again salad crop in S. Europe[27, 37], producing a harvestable yield within 10 weeks of sowing the seed[K]. This plant is possibly useful as a winter salad crop, growing in a sunny fairly sheltered position in Cornwall it has been yielding very well and continuously for a period of 18 months since the summer of 1993[K]. It requires more investigation[K].

#### 8.2.14 Umbellularia californica

California Laurel, California Bay 7 tlin 10 cyuc 4 kcak 0 tcan 2 dwat 25 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik vere winters[1]. The leaves are harvested commercially in hpa7tmwatli xre7t hjonli California and sold as a bay-leaf substitute[183]. The leaves

drutta Umbellularia californica is an evergreen Tree growing to 25 m (82ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower in April, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista The foliage can cause skin irritations[1, 11]. A volatile oil in the leaves can cause sneezing and headaches if inhaled[11]

kcakta Edible Parts: Fruit SeedEdible Uses: Coffee CondimentSeed - cooked[257]. It can be roasted and eaten or can be ground into a powder that is used with cereal flours in making bread[62, 105, 177, 183]. A bitter quality in the seed is dispensed by roasting or parching the seed[92, 161]. Fruit - raw or cooked[257]. The leaves are used as a condiment in cooked foods. They are a bayleaf substitute but with a much stronger flavour[2, 94, 238]. Used for flavouring soups, stew setc[183]. A tea is obtained from the leaves[2]. A coffee substitute is obtained from the root bark[161, 183].

tcanta Dye Essential Incense Repellent WoodThe leaves are used as an insect repellent, they are especially effective against fleas[62, 92, 94, 95, 169]. They have disinfectant properties and contain small quantities of camphor[95, 169]. The leaves are burnt as a fumigant to get rid of fleas[257]. The leaves have been hung in bunches to freshen the air[257]. The aroma of the leaves gives some people headaches[K]. An essential oil is obtained from the leaves by steam distillation[11, 46, 61, 82]. Beige and green dyes are obtained from the fruits (used without the seeds). Very aromatic, the dye retains its fragrance for many years[168]. Wood - hard, close grained, heavy, strong, takes a high polish. A beautifully textured wood, it is used for high quality cabinet making, panelling etcl61, 82, 94, 2291.

dwatta Analgesic Antirheumatic Nervine Poultice Salve Stimulant StomachicCalifornia laurel was employed medicinally by some native North American Indian tribes who used it particularly as an analgesic to treat a variety of complaints[257]. It is still occasionally used in modern herbalism, being valued for its beneficial effect upon the digestive system. The leaves are analgesic, antirheumatic, nervine and stomachic[92, 94, 95, 238, 257]. Although the aroma of the leaves is known to cause headaches, they have also been used as an infusion and a poultice to treat this affliction[92, 94, 95, 238, 257]. The leaves are also used internally to treat neuralgia, intestinal cramps and gastro-enteritis[238]. An infusion has been used by women to ease the pains of afterbirth[257]. Externally, an infusion has been used as a bath in the treatment of rheumatism[257]. A decoction of the leaves has been used as a wash on sores and to remove vermin from the head[257]. They are harvested as required and can be used fresh or dried[238]. A poultice of the ground seeds has been used to treat sores[257]. The seeds have been eaten as a stimulant[257].

nrakta South-western N. America - California to Oregon. ksacta Lower mountain slopes, flatlands, hillsides etc, on various soils and often in shade[62, 94]. The best specimens are found in deep rich soils of valley bottoms[229].

propta Šeed - it has a limited viability and is best sown as soon as it is ripe in the autumn in a greenhouse[200]. Stored seed should be sown as early in the year as possible in the greenhouse. In the wild the seed germinates as soon as it falls to the ground in the autumn[82]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a shaded frame. Pot up in spring. Good percentage[78, 200]. Layering.

nwatta Landscape Uses:Hedge, Aggressive surface roots possible, Screen, Specimen, Street tree, Woodland garden. Requires a well-drained moisture retentive lime-free soil in a sunny position[200]. Prefers an abundant supply of moisture in the growing season[82]. Older plants are hardy to about -15°c when growing in a position that is sheltered from cold drying winds, but young plants require some frost protection[200]. Even mature plants can be damaged in se-

vere winters[1]. The leaves are harvested commercially in California and sold as a bay-leaf substitute[183]. The leaves emit a powerful camphor-like scent when bruised[245]. So strong is the aroma that it can cause headaches and dizziness[245]. A very large and beautiful tree fruited regularly at Kew, producing viable seed, until it was blown down in the severe storms of October 1987[K]. Special Features:Attracts birds, North American native, Fragrant foliage, Inconspicuous flowers or blooms.

#### 8.2.15 Juglans regia

Walnut, English walnut, Persian Walnut,

7 tlin 9 cyuc 4 kcak 4 tcan 3 dwat 20 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Juglans regia is a deciduous Tree growing to 20 m (65ft) by 20 m (65ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in flower in June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil Oil Sap SeedEdible Uses: Oil Oil Sweetener TeaSeed - eaten raw or used in confections, cakes, ice cream etcl. 5, 12, 34, 183]. A delicious flavour. The seed can also be ground into a meal and used as a flavouring in sweet and savoury dishes[183]. The unripe fruits are pickled in vinegar[183]. An edible oil is obtained from the seed[4, 7, 57, 183], it should not be stored for any length of time since it tends to go rancid quickly[7, 132]. The oil has a pleasant flavour and is used in salads or for cooking[183]. The sap is tapped in spring and used to make a sugar[117]. The finely ground shells are used in the stuffing of 'agnolotti' pasta[183]. They have also been used as adulterant of spices[269]. The dried green husks contain 2.5 - 5% ascorbic acid (vitamin C) - this can be extracted and used as a vitamin supplement[269]. The leaves are used as a tea[183].

tcanta Dve Herbicide Miscellany Oil Oil Paint Polish Repellent Tannin Teeth WoodA yellow dye is obtained from the green husks[4, 7, 100, 117]. It is green[148]. The green nuts (is this the same as the green husks?) and the leaves are also used[148]. The rind of unripe fruits is a good source of tannin[158]. A brown dye is obtained from the leaves and mature husks[4, 7, 48, 117, 168]. It does not require a mordant and turns black if prepared in an iron pot[168]. The dye is often used as a colouring and tonic for dark hair[238]. The leaves and the husks can be dried for later use[169]. A golden-brown dye is obtained from the catkins in early summer. It does not require a mordant[168]. A drying oil is obtained from the seed. It is used in soap making, paints, etc. It is not very stable and quickly goes rancid[7, 21, 34, 46]. The nuts can be used as a wood polish. Simply crack open the shell and rub the kernel into the wood to release the oils. Wipe off with a clean cloth[4, 6, K]. The dried fruit rind is used to paint doors, window frames etc[145] (it probably protects the wood due to its tannin content). The shells may be used as anti-skid agents for tyres, blasting grit, and in the preparation of activated carbon[269]. The leaves contain juglone, this has been shown to have pesticidal and herbicidal properties[218]. The crushed leaves are an insect repellent[46, 61]. Juglone is also secreted from the roots of the tree, it has an inhibitory effect on the growth of many other plants[201]. Bark of the tree and the fruit rind are dried and used as a tooth cleaner. They can also be used fresh[145, 158]. Wood - heavy, hard, durable, close grained, seasons and polishes well. A very valuable timber tree, it is used for furniture making, veneer etc[1, 4, 7, 46, 61, 158]. A dynamic accumulator gathering minerals or nutrients from the soil and storing them in a more bioavailable form - used as fertilizer or to improve mulch.

dwatta Alterative Anodyne Antiinflammatory Astringent Bach Blood purifier Cancer Depurative Detergent Diuretic Eczema Laxative Lithontripic Miscellany Pectoral Skin Stimulant Urinary Vermifuge Vitamin CThe walnut tree has a long history of medicinal use, being used in folk medicine to treat a wide range of complaints [269]. The leaves are alter-

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can agaravate their condition[238].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves - raw or cooked[105]. A pleasant acid flavour, though a little fibrous[K]. Use in moderation, see notes at top of sheet, Flowers - raw[K]. A dellightful acid flavour, they make an attractive addition to the salad bowl and are especially relished by children[K]. Root - cooked. Starchy but of poor quality[2, 105].

tcanta Ground cover[K]. The plants are dormant for about 5 months of the year, but grow so densly in the summer that they make an effective ground cover in full sun or light shade[K].

nrakta Southern N. America - Mexico. Naturalized in Britain. ksacta A weed of cultivated soil in Jersey[17].

propta Seed - best sown as soon as it is ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta A very easily grown plant, preferring a sandy soil in a warm dry position[1]. Our plants have proved to be very tolerant of neglect, succeeding for a number of years even in the dense growth of grass weeds[K]. When well-tended, clumps can spread quite quickly[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Closely related to O. deppei, which is included in this species by many botanists[200].

#### 8.2.152 Allium akaka

7tlin 10 cyuc 3 kcak 0 tcan 2 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium akaka is a BULB growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[46, 61, 105, 177]. Used as an onion substitute[22]. The whole of the young plant is said to be a great delicacy and is used as an addition to rice in a pilau[2, 183]. The bulb is 15 - 30mm wide[200]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe growing plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta W. Asia - Turkey, N. Iran, Russia. ksacta Dry stony places, screes etc, 1600 metres to 3000 metres[74, 90]. propta Seed - sow spring in a cold frame. Prick out the seedlings into individual nots when they are large enough to

seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for

at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained dry to moist soil[1]. Bulbs are not hardy in all parts of Britain, they probably tolerate temperatures down to between -5 and -10°c but because of their need for a very well-drained dry to moist soil are probably best grown in a bulb frame[90]. The plants need a dry period in late summer when they are dormant in order to fully ripen the bulb[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. This species is a cultivated crop in Iran[105], where it is sold in the bazaars of Teheran[183]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.153 Fraxinus floribunda

Himalayan Ash

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 40 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Fraxinus floribunda is a deciduous Tree growing to 40 m (131ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: MannaEdible Uses: A manna is obtained by incision of the trunk[61, 177]. It is used as a sweetener but is laxative if used in quantity[61, 23].

tcanta WoodWood. Used for oars, ploughs and poles[51, 272]

dwatta Abortifacient LaxativeThe manna obtained from incisions in the stem is a safe and gentle laxative[61, 240, 243]. The young shoots are abortifacient[272].

nrakta E. Asia - Himalayas from Himachel Pradesh to S.W. China. ksacta Rich moist soils in forests, 1200 - 2700 metres in the Himalayas[51, 146]. Dense forests, mixed woods of valleys, roadsides; sea level to 2600 metres in western China[266].

propta The seed is best harvested green - as soon as it is fully developed but before it has fully dried on the tree - and can then be sown immediately in a cold frame[80]. It usually germinates in the spring[80]. Stored seed requires a period of cold stratification and is best sown as soon as possible in a cold frame[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out into their permanent positions or a nursery bed in late spring or early summer of the following year. If you have sufficient seed then it is possible to sow it directly into an outdoor seedbed, preferably in the autumn. Grow the seedlings on in the seedbed for 2 years before transplanting either to their permanent positions or to nursery beds.

mwatta Prefers a deep loamy soil, even if it is on the heavy side[1, 200]. Most members of this genus are gross feeders and require a rich soil[11, 200]. Plants succeed when growing in exposed positions[200] and also in alkaline soils[11]. Plants tolerate atmospheric pollution[200]. Closely related to F. ornus[200]. This species is not very hardy in Britain but can succeed outdoors in the milder areas[1]. It has a very wide range in the wild and there are probably provenances that will do much better in Britain[11]. Dioecious. Male and female plants must be grown if seed is required.

riander[18, 20, 201].

# 8.2.53 Myrteola nummularia

Cranberry-myrtle,

7 tlin 10 cyuc 4 kcak 3 tcan 0 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Myrteola nummularia is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June, and the seeds ripen from November to December. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit LeavesEdible Uses: TeaFruit raw or cooked. A sweet and agreeable flavour[2, 105]. The fruit is up to 1cm in diameter, it has a soft juicy flesh and a delicious slightly aromatic flavour[K]. It is produced in late autumn and early winter, and is a very valuable fruit at this time of the year[K]. The leaves are a tea substitute[177].

tcanta Suitable for ground cover when spaced about 45cm apart each way, the plants form a carpet of low branches that root as they spread[208]. Plants are a bit slow to become established and will need weeding for their first few years after planting[K].

nrakta S. America - S. Chile, Falklands. ksacta Raised parts of bogs, especially with sphagnum[69].

propta Pre-soak the seed for 24 hours in warm water and then sow it in late winter in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Pot up in the autumn and overwinter in a cold frame. Plant out in late spring. High percentage[78]. Cuttings of mature wood of the current seasons growth, 7 - 12cm with a heel, November in a shaded and frost free frame. Plant out in late spring or early autumn. High percentage[78]. Lavering.

nwatta Succeeds in any reasonably good soil[1] including dry ones. Prefers a moderately fertile well-drained loam in a sunny position[11, 200]. Prefers a cool position according to another report. Tolerates maritime exposure[182]. This species is not very hardy when grown outdoors in Britain, succeeding to the south and west of London[11]. A group of plants in a sunny position on a rock garden at Kew Gardens seem to be perfectly happy and hardy, producing a reasonable crop of fruit in December 1996[K]. A good carpeting plant for moist stones etc in a rockery[11]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.54 Ouercus lamellosa

Bull Oa

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 35 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus lamellosa is an evergreen Tree growing to 35 m (114ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - cooked. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed of this species is particularly large with four of them covering an adult hand[258]. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be

lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute

tcanta Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is a source of tannin[146]. Wood - very hard, durable if it is not wet. Used for construction, making the handles of agricultural implements etc[146, 272]. An excellent fuel[146].

dwatta Astringent DysenteryThe bark and acorns are astringent[240]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta E. Asia - Himalayas. ksacta Forms dense evergreen forests with Lithocarpus and Castanopsis species at altitudes up to 2700 metres [146, 258].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A very ornamental tree[1], it is somewhat tender in Britain but grows well on the Isle of Wight and in Cornwall[1]. It prefers warmer sumers than are usually experienced in Britain[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 8.2.55 Eucalyptus gunnii

Cider Gum

7 tlin 10 cyuc 3 kcak 3 tcan 3 dwat 30 m hkuc

htut cyutli hgatkyuctcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Eucalyptus gunnii is an evergreen Tree growing to 30 m (98ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Citronellal, an essential oil found in most Eucalyptus species is reported to be mutagenic when used in isolation[269]. In large doses, oil of eucalyptus, like so many essential oils has caused fatalities from intestinal irritation[269]. Death is reported from ingestion of 4 · 24 ml of essential oils, but recoveries are also reported for the same amount[269]. Symptoms include gastroenteric burning and irritation, nausea, vomiting, diarrhoea, oxygen deficiency, weakness, dizziness, stupor, difficult respiration, delirium, paralysis, convulsions, and death, usually due to respiratory failure[269].

kcakta Edible Parts: Manna SapEdible Uses: The sap[2, 77] (it is a stem exudate according to some reports[61, 177])

has a sweet taste. The sap is obtained by making wounds in the bark during spring[2]. A tapped trunk yields up to ½ litre a day[144]. Another report says that the sap exudes from the trunk and can be drunk directly or fermented into a cider[183]. This same report says that the plant also produces an edible manna[183].

tcanta Essential Fuel Fungicide RepellentLeaves yield between 0.4 to 0.8% of an essential oil that contains antifungal substances[152, 154]. Coppiced for fuel. The wood must be dried for at least 12 months before use[107]. Trees can be planted in wet ground to dry it up and make it unsuitable for mosquitoes to breed in[50].

dwatta AntisepticEucalyptus leaves are a traditional Aboriginal herbal remedy. The essential oil found in the leaves is a powerful antiseptic and is used all over the world for relieving coughs and colds, sore throats and other infections[254]. The essential oil is a common ingredient in many over-the-counter cold remedies[254]. An essential oil obtained from the leaves is antiseptic[152]. The essential oil obtained from various species of eucalyptus is a very powerful antiseptic, especially when it is old, because ozone is formed in it on exposure to air. It has a decided disinfectant action, destroying the lower forms of life[4]. The oil can be used externally, applied to cuts, skin infections etc, it can also be inhaled for treating blocked nasal passages, it can be gargled for sore throat and can also be taken internally for a wide range of complaints[4]. Some caution is advised, however, because like all essential oils, it can have a deleterious effect on the body in larger doses[4].

nrakta Australia - South Australia, Tasmania. ksacta Alpine areas on rocky well-drained soils, sometimes also found on marshy soils[77].

propta Seed - surface sow February/March in a sunny position in a greenhouse[11, 78, 134]. Species that come from high altitudes appreciate 6 - 8 weeks cold stratification at 2°c[200]. Pot up the seedlings into individual pots as soon as the second set of seed leaves has developed, if left longer than this they might not move well. Plant out into their permanent positions in early summer and give them some protection from the cold in their first winter. The seed can also be sown in June, the young trees being planted in their final positions in late spring of the following year. The seed has a long viability[2001.

nwatta Prefers a sunny position in a moderately fertile well-drained moisture retentive circum-neutral soil[200]. Dislikes clay or chalk soils but succeeds in most other soils[98]. Tolerates poor soils[98], especially those low in mineral elements[200]. Dislikes shade[98]. Tolerates dry soils and also drought once it is established[200]. One of the hardiest Eucalyptus species[11], it is very frost resistant, tolerating long periods down to -14°c and short periods down to -18°c[107, 200]. Eucalyptus species have not adopted a deciduous habit and continue to grow until it is too cold for them to do so. This makes them more susceptible to damage from sudden cold snaps. If temperature fluctuations are more gradual, as in a woodland for example, the plants have the opportunity to stop growing and become dormant, thus making them more cold resistant [200]. A deep mulch around the roots to prevent the soil from freezing also helps the trees to survive cold conditions. The members of this genus are remarkably adaptable however, there can be a dramatic increase in the hardiness of subsequent generations from the seed of survivors growing in temperate zones[200]. A very ornamental tree, it is very fast growing when young and reguires shelter from strong winds if it is not to become very wind-shaped[K]. Trees can tolerate salt-laden winds[200]. The plant has juvenile foliage which is quite different from the adult leaves[188]. The leaves, especially when bruised, are very aromatic[245]. Plants respond well to coppicing. Commonly planted in S.W. Europe as a timber tree and also for shelter, soil conservation and as an anti-malarial measure since it will dry out wet land that is suitable for mosquitoes to breed in [50]. Plants are shallow-rooting and, especially in windy areas, should be planted out into their permanent positions when small to ensure that they do not suffer from windrock[245]. They strongly resent root disturbance and should be container grown before planting out into their permanent position[11]. Eucalyptus monocultures are an environmental disaster, they are voracious, allelopathic and encourage the worst possible attitudes to land use and conservation[200]. The flowers are rich in nectar and are a good bee crop[200] The plant is heat tolerant in zones 10 through 8. (Plant Hardi-

ness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2].

#### 8.2.56 Eucalyptus viminalis

Manna Gum

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 30 m hkuc htut cyutli hgatkyuctcuphja7n hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eucalyptus viminalis is an evergreen Tree growing to 30 m (98ft) by 15 m (49ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought.

pcista Citronellal, an essential oil found in most Eucalyptus species is reported to be mutagenic when used in isolation[269]. In large doses, oil of eucalyptus, like so many essential oils has caused fatalities from intestinal irritation[269]. Death is reported from ingestion of 4 · 24 ml of essential oils, but recoveries are also reported for the same amount[269]. Symptoms include gastroenteric burning and irritation, nausea, vomiting, diarrhoea, oxygen deficiency, weakness, dizziness, stupor, difficult respiration, delirium, paralysis, convulsions, and death, usually due to respiratory failure[269].

kcakta Edible Parts: MannaEdible Uses: A manna is exuded from the leaves[4, 11, 177] (from the bark as well according to some reports[61, 177]) as a result of insect damage[144]. The red gum or manna exuding from cracks in the bark is eaten eagerly by boys[269]. Eucalyptus manna, which exudes from punctures in summer months, is sometimes consumed[269]. A very pleasant sweet taste[46, 105], it is slightly laxtive[152]. The aboriginal Australians collected it after it fell to the ground, or they scraped it from the leaves[183]. Heavily covered leaves were pounded and baked[183]. Since the manna is probably formed as a result of insect damage, it is quite possible that it will not be formed in Britain because the same insects will not be able to live here[K]. The manna contains the sugars arabinose, raffinose, dextrose, and sucrose[269].

tcanta Adhesive Essential Fuel Repellent Soil stabilization WoodThe leaves contain between 0.35 - 0.75% essential oil, of which 50 - 65% is cineol, 5% is pinene, and 10% is eudesmol[154, 269]. The bark contains 4.8 - 8% tannin[269]. The red gum or manna exuding from cracks in the bark has been used for making adhesives[269]. Planted in S. Europe for soil stabilization and to drain marshes in order to get rid of malarial mosquitoes[50]. Wood - coarse grained, durable in the soil[46, 61], excellent quality[77]. In rich soils the wood is not so hard or durable[155]. The wood, which weighs about 51 lb,/cu ft, is used for building, construction, joinery, and vehicles[269]. It is considered suitable for paper pulp[269] and is a moderately good fuel[155].

dwatta Antiviral LaxativeA sweet manna exuded from the plant has a mild laxative effect[152, 238]. The essential oil found in the leaves shows an antiviral effect and can be used in the treatment of influenza[269]. The leaves inhibit the growth of Staphylococcus aureus[269]. The leafy twig decoction was used to bathe rheumatic limbs[269].

nrakta Australia - Tasmania. ksacta Cool moist sites, usually on better soils, to 1400 metres[77, 152].

propta Seed - surface sow February/March in a sunny position in a greenhouse[11, 78, 134]. Species that come

hardy in the colder areas of the country, it tolerates temperatures down to about -10°c[200]. Sometimes cultivated as a culinary herb. A good companion plant, improving the flavour of nearby plants[18, 20]. The flowers are very attractive to bees[108]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.148 Muehlenbeckia axillaris

Sprawling wirevine

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Muehlenbeckia axillaris is a deciduous Climber growing to 0.3 m (1ft) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Sweet and juicy[173]. The fruit is very small, only 3mm in diameter[200].

tcanta A fast growing ground cover plant for a sunny position but it requires weeding for the first year or so[197, 208]. Once established, it can swamp out small plants[197].

nrakta Australia to New Zealand. ksacta Gravelly and rocky places and open grassland southwards from 38° south in North and South Islands of New Zealand[44]. Scrub and river flats to the sub-alpine zone[173].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8 cm with a heel, pluly/August in a frame. Pot up in autumn and overwinter in a cold frame. High percentage[78]. Plant out in late spring. Cuttings of mature wood of the current season's growth, 5 - 10cm with a heel, October/November in a cold frame. High percentage[78]. Division in sprind[200].

nwatta Requires a well-drained soil in sun or semishade[200]. Plants are not hardy outside the milder areas of Britain, but given a position sheltered from cold drying winds they tolerate temperatures down to about -15°c[200]. A climbing plant that supports itself by twining around other plants etc[219]. Plants can become invasive, spreading by means of underground shoots[208]. Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.149 Oxalis articulata

Pink Sorrel

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 0.2 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Oxalis articulata is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers LeavesEdible Uses: Leaves and flowers - raw or cooked. A pleasant lemony flavour, they make a nice flavouring in salads[K]. The leaves

are available from June to October and the flowers from July to October, or even later in mild autumns[K]. Use in moderation, see notes at top of sheet.

nrakta Southern S. America - Paraguay. ksacta Not

propta Seed - best sown as soon as ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Our plants have never produced seed. Division in spring. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta An easily grown plant, preferring a sandy soil in a warm dry position[1, 27, 37]. It dislikes dry or heavy soils[37]. Dislikes lime[37]. Prefers a southerly aspect[37]. This species is only hardy outdoors in the milder areas of Britain, tolerating temperatures down to about -5°c or perhaps a bit lower if the soil is very well-drained[200]. This plant can become a weed in areas suitable for its growth[200], though the British climate is generally too cool for this to happen[K].

# 8.2.150 Atriplex californica

California Orach, California saltbush 7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 0.1 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli

drutta Atriplex californica is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves - cooked. Seed - cooked. Used as a piñole[103, 105, 161, 177]. The seeds are 1 - 2mm in diameter[270].

nrakta South-western N. America - California. ksacta Sea bluffs, sandy coasts, crevices in sea cliffs, coastal strands, edges of coastal salt marsh, coastal sage scrub from sea level to 50 metres/2701.

propta Seed - sow April/May in a cold frame. Germination usually takes place within 1 - 3 weeks at 13°c. As soon as they are large enough to handle, prick the seedlings out into individual pots and plant them out into their permanent positions in the summer[134].

nwatta Succeeds in full sun in any well-drained but not too fertile soil[200]. Most species in this genus tolerate saline and very alkaline soils[200]. Succeeds in a hot dry position. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200].

#### 8.2.151 Oxalis tetraphylla

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Oxalis tetraphylla is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Western N. America - Oregon to California. ksacta Meadows and aspen groves, occasionally on open slopes[60]

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained soil[1]. This species is only hardy in the milder areas of the country, it should tolerate temperatures down to between -5 and -10°c[200]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.146 Allium roseum

Rosy Garli

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 0.4 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Allium roseum is a BULB growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[2, 105, 177]. A garlic substitute, it is used as a flavouring in salads and cooked foods[22]. The bulbs are 10 - 15mm in diameter[200]. Leaves - raw or cooked. A mild garlic flavour, they make a nice addition to salads and can also be used as a flavouring in cooked foods[K]. Flowers - raw. Used as a garnish on salads, they are very attractive and have a pleasant mild garlic flavour[K]. Bulbils - raw or cooked. Very small and fiddly to use, though they have a pleasant mild garlic flavour[K].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta Europe - Mediterranean. Naturalized in Britain[17]. ksacta Grassland and gravelly places near the sea[45].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. Very easy, the plants divide successfully at any time in the grow-

ing season and the divisions can be planted straight out into their permanent positions if required.

nwatta Easily grown in a warm sunny position in a light well-drained soil[1, 90, 203]. Only hardy in the milder parts of Britain, it tolerates temperatures down to between -5 and -10°c[200]. The bulbs should be planted fairly deeply[1]. A very ornamental plant[1]. There are several named forms[203]. The sub-species A. roseum bulbiferum produces a few sterile flowers and many bulbils on its flowering stem[203]. This form will probably spread freely and perhaps escape from cultivation[K]. The sub-species A. roseum roseum does not produce bulbils[203]. Both forms produce numerous bulblets around the base of the main bulb[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes [18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 8.2.147 Origanum onites

Pot Marioram

7 tlin 10 cyuc 3 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Origanum onites is a PERENNIAL growing to 0.3 m (1ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaLeaves-raw or cooked. They are used as a flavouring for salad dressings, vegetables and legumes and are best added in the final stages of cooking[183, 238]. A strong thymelike aroma, the leaves are used as a substitute for oregano r marjoram, but they are inferior in flavour[183, 238]. A slightly bitter flavour, it is not nearly so sweet and delicate as O. majorana or O. vulgare[244]. Its flavour, however, lasts longer in cooked dishes[244]. A herb tea is made from the leaves[183].

tcanta Disinfectant Dye Essential Pot-pourriAn essential oil from the leaves is used as a food flavouring and in perfumery[57, 61, 171]. The leaves and flowering stems are added to pot-pourri and scented articles[238]. The plant is often used to disinfect bee hives[7].

dwatta Antiseptic Antispasmodic Carminative Cholagogue Diaphoretic Disinfectant Emmenagogue Expectorant Stimulant Stomachic TonicThe leaves and flowering stems are antiseptic, antispasmodic, carminative, cholagogue, diaphoretic, emmenagogue, expectorant, stimulant, stomachic and mildly tonic[4, 21]. They are harvested in the summer and can be used fresh or dried[238].

nrakta Europe - Mediterranean ksacta Stony hills and rocky slopes, usually on limestone, occasionally in partial shade, to 1400 metres in Turkey[93].

propta Seed - sow early spring at 10 - 13°c and only just cover the seed. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late spring. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to not up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings of young barren shoots in June. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 -10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a rather dry, warm, well-drained soil, but is not fussy as to soil type[1, 18], thriving on chalk[1]. Prefers slightly alkaline conditions[200]. This species is not

from high altitudes appreciate 6 - 8 weeks cold stratification at  $2^{\circ}c[200].$  Pot up the seedlings into individual pots as soon as the second set of seed leaves has developed, if left longer than this they might not move well. Plant out into their permanent positions in early summer and give them some protection from the cold in their first winter. The seed can also be sown in June, the young trees being planted in their final positions in late spring of the following year. The seed has a long viability[200].

nwatta Prefers a sunny position in a moderately fertile well-drained moisture retentive circum-neutral soil[200]. Tolerates poor soils, especially those low in mineral elements[200]. Tolerates dry soils and also drought once it is established[200]. A fairly hardy species, one report suggests that it is hardy to between -15°c and -20°c[200] whilst another says that plants succumb to hard frosts[11]. Eucalyptus species have not adopted a deciduous habit and continue to grow until it is too cold for them to do so. This makes them more susceptible to damage from sudden cold snaps. If temperature fluctuations are more gradual, as in a woodland for example, the plants have the opportunity to stop growing and become dormant, thus making them more cold resistant. A deep mulch around the roots to prevent the soil from freezing also helps the trees to survive cold conditions. The members of this genus are remarkably adaptable however, there can be a dramatic increase in the hardiness of subsequent generations from the seed of survivors growing in temperate zones[200]. Eucalyptus monocultures are an environmental disaster, they are voracious, allelopathic and encourage the worst possible attitudes to land use and conservation[200]. A fast growing tree, it is often cultivated in S.W. Europe for timber, soil stabilization shelter and as an anti-malarial measure, the trees are capable of drying out wet ground, making it unsuitable for mosquitoes to breed in[50]. This species is very easily confused with E. dalrympleana[11]. Plants are shallow-rooting and, especially in windy areas, should be planted out into their permanent positions when small to ensure that they do not suffer from windrock[245]. They strongly resent root disturbance and should be container grown before planting out into their permanent position[11]. The flowers are rich in nectar and are a good bee crop[200].

#### 8.2.57 Juniperus deppeana

Alligator Juniper

7 tlin 9 cyuc 3 kcak 0 tcan 0 dwat 18 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatprikl-

wisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus deppeana is an evergreen Tree growing to 18 m (59ft lin) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from February to March, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[85, 161, 183]. A dry and mealy texture[82, 181] but with a sweet and palatable taste[2, 181]. The fruit can also be dried, ground into a meal and prepared as a mush or cakes[95, 105, 183]. The fruit has a sweetish palatable pulp and is about 15mm in diameter[183]. The cones take 2 years to mature[200].

tcanta WoodWood - light, soft, not strong, brittle, close grained[82]. Although easily worked, it is of limited value as lumber and is used mainly for fence posts and fuel[229].

nrakta South-western N. America - Texas, Arizona and Mexico. ksacta Open oak or pine woodlands[229] on dry, arid mountain sloves. 1200 - 1800 metres[82].

propta The seed requires a period of cold stratification.
The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown

as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Screen, Specimen. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[11]. Requires a hot dry position in full sun[200]. Does well on lime[200]. A slow-growing but long-lived tree[229], it grows better in dry areas with hot summers[200]. Western Britain is generally to cool and wet for this species to thrive[200]. Trees often produce vigorous shoots from the base of the trunk, or from the stumps of felled trees[82]. The seed takes two summers to ripen[229]. Dioecious. Male and female plants must be grown if seed is required. Special Features: North American native, Fragrant foliage, Inconspicuous flowers or blooms.

#### 8.2.58 Cordyline australis

Cabbage Tree

7 tlin 10 cyuc 3 kcak 3 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cordyline australis is an evergreen Tree growing to  $15 \, \mathrm{m}$  (49ft) by  $5 \, \mathrm{m}$  (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year, in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Leaves Root StemEdible Uses: SweetenerRoot - baked[105, 153, 173, 177]. It can also be brewed into an intoxicating drink[183]. Pith of the trunk - dried and steamed until soft[173]. Sweet and starchy, it is used to make porridge or a sweet drink[173]. The root and stems are rich in fructose, the yields compare favourably with sugar beet (Beta vulgaris altissima)[153]. Edible shoots - a cabbage substitute[105, 128, 173]. The leaves are very fibrous even when young, we would not fancy eating them[K].

tcanta Fibre PaperThe leaves contain saponins, but not in commercial quantities[153]. The leaves contain a strong fibre, used for making paper, twine, cloth, baskets, thatching, rain capes etc[1, 46, 61, 128, 153]. The whole leaves would be used for some of these applications. When used for making paper, the leaves are harvested in summer, they are scraped to remove the outer skin and are then soaked in water for 24 hours prior to cooking[189]. Carbon farming Industrial Crop: fiber.

nrakta New Zealand. ksacta Forest margins and open places. Abundant near swamps. North, South and Stewart Islands[44].

propta Seed - pre-soak for about 10 minutes in warm water and sow in late winter to early spring in a warm greenhouse[78, 164]. The seed usually germinates in 1 - 3 months at 25°c[164]. There is usually a good percentage germination[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring after the last expected frosts and give the plants some protection in their first winter outdoors[K]. Stem cuttings cut off the main stem just below the head and then saw off 5cm thick blocks of stem and place them 3cm deep in pure peat in a heated frame. Keep them moist until they are rooting well, then pot them up into individual pots. Plant out in late spring after the last expected frosts. Suckers, These are best removed in early spring and planted out in situ. Protect the division from wind and cold weather and do not allow the soil to become dry until the plant is established. Divisions can also be potted up and grown on until established, planting them out in the summer.

nwatta Industrial Crop: Fiber Management: Standard Minor Global CropPrefers a good sandy loam rich in humus[1]. Succeeds in full sun or light shade[188]. A very wind hardy plant, tolerating maritime exposure[49, 166]. A very ornamental plant[1], it is not very cold-hardy, tolerating short-lived lows down to about -10°c[260]. It only succeeds outdoors in the milder areas of Britain[1, 11, 59]. It grows very well in Cornwall where it often self-sows[1, 11, 59]. A form with purplish leaves is hardier than the type and succeeds outdoors in Gloucestershire[11]. The flowers have a delicious sweet scent that pervades the air to a considerable distance[245]. Mice often kill young plants by eating out the pith of the stem[11]. Carbon Farming Cultivation: minor global crop. Management: standard.

#### 8.2.59 Prumnopitys andina

Plum-Fruited Yew

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 15 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Prumnopitys andina is an evergreen Tree growing to 15 m (49ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[105, 139, 177]. Aromatic with a taste like the sweetwater grape[11, 245]. The fruit is up to 20mm long and 15mm wide, it contains one seed[200]. Seed[11, 81]. No more details are given.

tcanta Hedge Hedge WoodThe plant is very tolerant of trimming and can be grown as a hedge[1, 29, 200]. Wood. Used to make furniture[139].

nrakta S. America - S. Chile. ksacta Humid woods between the coast and the hills[139], between latitudes 36 and  $40^{\circ}$ south[11].

and spropta Seed - it can be sown at any time of the year in a sandy soil in a greenhouse[1]. It can take 18 months to germinate[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/august in a frame. Easy[1]. Cuttings of ripe wood with a heel in late summer.

nwatta Thrives in any good soil, including chalk[11, 81]. Requires a sheltered position[11]. A very ornamental plant[1], but it is in general very slow growing in Britain[11, 81], though slightly faster in the south-west[185]. Plants are usually dioecious though monoecious forms are known. Male and female plants must be grown if seed and fruit are required. The fruits are fragrant[245].

# 8.2.60 Jubaea chilensis

Chilean Wine Palm, Chile cocopalm 7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 12 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Jubaea chilensis is an evergreen Tree growing to  $2\,\mathrm{m}$  (39ft) by  $5\,\mathrm{m}$  (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Fruit Oil Sap SeedEdible Uses: Oil-Sap - raw or cooked. A very sweet taste, it can be used as a refreshing drink[1, 2, 11, 61], concentrated into a syrup of fermented into a wine[183]. The tree is felled and the crown removed, the sap then begins to flow and, providing a thin

section of trunk is removed daily, the sap will continue to flow for several months[2]. Yields of over 400 litres of sap can be obtained from a tree[2]. Fruit - candied and used as a sweetmeat[61, 183]. The fruit is about 5cm in diameter[200]. Seed -raw or cooked[46, 61]. A pleasant nutty flavour raw[2], they are also used in sweetmeats[183]. The seed is about 5cm in diameter[231]. An edible oil is obtained from the seed[46, 61, 105, 177].

tcanta Basketry Brush Oil Paper Stuffing ThatchingThe leaves are used to make baskets, brushes and for thatching[46, 61, 139]. Fibres from the plant are used as a stuffing material for mattresses etc[139]. A paper is made from the fibres in the trunk[139].

nrakta S. America - Chile. ksacta Usually found between the coast and the hills to 300 metres, between latitudes 31 to  $35^{\circ}$ south[139].

propta Seed - best sown as soon as it is ripe in a warm greenhouse. The seed can take 6 months to germinate[200]. Stored seed should be soaked for 12 - 24 hours in warm water as soon as it is received and then sown in a warm greenhouse. It can be very slow to germinate. The seed has a short viability. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first two winters. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts, and give them some protection from the cold for their first few winters outdoors.

nwatta Management: Standard Regional Crop Staple Crop: OilWe have no records of the cultivation needs of this plant in Britain. It is said in many books that it is not hardy in Britain but some trees have been growing outdoors in Britain at Torquay since 1900 and they were 7.5 metres tall in 1972[11, 166]. It will probably require a sunny sheltered position in a moist but well-drained soil[231]. Some reports say that it can tolerate several degrees of short-lived frost[200, 260]. Palms usually have deep penetrating root systems and generally establish best when planted out at a young stage. However, older plants are substantially more cold tolerant than juvenile plants[231]. In areas at the limit of their cold tolerance, therefore, it is prudent to grow the plants in containers for some years, giving them winter protection, and only planting them into their permanent positions when sheer size dictates [231]. Palms can also be transplanted even when very large. Although the thick fleshy roots are easily damaged and/or desiccated, new roots are generally freely produced. It is important to stake the plant very firmly to prevent rock, and also to give it plenty of water until re-established - removing many of the leaves can also help[231]. This species is sometimes cultivated for its edible fruit and seed plus its many other uses[139]. It is a very slowgrowing plant that takes several years before it begins to form a trunk and takes up to 60 years to produce seed[139]. The tree is becoming very rare in its native range because it has been widely exploited for its edible sap. The trees are beheaded and a large quantity of sap exudes from the trunk. Unfortunately, the tree cannot produce side branches and so it dies after this treatment[139].

#### 8.2.61 Camellia japonica

Camellia, Common Camellia, Japanese Camellia 7 tlin 9 cyuc 3 kcak 2 tcan 2 dwat 10 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Camellia japonica is an evergreen Shrub growing to  $10\ m$  (32ft) by  $8\ m$  (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Oil OilEdible Uses: Oil Oil TeaAn edible oil is obtained from the seed[11, 61, 105]. It is called 'tsubaki oil'[183]. Dried flowers - cooked[105]. Used as a vegetable or mixed with gelatinous-rice to make a Japanese food called 'mochi' [183]. The leaves are a tea substitute[142, 177, 178, 183].

for breast tumours[269]. A salve derived from the flowers is said to help skin cancer[269].

nrakta Derived in cultivation. ksacta Not known in the

propta Seed - sow in situ from early spring to late summer. The first sowing can be made under cloches in late winter and will be ready for use in early summer. The latest sowings for winter use can be made in mid to late summer.

nwatta Turnip is basically a cool climate crop that is resistant to frost and mild freezes[269]. The plants are very easily grown, provided they grow quickly when young and the soil is not allowed to dry out[264]. They succeed in full sun in a well-drained fertile preferably alkaline soil[200]. Turnips grow best in deep, friable, highly fertile soil with pH 5.5 - 6.8[269]. They are said to prefer a light sandy soil, especially when grown for an early crop in the spring, and dislike a heavy soil[37, 269]. They prefer cool moist growing conditions[16]. Turnips tolerate an annual precipitation of 35 to 410cm, an annual average temperature range of 3.6 to 27.4°C and a pH in the range of 4.2 to 7.8[269]. Temperatures below 10°C cause the plants to run to seed, even if they have not yet formed an edible root[269]. The turnip is often cultivated, both in the garden and commercially, for its edible root. A fast growing plant, it can take less than ten weeks from sowing to harvesting[264]. Its short growing season makes turnips very adaptable as a catch crop[269]. There are several named varieties and by careful selection and successional sowing it is possible to harvest roots all year round. The roots are fairly cold hardy and can be left in the ground during the winter, harvesting them as required. However, they can be troubled by slugs and other creatures so it is often better to harvest them in late autumn or early winter and store them in a cool but frost-free place. This species has long been cultivated as an edible plant and a large number of forms have been developed. Botanists have divided these forms into a number of groups, and these are detailed below. Separate entries in the database have been made for each group. B. rapa. The species was actually named for the cultivated garden turnip with its edible swollen tap root. This form is dealt with on this record. B. rapa campestris. This is the wild form of the species. It does not have a swollen root and is closest to the forms grown for their oil-rich seeds. B. rapa chinensis. Pak choi has long been cultivated in the Orient for its large tender edible leaves which are mainly produced in the summer and autumn. B. rapa dichotoma. Cultivated in the Orient mainly for its oil-rich seeds. B. rapa narinosa. Chinese savoy is another Oriental form. It is grown for its edible leaves. B. rapa nipposinica. Mizuna is a fastgrowing cold-hardy form with tender edible leaves that can be produced all year round. B. rapa oleifera. The stubble turnip has a swollen edible root, though it is considered too coarse for human consumption and is grown mainly for fodder and as a green manure. It is also cultivated for its oil-rich seeds. B. rapa parachinensis. False pak choi is very similar to B. rapa chinensis with tender edible leaves, though it is considerably more cold-hardy. B. rapa pekinensis. Chinese cabbages are widely grown in the Orient. The large tender leaves often form a cabbage-like head. B. rapa perviridis. Spinach mustard is grown for its edible leaves. A very cold-hardy plant, and also able to withstand summer heat, it can provide a crop all year round. B. rapa trilocularis. Indian colza is mainly grown for its oil-rich seeds. Grows well with peas but dislikes growing with hedge mustard and knotweed[18, 20]. A good bee plant[108].

# 8.2.144 Allium validum

Swamp Onion, Pacific onion 7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli tcuphja7n hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Allium validum is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poison-

ing caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[257]. The bulb is somewhat fibrous buls is very acceptable as a flavouring in soups and stews[183]. The bulb is fairly large, up to 5cm in diameter, and is produced in clusters[200]. The plant has thick iris-like rhizomes[203]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta South-western N. America - Idaho to California. ksacta Swampy meadows at medium to high elevations in the mountains[60].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained soil[1]. This species tolerates much wetter soils than most members of the genus but it dislikes winters with alternating periods of damp and cold and no snow cover, so it is best given a damp though well-drained soil[203]. It requires plenty of moisture in the growing season[203]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. The bulbs should be planted fairly deeply[1]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.145 Allium bisceptrum

Aspen Onion, Twincrest onion

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium bisceptrum is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves Root SeedEdible Uses: Bulb - raw or cooked[105, 161, 177, 257]. They were usually harvested in spring or early summer[257]. The bulbs are 10 - 15mm wide[200]. Leaves - raw or cooked. Used as a relish[257]. Flowers - raw. Used as a garnish on salads. The seed heads can be placed in hot ashes for a few minutes, then the seeds extracted and eaten[257].

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20]

dwatta AppetizerThe plant juice has been used as an appetite restorer[257]. Although no other specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the

season[188]. Corms are not hardy outside the milder areas of Britain and should be dug up in the autumn and stored in a cool but frost free place over winter[1]. Plant out the corms in April or May about 15cm deep[79]. In areas with cool summers the plant might not manage to develop adequate corms for subsequent growing[200]. A beautiful, late flowering corm, it self-sows freely with us on a well-drained soil in Cornwall, even very wet winters do not seem to affect this plant[K]. Plants flower in their first or second year from seed[K].

#### 8.2.141 Allium wallichii

Jimbur

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Allium wallichii is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Young leaves - cooked as a vegetable[272]. The dried leaves are used as a condiment in curries and pickles[177, 183, 272]. Bulb - raw or cooked. Poorly developed and rather small[200]. The cloves are used as a substitute for garlic[272]. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Cholera DysenteryThe bulbs, boiled then fried in ghee, are eaten in the treatment of cholera and dysentery[272]. The raw bulb is chewed to treat coughs and colds[272]. It is said that eating the bulbs can ease the symptoms of altitude sickness[272]. Members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta E. Asia - W. China to the Himalayas. ksacta Forest clearings and shrubberies, fully open to the monsoon rains, 2800 - 4300 metres from Pakistan to S.W. China[51].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta An easily grown plant[203], it prefers a sunny position in a light well-drained soil[1]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. It succeeds outdoors in N.W. England where it sets seed[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.142 Astroloma humifusum

Cranberry Heath 7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 0.1 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Astroloma humifusum is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. A sweet viscid pulp[46, 144, 154, 157, 177]. The taste is somewhat like apples[193]. The fruit is a drupe about 7 - 11mm wide[193, 200].

nrakta Australia - Western Australia, South Australia, Victoria, New South Wales and Tasmania. ksacta Sandy loams in the mountain zone[154]. In heathland and open forests[193, 200]. Also found on cleared land in a range of soils including sandstone, shale and heavy clay[200].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed has a hard coat and some form of scarification is necessary or the seed can take up to 5 years to germinate. Two or three periods each of 4 - 6 weeks cold stratification can reduce the time taken to germinate[175]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. When large enough, plant them out into their permanent positions in late spring or early summer. Cuttings of firm young tip growths[200]. It is very difficult to obtain suitable wood[157] and the cuttings are slow to root[200].

nwatta Succeeds in most well-drained soils[200]. Established plants are moderately drought tolerant[200]. This species is hardy to about -7°c in Australian gardens[157], but this cannot be translated directly to British gardens because of our cooler summers and longer, colder and wetter winters. Plants can survive frosts in Britain, particularly if the roots are well mulched, but they are best when grown in a cold greenhouse in this country[200]. The plants have a very fine root system which makes transplanting difficult[157].

# 8.2.143 Brassica rapa

Turnip, Field mustard, Toria, Yellow sarson 7 tlin 11 cyuc 3 kcak 1 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Brassica rapa is a BIENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Leaves raw or cooked[1, 5]. The cooked leaves make an acceptable vegetable, though they are coarser than the related cabbage. They are more often used as a spring greens, sowing the plants in the autumn and allowing them to verwinter. Young leaves can also be added in small quantities to salads, they have a slightly hot cabbage-like flavour and some people find them indigestible[K]. A nutritional analysis is available[218]. Root - raw or cooked[1, 5, 16, 132]. Often used as a cooked vegetable, the young roots can also be grated and eaten in salads, they have a slightly hot flavour like a mild radish. A nutritional analysis is available[218].

tcanta Fodder InsecticideTurnip root peelings contain a natural insecticide. The chopped roots can be brewed into a tea with flaked soap, this is then strained before use. It is effective against aphids, red spider mites and flies[201].

dwatta Cancer PoulticeA decoction of the leaves or stems is used in the treatment of cancer[218]. The powdered seed is said to be a folk remedy for cancer[269]. The crushed ripe seeds are used as a poultice on burns[222]. Some caution should be exercised here since the seed of most brassicas is rubefacient[K]. The root when boiled with lard is used

tcanta Dye Oil OilA non-drying oil is obtained from the seed - used as a hair-dressing[46, 61]. The oil consists mainly of olein it is not subject to polymerize or oxidize, nor does it form solids at low temperatures[174]. A green dye is obtained from the pink or red petals[168].

dwatta Astringent Cancer Haemostatic Salve TonicThe flowers are astringent, antihaemorrhagic, haemostatic, salve and tonic[178, 218]. When mixed with sesame oil they are used in the treatment of burns and scalds[218]. The plant has shown anticancer activity[218].

nrakta E. Asia - Japan, Korea. ksacta Woods in hills and down to sea level near the coast in C. and S. Japan[58].

propta Seed - can be sown as soon as it is ripe in a green-house[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10 - 15cm with a heel, August/September in a shaded frame. High percentage but slow[78]. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leaf-bud cuttings, July/August in a frame.

nwatta Landscape Uses:Border, Container, Espalier, Standard, Specimen. Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1. 11, 200]. A calcifuge plant, preferring a pH around 5[11, 200]. Prefers the partial shade of a light woodland[200], it also grows well on a north-west aspect[11] and on sunless walls[202]. This is a very cold hardy plant, but it cannot tolerate cold winds[11]. Plants should be given a position shaded from the morning sun in order to protect the flowers from late frosts[219]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200]. A very ornamental plant[11]. A large amount of named forms have been developed, mainly for their ornamental value[11, 200]. Many of them tolerate full sun[182, 200]. Camellias are a valuable commercial crop in Asia, where they are cultivated for the oil obtained from their seed. Many of the cultivars grown in Britain do not set seed, unfortunately. The following cultivars have been seen with good crops of seeds:- 'Alba Simplex'; 'Coppelia'; 'Guillio Nuccio'; 'Jupiter'[K]. The sub-species C. japonica macrocarpa. Masam. has larger fruits than the type, looking like small apples. The sub-species C, japonica rusticana (Honda,)Kitamura, is a hardier form from N. Japan where it grows at higher altitudes than the species and withstands long snowy winters[11, 219]. Special Features: Attractive foliage. Not North American native. Blooms are very showy.

#### 8.2.62 Pistacia vera

Pistachio, Pistachio Nut

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 10 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprikl-

wisslip hpa7tmwatli nyanhjen hjonli

drutta Pistacia vera is a deciduous Tree growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 9. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Fruit Oil Oil SeedEdible Uses: Oil OilSeed - raw or cooked[2, 46, 61, 74]. The seed is rich in oil and has a pleasant mild flavour[2]. It is very nice when eaten raw and is also widely used in confectionery, ice cream, cakes, pies etc[183]. An edible oil is obtained from the seed but is not produced commercially due to the high price of the seed[183]. The fruits can be made into a flavourful marmalade[183].

tcanta Miscellany Oil Oil ResinThe seed yields up to 40% of a non-drying oil. It is not used commercially due to the high value of the seed for food[183]. Male trees yield a small quantity of a high grade resin. It is used in paints, lacquers etc1741.

dwatta Dysentery Miscellany Sedative TonicThe plant is used in China for the treatment of abdominal ailments, abscesses, amenorrhoea, bruises, chest ailments, circulation, dysentery, gynecopathy, pruritus, rheumatism, sclerosis of the liver, sores and trauma[218]. The seed is said to be sedative and tonic[240].

nrakta W. Asia. ksacta Hilly and mountainous regions, especially on sandstone soils, with a temperature range from -10°c in the winter to 40°c in the summer, to 1500 metres[200]

propta Pre-soak the seed for 16 hours in alkalized water(78), or for 3 - 4 days in warm water(1), and sow late winter in a cold frame or greenhouse(78, 113). Two months cold stratification may speed up germination, so it might be better to sow the seed in early winter(113). The germination is variable and can be slow. Prick out the seedlings into individual pots when they are large enough to handle and grow on the plants for at least their first winter in a greenhouse. Plant out into their permanent positions in early summer and consider giving some protection from winter cold for their first year or two outdoors[K]. Cuttings of half-ripe wood from juvenile trees, July in a frame[113]. Layering.

nwatta Global Crop Management: pice Management: Standard Other Systems: Strip intercrop Staple Crop: Protein-oilLandscape Uses: Specimen. Requires a sunny position in a deep well-drained light soil[200]. Succeeds in dry soils. Does well in light calcareous soils[200]. Grows well on poor soils[200]. Prefers long hot summers and low humidity[200]. Plants are not very hardy in Britain and are unlikely to succeed outdoors in any but the mildest areas of the country. They will be hardier in areas with long hot summers that will thoroughly ripen the wood. Plants are prone to fungal root rots[200] The pistachio nut is often cultivated for its edible seed in warm temperate areas, there are many named forms[183]. It is very unlikely to produce a crop of seeds in Britain, simply because the summers here are not hot enough or long enough[K]. Any pruning that needs to be done is best carried out in the spring[238]. Dioecious, male and female plants must be grown if seed is required. One male plant for every five females is adequate[200]. Special Features: Edible. Not North American native, Attractive flowers or blooms.

# 8.2.63 Camellia reticulata

To-tsubak

7 tlin 10 cyuc 3 kcak 1 tcan 0 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Camellia reticulata is an evergreen Shrub growing to 10 m (32ft) by 5 m (16ft). See above for USDA hardness. It is hardy to UK zone 8. It is in leaf all year, in flower in March, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: OilEdible Uses: OilAn edible oil is obtained from the seed[177, 183]. This is a particularly good oil-bearing species[180].

nrakta E. Asia - S.W. China in Yunnan. ksacta Sparse forests, open pine forests, scrub and thickets on dry often stony hillsides, 1800 - 2700 metres in Yunnan[1, 180].

propta Seed - can be sown as soon as it is ripe in a green-house[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10 - 15cm

with a heel, August/September in a shaded frame. High percentage but slow[78]. This species does not strike from cutings. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. This species does not strike from cuttings. Leaf-bud cuttings, July/August in a frame. This species does not strike from cuttings.

nwatta Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1, 11, 200]. A calcifuge plant, preferring a pH between 5 and 7[11, 200]. Prefers the partial shade of a light woodland[200], but established shrubs do well in full sun. They require protection from cold winds. A very ornamental plant[1] but it is only hardy in mild areas of Britain, tolerating temperatures down to about -10°c[184]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200]. This species was named after the cultivated garden form, the true wild form is C. reticulata simplex. Sealy[180].

# 8.2.64 Phyllostachys vivax

Giant Timber Bamboo, Running giant bamboo 7 tlin 10 cyuc 3 kcak 2 tcan 0 dwat 10 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phyllostachys vivax is an evergreen Bamboo growing to 10 m (32ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - raw or cooked. A delicious flavour[266], they are almost entirely free of acridity, even in the raw state[183, 195]. The shoots, which are 4 - 8cm in diameter[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta Basketry WoodThe culms are used for weaving articles and as handles of farm tools[266].

nrakta E. Asia - E. China in Jiangsu and Zhejiang. ksacta Plains and mountains

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position and plenty of moisture in the growing season. Dislikes prolonged exposure to hard frosts, but plants are hardy to at least -20°c[195]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. Closely related to P. bambusoides[195]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195].

#### 8.2.65 Melia azederach

Bead Tree, Pride of India, Chinaberry 7 tlin 12 cyuc 3 kcak 4 tcan 3 dwat 9 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Melia azederach is a deciduous Tree growing to 9 m (29ft) by 9 m (29ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 9. It is in flower in June, and the seeds ripen from October to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The fruit is somewhat poisonous[2, 4, 89]. Ripe fruits are more toxic than green ones[218]. As little as six fruits have caused fatalities in children[274]. All parts of the plant contain toxins that can cause gastric tract irritation and degeneration of the liver and kidneys[274].

kcakta Edible Parts: Fruit Leaves OilEdible Uses: Drink Gum OilLeaves - cooked[2, 105]. A bitter flavour, they are used as a pot-herb, in curries, soups etc[2]. Fruit[2]. A sweetish flavour, it is eaten by children though some people believe it to be poisonous[2]. The fruit is between 1 and 5cm in diameter[200] and contains a single seed[219]. Both these reports, of edible leaves and fruits, should be treated with some caution. The fruit is poisonous according to one report where it says that the ripe fruit is more poisonous than the green fruit and that they have sometimes caused human fatalities[218]. A cooling drink is made from the sap[2] - it is actually a gum[64]. This gum is tasteless, clear to dark amber and of good solubility[64]. The sap is obtained from incisions that are made near the base of the trunk in the spring[2].

tcanta Beads Biomass Containers Fuel Furniture Gum Insecticide Lighting Oil Parasiticide Repellent Varnish WoodThe seed contains up to 40% of a drying oil[114]. It is used for lighting, varnish etc[4, 74]. The musk-scented seeds are used as beads in rosaries[1, 51, 89, 158, 245]. The fruits are a source of a flea powder and an insecticide[46, 74]. The whole fruit is ground up and used[61]. The fruit pulp is also used as an insect repellent[149]. The leaves repel mosquitoes and other insects[89, 148, 178]. Wood-tough, durable, moderately heavy, somewhat brittle, hand-somely marked, takes an excellent polish. It has a musk-like aroma[245]. It is used for making furniture, packing cases etc[114, 146, 149, 227]. Because it is fast-growing, it is often used as a fuel[272].

dwatta Anthelmintic Antiasthmatic Antirheumatic Antiseptic Aphrodisiac Astringent Bitter Diuretic Emetic Emmenagogue Febrifuge Laxative Lithontripic Parasiticide Poultice Purgative Skin Stomachic Tonic VermifugeUsed externally in the treatment of rheumatism[4, 152]. An aqueous extract reduces the intensity of asthmatic attacks[240]. (This report does not specify the part of the plant that is used[K].) The leaf juice is anthelmintic, antilithic, diuretic and emmenagogue[218, 240]. A decoction is astringent and stomachic[218]. The leaves are harvested during the growing season and can be used fresh or dried[238]. The flowers and leaves are applied as a poultice in the treatment of neuralgia and nervous headache[218, 240]. The stem bark is anthelmintic, astringent and bitter tonic[21, 176, 218]. It is used as a tonic in India[21]. It can be harvested at any time of the year and is used fresh or dried[238]. The fruit is antiseptic and febrifuge[218]. The pulp is used as a vermifuge[227]. The fruit is harvested in the autumn when it is fully ripe and can be used fresh or dried[238]. The seed is antirheumatic[218, 240]. It is used externally. The root bark is emetic, emmenagogue, purgative and vermifuge[21, 176, 218]. It is highly effective against ringworm and other parasitic skin diseases[218]. It can be harvested at any time of the year and is used fresh or dried[238]. A gum that exudes from the tree is considered by some to have aphrodisiac properties[21]. This plant should be used with caution, preferably under the supervision of a qualified practitioner[238]. Excess causes diarrhoea, vomiting and symptoms of narcotic poisoning[238].

nrakta E. Asia - N. India to China. Naturalized in the Mediterranean. ksacta Moist sunny locations[152] to 2700 metres in the Himalayas[51].

propta Seed - sow late winter in a greenhouse. The seed is best sown as soon as it is ripe in the autumn[188, 238]. The seed usually germinates well. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late

other growing plants[203]. This species is not fully hardy in Britain and is unlikely to survive in the colder parts of the country. It is only marginally hardy in N.W. England[203]. A new bulb is formed annually, the old one withering away[90]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.138 Dudleva edulis

Mission Lettuce, Fingertips 7 tlin 10 cvuc 3 kcak 0 tcan 0 dwat 0.5 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Dudleya edulis is an evergreen Perennial growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Leaves StemEdible Uses: Leaves raw. Fleshy[183]. They are considered to be a delicacy[183]. Stems - slightly sweet and refreshing to chew, though they leave a chalky taste in the mouth[183].

nrakta South-western N. America - S. California. ksacta Rocky hillsides below 1,000 metres[71]. High elevations in the Sonoran Desert[200].

propta Seed - we have no details for this species but suggest sowing the seed in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of side shoots in the summer. Dry the stem for 24 hours before planting in a very sandy soil mix[200]. The main stem can also be used, the parent plant will then produce new plantlets at the cut edge[200].

nwatta Requires a very sunny position in a well-drained soil[200]. Plants enter a semi-dormant state in late summer and they should be kept fairly dry at this time[200]. There must be some doubt over the hardiness of this species. One report says that it is hardy to zone 8 which suggests that it should tolerate occasional cold periods down to between -5 and -10°c, but the report also says that the plants should be protected from frost, with a winter temperatures no lower than 7°c[2001.

#### 8.2.139 Physalis heterophylla

Clammy Ground Cherry, Rowell's groundcherry 7 tlin 10 cyuc 3 kcak 0 tcan 1 dwat 0.9 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Physalis heterophylla is a PERENNIAL growing to 0.9 m (3ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista All parts of the plant, except the fruit, are poisonous[19, 65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[46, 105, 161]. Quite nice raw though rather small[K], the fruit can also be made into pies, jams, sauces etc[183]. Pectin or pectin-rich fruit should be added if the fruit is used in jams and preserves[183]. The fruit can also be dried, ground into a meal and added to flour for making bread etc[183]. The plant conveniently wraps up each fruit in its own 'paper bag' (botanically, the calyx) to protect it from pests and the elements. This calyx is toxic and should not be eaten.

dwatta Antitumor Diuretic Poultice UrinaryThe seed is considered to be beneficial in the treatment of difficult urination, fever, inflammation and various urinary disorders[222]. A tea made from the leaves is used in the treatment of headaches and as a wash for burns and scalds[222]. A poultice of the leaves and roots is applied to wounds[222]. An infusion of the leaves and roots is used as a wash on scalds, burns and VD sores[257]. Compounds in the plant are being investigated for antitumor activity[222].

nrakta N. America - New Brunswick to Saskatchewan, Florida, Colorado and Texas. ksacta Dry open woods[43]. Rich soils, especially where the surface has been disturbed[235].

propta Seed - sow March/April in a greenhouse only just covering the seed. Germination usually takes place quickly and freely. Prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle and plant them out after the last expected frosts. Consider giving them some protection such as a cloche until they are growing away well. Diurnal temperature fluctuations assist germination[170]. Division in spring[111]. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings in early summer[111]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in any well-drained soil in full sun or light shade[200]. A polymorphic species[43]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is fibrous dividing into a large number of fine roots [1-2]. The root pattern is rhizomatous with underground stems sending roots and shoots along their length [1-2]

# 8.2.140 Tigridia pavonia

Tiger Flower

1355

7 tlin 10 cyuc 3 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tigridia pavonia is a CORM growing to  $0.6~\mathrm{m}$  (2ft) by  $0.1~\mathrm{m}$  (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from June to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Corm -cooked[2, 46, 61, 105]. Delicious when baked, tasting like a sweet potato[K]. The corm is quite small unfortunately and so will never be more than a very tasty occasional treat[K]. The corm has an unpleasant, burning sensation on the mouth if it is eaten raw[K].

dwatta InfertilityThe plant has been used to promote fertility[200].

nrakta Southern N. America - Mexico. ksacta Oak and pine forests, it is also frequent on roadsides and in semi-wild habitats[90].

propta Seed - sow early spring in a greenhouse. It usually germinates freely. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring, after the last expected frosts. If the seedlings are potted up whilst still small and grown on quickly, they sometimes flower in their first year[K]. Division of offsets in the autumn. Store the corms in a cool but frost-free place and plant them out in the late spring. It is probably best to pot up the smaller corms and grow them on in a greenhouse for a year before planting them out in the spring.

nwatta Prefers a well-drained light sandy soil in a warm sunny position[1, 42]. Likes plenty of moisture in the growing

ticularly efficient at high temperatures, in bright sunlight and under dry conditions [196].

#### 8.2.135 Helianthus cusickii

Cusick's sunflower

7 tlin 10 cyuc 3 kcak 0 tcan 1 dwat 0.6 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Helianthus cusickii is a PERENNIAL growing to 0.6 m (2ft) by 0.2 m (0ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Oil Root SeedEdible Uses: OilEdible Portion: Seeds, Roots. The roots are peeled and eaten raw. Carbon Farming Solutions - Staple Crop: protein-oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1]. Perennial crops are being developed for their oil-seed. The Land Institute see them as part of a perennial polyculture system. Helianthus cusickii is an arid US western mountain species not tolerant of boreal conditions but grows on poor soils [1-1].

tcanta OilNone Known

dwatta The root was used by US Plateau Indian tribes to treat erectile dysfunction, wasting, and tuberculosis.

nrakta N. America. Native to the western United States from Washington, Oregon, Idaho, northern California, and northwestern Nevada. ksacta Dry grassy slopes, open woodland, mountain forests and foothills. Elevation: 1050-1300m. propta Seed

nwatta Management: Standard Staple Crop: Proteinoil Under DevelopmentClimate: cold to warm temperate. Humidity: arid to semi-arid. A perennial wildflower herb. Poor soils. Flowering Time: Late Spring, Early Summer. Cultivation: under development. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1]

### 8.2.136 Allium cupanii

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 0.3 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Allium cupanii is a BULB growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[177]. The bulb is up to 15mm in diameter[200]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta S. Europe - Mediterranean to W. Asia. ksacta Pinus nigra forest, amongst Quercus parygana, alpine and grey steppe rocky places on limestone, serpentine and schist, to 2200 metres in Turkey[93].

propta Seed - sow spring in a cold frame. Prick out the sedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Requires a sunny position in a light well-drained soil[1, 2031. Only hardy in the milder areas of the country, tolerating temperatures down to between -5 and -10°c[200]. The bulbs show some summer dormancy and so are best grown in a bulb frame, water being withheld in late sumer[203]. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile, but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.137 Allium unifolium

One-Leaved Onion

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 0.6 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Allium unifolium is a BULB growing to 0.6 m (2ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in very large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible [76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked[161, 177, 257]. The bulbs are 10 - 15mm in diameter[200]. Together with the young shoots, they are fried and eaten[183]. Leaves - raw or cooked[183]. Flowers - raw. Used as a garnish on salads.

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20].

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta South-western N. America - California and Oregon. ksacta Moist soils in pine or mixed evergreen forest in the coastal ranges of California [60, 90].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a hot dry sunny position in a light, rich well-drained soil[90, 200]. This species is difficult to maintain under cultivation in Britain, our weather is probably too wet and cool for it to really thrive[142]. The plant has a summer resting period when it should be kept dry and so it is best grown in a cold greenhouse or bulb frame[203]. Placing a cloche over outdoor-grown plants in the summer, especially after flowering, will help to ripen the bulbs[142]. Most members of this genus are intolerant of competition from

spring or early summer, after the last expected frosts[78]. Root cuttings[113].

nwatta Industrial Crop: Biomass Industrial Crop: Oil Industrial Crop: Pesticide Management: pice Management: Standard Minor Global CropRequires a sunny sheltered position[166]. Succeeds in most welldrained soils and in hot dry conditions[200]. Likes sandy soils[188]. Grows well in mild coastal areas[188]. A very ornamental tree[1], it is not very cold tolerant being killed by temperatures lower than about -5°c[260]. It only succeeds outdoors in the mildest areas of Britain[166], seldom growing larger than a shrub[182]. It is hardy on a sunny wall in S.W. England[11, 219]. It is often cultivated in warmer regions than Britain for its many useful qualities[1]. The flowers are produced on the current years wood and have a delicate sweet perfume[182, 245]. The trees do not normally require pruning[219]. The seeds have a strong scent of musk and the wood is also musk-scented[245]. Trees are very susceptible to forest fire, though they sprout back readily from the roots[229]. They are planted for re-afforestation in their native areas, where they are fast growing though short-lived[200, 229]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Invasive, Naturalizing, All or parts of this plant are poisonous, Fragrant flowers, Inconspicuous flowers or blooms

#### 8.2.66 Ouercus brantii

Barro Brant's oak

7 tlin 9 cyuc 3 kcak 3 tcan 2 dwat 8 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Quercus brantii is a deciduous Tree growing to 8 m (26ft) by 8 m (26ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. The flowers are pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista All parts of the plant contain tannins. Whilst tannins are found in many foods, and have a range of medicinal uses. They are usually only present in low concentrations. In some foods made from oaks (particularly the seeds), the tannin content can be quite high unless the food is treated to reduce tannin content. Tannins are only of low toxicity and, because of their bitter taste and astringency, are unlikely to be eaten in large quantities. However, if they are taken in excess, they can cause stomach pains; constipation followed by bloody diarrhoea: excessive thirst; and excessive urination[293].

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed raw or cooked[317]. The seed is 30 - 50mm long and 12 -22mm wide[1223]. The seed is usually cooked before eating, though it can also be eaten raw. It can be eaten whole, though it is more commonly dried, then ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. In some species, especially many of those classified as 'white oaks' the seeds are low in tanning and have a more or less sweet and agreeable flavour. The seed of most species, however, have a very bitter flavour. due especially to the presence of tannins. In these species there are various processes that can remove or at least reduce the amount of these bitter substances (although other water-soluble substances, including some minerals, will also be removed). Tannins are water-soluble and therefore the easiest way to remove or reduce tannin levels is by soaking in water. A few different methods are listed:- A traditional method of preparing the seed was to bury it in boggy ground overwinter and allow the wet soil to gradually leach the tannins. The germinating seed was dug up in the spring when it would have lost most of its astringency and bitterness. Another method was to wrap the seeds in a cloth bag and place them in a stream for several weeks. Drying the seed and grinding it to a powder before soaking speeds up the process. The fastest method is to use hot water, by cooking the powder and changing the water several times until the cooking water is no longer bitter. Alternatively, you can use cold water (which is reported to produce the best quality flour).

In this case, you soak the powdered seed in cold water for 12 - 24 hours then discard the water. Repeat this process for a number of times until the soak water is no longer bitter. The roasted seed is used as a coffee substitute[317]. Carbon Farming - Staple Crop: balanced carb.

tcanta Dye Fodder Fuel Furniture Ink Mulch Tannin Teeth Waterproofing WoodThe leaves of most species in this genus are more or less rich in tannins. A mulch of the partially decayed leaves can be placed around vulnerable plants in order to repel slugs, snails, grubs etc, and these will in time break down to add humus and nutrients to the soil. Fresh leaves should be used with caution, however, since as these decay they utilize some of the nitrogen in the soil and thus can inhibit plant growth[20, K].. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff and is also used by many cultures to make ink[4 . 331 l. The bark of oak trees is also usually rich in tannins and can be used as a dyestuff and for waterproofing rope[331 , K ]. As a source of wood and lumber the genus Quercus is one of the most important of all groups of trees. We have no specific information for this species, but in general the timber is noted for its strength, durability, and beauty, and is used everywhere for innumerable purposes, ranging from fuel to railroad ties, construction of buildings and ships, interior trim, flooring, and all grades of furniture. The woods of different species vary as to their physical qualities; some of them are very hard and tough, others are lighter in weight, softer, and less tough[331]. The wood is a favoured fuelburning well and giving off a lot of heat. It is also used for making a good quality charcoal[331, 1223]. Carbon Farming - Industrial Crop: tannin. Fodder: mast.

dwatta Antibacterial Antidiarrhoeal Antifungal Antiinflammatory Antiseptic Astringent Dysentery Haemostatic Mouthwash Skin StypticThe seeds are used in traditional medicine[317]. No further details are given[K]. Quercus (oak) species are used in the traditional medicine of many cultures, being valued especially for their tannins. Various parts of the plant can be used, most frequently it is the leaves, bark, seeds, seed cups or the galls that are produced as a result of insect damage. A decoction or infusion is astringent. antibacterial, antifungal, antiseptic, styptic and haemostatic. It is taken internally to treat conditions such as acute diarrhea, dysentery and haemorrhages. Externally, it is used as a mouthwash to treat toothache or gum problems and is applied topically as a wash on cuts, burns, various skin problems, haemorrhoids and oral, genital and anal mucosa inflammation[4]. Extracts of the plant can be added to ointments and used for the healing of cuts[4, 1231].

nrakta W. Asia - eastern Turkey, Iraq, Iran, Caucasus ksacta Limestone slopes; at elevations from 350 - 1,700 metres[1212].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Fodder: Mast Industrial Crop: nin Management: Standard Regional Crop Staple Crop: Balanced carbClimate: warm temperate. Humidity: semiarid. Quercus brantii is a plant of arid and semi-arid environments, and is able to withstand moderate amounts of frost, surviving temperatures falling to around -5°c or perhaps lower when dormant, especially if the summers are hot. Ouercus species generally grow well in a sunny position, though young plants usually tolerate reasonable levels of side shade[200]. They usually prefer a good deep fertile loam which can be on the stiff side[1, 11]. They are also often tolerant of moderate exposure, surviving well but being somewhat stunted[200]. Established plants of this species are highly drought tolerant[1212]. Seedlings soon develop a taproot and become intolerant of root disturbance, they should be planted into their permanent positions whilst young[11]. Most Quercus species hybridize freely with

notably resistant to honey fungus[200]. Carbon Farming -Cultivation: regional crop. Management: standard.

### 8.2.67 Phyllostachys rubromarginata

Reddish bamboo

7 tlin 10 cyuc 3 kcak 2 tcan 0 dwat 8 m hkuc

hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phyllostachys rubromarginata is an evergreen Bamboo growing to 8 m (26ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots - cooked[195]. They have a small degree of acridity when raw but this is removed if they are boiled in water, they are then eaten in salads etc[183]. The shoots, which are about 35mm in diameter[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta Basketry WoodThe canes are used for plant supports, making musical pipes and weaving baskets etc[195,

nrakta E. Asia - China in Zhejiang and Guangxi. ksacta Not known

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position and plenty of moisture in the growing season. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It dislikes prolonged exposure to hard frosts. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. Cultivated for its edible shoots in China[195]. Plants show a remarkably high survival rate when planted out[195]. Commercial plantings in America averaged around 86% success rate[195]. (This probably refers to divisions) In tests in Alabama, USA, this species was considerably more productive than any other member of this genus in producing canes as measured by number and by weight of the wood[195]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195].

#### 8.2.68 Bambusa textilis

Clumping Bamboo. Weaver's bamboo 7 tlin 11 cyuc 3 kcak 4 tcan 0 dwat 8 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Bambusa textilis is an evergreen Bamboo growing to 8 m (26ft) by 1.5 m (5ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

other members of the genus[200 ]. Plants in this genus are well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

ncista None Known

kcakta Edible Parts: ShootsEdible Uses: Edible Portion:

tcanta Biomass Fodder Hedge StrawCarbon Farming Solutions - Industrial Crop: biomass (Crops grown for nonfood uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. Fodder: bank. Other Systems: strip intercrop, multistrata. Good hedging/screening in full sun to part shade. Tolerates rigorous pruning of tops to 1m. Tight footprint to 1m. A good specimen plant. Good for pots.

dwatta None Known

nrakta Australasia. ksacta Usually cultivated along rivers and near villages at low altitudes in southern China.

propta By dividing the rootball, rhizomes, tubers, corms or bulbs (including offsets)

nwatta Fodder: Bank Industrial Crop: Biomass Manage Managed Multistem Minor Global Crop Other Systems: Multistrata Other Systems: Strip intercropA clumping noninvasive bamboo. Climate: warm temperate to tropical. Humidity: humid. Both hardy and drought resistant once established and tolerates sandy soils, winds and light frosts. Tolerates rigorous pruning of tops to 1m. Tight footprint to 1m. Carbon Farming Solutions - Cultivation: minor global crop. Management: managed multistem (Describes the non-destructive management systems that are used in cultivation) [1-1]. .

#### 8.2.69 Abutilon vitifolium

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Abutilon vitifolium is an evergreen Shrub growing to 8 m (26ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw. The flowers are up to 8cm in diameter[219]. A delicious mild flavour with a slight sweetness, they have a pleasant mucilaginous texture and can be eaten in quantity as part of a salad[K].

nrakta S. America - Chile. ksacta Open places in warm temperate forests[260].

propta Seed - sow spring in a greenhouse[200]. Germination should take place within a few weeks. Once the seedlings are large enough to handle, prick them out into individual pots. Grow them on for at least the first winter in a greenhouse and plant out in late spring or early summer, after the last expected frosts. Cuttings of young shoots, June in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200], Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts.

nwatta An easily grown plant, fast to establish and flower from seed and growing best in coastal areas[260]. In hot summer climates it requires partial shade, plus ample humidity and moisture in the growing season[260]. Requires a sunny position or part day shade in a fertile well-drained soil[200]. Dislikes drought[200]. Plants do not like windy conditions[260]. This species is only hardy in the mildest areas of Britain, tolerating temperatures down to between -5 to -10°c when given the protection of a south or southwest facing wall[11, 184, 200]. Plants are often deciduous in cold winters[219]. A deep mulch in winter and tying in growth to the wall will maximise protection in winter[200]. If the plant is cut back by cold weather, it will normally resprout from the base in the spring and can flower on the current year's growth[202]. A plant of the cultivar 'Album', growing in an open position at Westonbirt Arboretum, was 2

female organs) and is pollinated by Bees. The plant is selffertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: TeaLeaves[160]. No further details are given, but they are most likely to be used as an aromatic flavouring in salads and cooked foods[K]. Seed - raw or cooked[105, 161, 177, 183, 212, 257]. The seed is very small and fiddly to use[K]. The dried flowers and leaves are used to make a herbal tea[183].

dwatta Analgesic Antirheumatic StomachicThe leaves are analgesic and antirheumatic[257]. A decoction is taken internally in the treatment of rheumatism, measles, stomach pains and colds[257]. Externally, a poultice of the mashed leaves is applied to swellings[257].

nrakta Western N. America - Montana to British Columbia, south to California and Colorado. ksacta Moist soils of open hillsides, canyons and mountain valleys, from the foothills to about 2,500 metres[212].

propta Seed - sow spring in a greenhouse and only just cover the seed. The seed usually germinates in 1 - 3 months at 13°c[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant out in late spring or early summer[K]. Division in spring. Fairly simple, if large divisions are used it is possible to plant them straight out into their permanent positions. Basal cuttings of young shoots in spring[111]. Harvest the young shoots when they are about 10 - 15cm tall and pot them up in a lightly shaded position in a greenhouse. They should root within 3 weeks and can be planted out in the summer or following spring.

nwatta Prefers a warm sunny sheltered position and a well-drained soil. Succeeds in most soils. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. A plant is growing in a sunny bed at Kew Botanical gardens and appears fully hardy there[K]. This species withstands temperatures down to about -40°c when fully dormant[160]. The flowers are very attractive to bees

#### 8.2.133 Brodiaea coronaria

Californian Hyacinth, Crown brodiaea, Indian Valley brodi-

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Brodiaea coronaria is a CORM growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit RootEdible Uses: Corm raw or cooked[105, 161, 177]. Baked or boiled and eaten like potatoes[257]. When slowly roasted, it becomes very sweet[95]. Edible fruit[2]. This report is rather dubious and possibly refers to the seedpod since the seed is encased in a small dry capsule[K].

nrakta Western N. America from British Columbia to California. ksacta Gravelly prairies, grassy slopes and rocky buffs[60]. Grasslands, volcanic mesas from sea level to 1600 metres[270].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. The seed can also be sown in spring in a cold frame[138]. Germination usually takes place within 1 - 3 months at 15°c[138]. Sow the seed thinly so that it will not require thinning and grow the seedlings on undisturbed in the pot for their first year. Pot up the small bulbs when they are dormant in early autumn and grow them on for at least another year before planting them out when dormant in the autumn. Seedlings are prone to damping off, they should be watered with care and given plenty of ventilation[138]. Division in autumn[188]. Dig up the clumps of corms when they are dormant, divide them and replant the larger corms into their permanent positions. It is best to pot up the smaller

corms and grow them on for a year in a cold frame, planting them out in late summer or the autumn.

nwatta Prefers a rich sandy loam and a well-drained soil in a sheltered position[1, 188]. Succeeds in most soils and situations[42]. Likes plenty of moisture whilst in growth, followed by a warm dry period in late summer to autumn[200]. Plants may require protection in severe winters[1], they are susceptible to rot in wet winters[200]. They die down in the summer after flowering[188]. A very ornamental plant[2], it can flower in 2 years from seed[138].

# 8.2.134 Amaranthus viridis

Calalu. Slender amaranth

7 tlin 11 cyuc 3 kcak 1 tcan 2 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Amaranthus viridis is a ANNUAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 9 and is frost tender. It is in leaf from April to October, in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista No members of this genus are known to be poisonous, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorganically.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves cooked as a spinach[46, 61, 144, 177, 183]. A mild flavour[K]. The leafy stems and flower clusters are similarly used[183]. On a zero moisture basis, 100g of leaves contains 283 calories, 34.2g protein, 5.3g fat, 44.1g carbohydrate. 6.6g fibre, 16.4g ash, 2243mg calcium, 500mg phosphorus, 27mg iron, 336mg sodium, 2910mg potassium, 50mg vitamin A, 0.07mg thiamine, 2.43mg riboflavin, 11.8mg niacin and 790mg ascorbic acid[218]. Seed - cooked. Very small, about 1mm in diameter[266], but it is easy to harvest and very nutritious[K]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K]. The seed contains 14 - 16% protein and 4.7 - 7% fat[218]. The nutty edible seeds can be eaten as snacks or used in biscuits. A porridge can be made by boiling the seeds in water. In northeastern Indian it is known as Cheng-kruk and eaten traditionally as a vegetable. In South India it is known as Kuppacheera. It is also a common vegetable in Bengali cuisine and is called "note shak.

tcanta DveYellow and green dves can be obtained from the whole plant[168]

dwatta Astringent Dysentery VermifugeA decoction of the entire plant is used to stop dysentery and inflammation[218]. The plant is emollient and vermifuge[218, 240]. The root juice is used to treat inflammation during urination[272]. It is also taken to treat constipation[272].

nrakta Tropical N. America? Original habitat is obscure. ksacta A weed of waste ground and roadsides but the original habitat is obscure[144].

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easilv[206].

nwatta Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. Cultivated as a food plant in the tropics[46]. Should this plant be called A. caudatus. L. 'Viridis'[200]? Most if not all members of this genus photosynthesize by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is par-

because the plant resents root disturbance. Pot the divisions up and keep them in a lightly shaded position in a cold frame or greenhouse until they are growing away actively. Layering in spring[200].

nwatta Requires a deep moist well-drained light or medium lime-free loam[11, 166, 200] in sun or semi-shade but plants produce less fruit when they are grown in the shade[200]. Tolerates maritime exposure. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Very closely related to A. columbiana but with a more southerly range[11]. Plants can regenerate after a forest fire from a mallee-like base[166]. Plants resent root disturbance and should be placed in their final positions as soon as possible[11, 134].

### 8.2.129 Ribes gayanum

7 tlin 10 cvuc 3 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ribes gayanum is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[200]. A fine taste[177]. The fruit is about the size of a pea and is hairy[11, 200].

nrakta S. America - Chile. ksacta Not known

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Stored seed requires 4 - 5 months cold stratification at between 0 to 9°c and should be sown as early in the year as possible[113, 164]. Under normal storage conditions the seed can remain viable for 17 years or more. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter, planting them out in late spring of the following year. Cuttings of half-ripe wood, 10 - 15cm with a heel, July/August in a frame[78, 113]. Cuttings of mature wood of the current year's growth, preferably with a heel of the previous year's growth. November to February in a cold frame or sheltered bed outdoors[78, 200].

nwatta Easily grown in a moisture retentive but welldrained loamy soil of at least moderate quality[11, 200]. Plants are quite tolerant of shade though do not fruit so well in such a position[11]. This species is not hardy in the colder areas of the country, though it has succeeded outdoors at Kew for many years[11] and tolerates temperatures down to between -5 and -10°c[200]. A very ornamental plant[1]. The flowers have a soft sweet perfume[245]. Plants can harbour a stage of 'white pine blister rust', so they should not be grown in the vicinity of pine trees[155]. Plants in this genus are notably susceptible to honey fungus[200]. A suckering

# 8.2.130 Astroloma pinifolium

7 tlin 10 cvuc 3 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Astroloma pinifolium is an evergreen Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the

shade. It prefers dry or moist soil and can tolerate drought. kcakta Edible Parts: FruitEdible Uses: Fruit - raw. Sweet and succulent when fully ripe[200]. The fruit is about 5mm in diameter[200].

nrakta Australia - Western Australia, South Australia, Victoria, New South Wales and Tasmania. ksacta In heathland and open dry sclerophyll forests on sandy soils[200,

propta Seed - best sown as soon as it is ripe in a cold frame. The seed has a hard coat and some form of scarification is necessary or the seed can take up to 5 years to germinate. Two or three periods each of 4 - 6 weeks cold stratification can reduce the time taken to germinate[175]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. When large enough, plant them out into their permanent positions in late spring or early summer. Cuttings of firm young tip growths[200]. It is very difficult to obtain suitable wood[157] and the cuttings are slow to root[200].

nwatta Succeeds in most well-drained soils[200]. Established plants are moderately drought tolerant[200]. This species can survive frosts in Britain, particularly if the roots are well mulched, but they are more safely grown in a cold greenhouse in this country[200]. They will probably be all right in sheltered coastal gardens[200]. The roots are prone to fungal infection, so the plant must be grown in a welldrained soil[200]. The plants have a very fine root system which makes transplanting difficult[157].

#### 8.2.131 Agastache neomexicana

New Mexico Giant Hyssop, Bill Williams Mountain giant hys-

7 tlin 10 cyuc 3 kcak 2 tcan 1 dwat 1.2 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hionli

drutta Agastache neomexicana is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is selffertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil

kcakta Edible Parts: LeavesEdible Uses: TeaThe highly aromatic young leaves are used as a flavouring in cooked dishes[183, 257]. The young leaves are used to make a herbal tea[183].

tcanta Attracts wildlife.

dwatta Febrifuge SalveThe dried and pulverized root has been used as a dusting powder for sores and cankers[257]. The plant has been used in the treatment of fevers and bad coughs[257].

nrakta South-western N. America, ksacta Not known propta Seed - sow spring in a greenhouse and only just cover the seed. The seed usually germinates in 1 - 3 months at 13°c[133]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first year. Plant out in late spring or early summer[K]. Division in spring. Fairly simple, if large divisions are used it is possible to plant them straight out into their permanent positions. Basal cuttings of young shoots in spring[111]. Harvest the young shoots when they are about 10 - 15cm tall and pot them up in a lightly shaded position in a greenhouse. They should root within 3 weeks and can be planted out in the summer or following spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain. The closely related A. pallidiflora (some authorities consider this species to be no more than a sub-species of A. pallidiflora) is hardy in the milder areas of the country [200, 257] The following notes are based on the general needs of the genus. Prefers a warm sunny sheltered position and a well-drained soil. Succeeds in most soils. The flowers are very attractive to bees.

#### 8.2.132 Agastache urticifolia

1352

Giant Hyssop, Nettleleaf giant hyssop 7 tlin 10 cvuc 3 kcak 0 tcan 1 dwat 1.2 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Agastache urticifolia is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and

metres tall and flowering prolifically in June 1994[K]. Plants basic (mildly alkaline) soils. It can grow in semi-shade (light tend to be short-lived in Britain, dying suddenly without any apparent cause. This is probably because they flower so profusely that they die of exhaustion[11]. They produce an abundance of fertile seed, however, and this normally breeds true to type, whether from the white or the purple-flowered form[11]. Dead-heading plants to prevent seeding can enhance longevity[200]. Tip-prune young plants to promote a bushy habit, older plants can be cut back hard annually in spring if required[200]. There are some named forms, selected for their ornamental value[200]. 'Album' has very nice tasting flowers[K]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.70 Abutilon x suntense

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Abutilon x suntense is an evergreen Shrub growing to 8 m (26ft) by 5 m (16ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers raw[K]. The flowers are up to 6cm in diameter[219]. A mild flavour with a slight sweetness and pleasant mucilaginous texture[K].

nrakta A hybrid of garden origin, A. ochsenii x A. vitifolium. ksacta Not known in the wild.

propta Seed - sow spring in a greenhouse[200]. Germination should take place within a few weeks. Once the seedlings are large enough to handle, prick them out into individual pots. Grow them on for at least the first winter in a greenhouse and plant out in late spring or early summer, after the last expected frosts. Although this species is a hybrid, seedlings are usually true to type[260]. Cuttings of young shoots, June in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts.

nwatta Requires a sunny position or part day shade in a fertile well-drained soil[200]. Dislikes drought[200]. This species is only hardy in the mildest areas of Britain, tolerating temperatures down to between -5 to -10°c when given the protection of a south or south-west facing wall[11, 200]. It is probably hardier than either of its parents[11]. Plants are often deciduous in cold winters[219]. A deep mulch in winter and tving in growth to the wall will maximise protection in winter[200]. If the plant is cut back by cold weather, it will normally resprout from the base in the spring and can flower on the current year's growth[202]. Plants grow very rapidly for their first few years and need staking if they are not in a sheltered position[11]. Plants tend to be short-lived in Britain, dying suddenly without any apparent cause. This is probably because they flower so profusely that they die of exhaustion[11]. Dead-heading plants to prevent seeding can enhance longevity[200]. Tip-prune young plants to promote a bushy habit, older plants can be cut back hard annually in spring if required[200]. There are some named forms. selected for their ornamental value[11, 200]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.71 Cordyline indivisa

Cabbage Tree

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 8 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cordyline indivisa is an evergreen Tree growing to 8 m (26ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and

woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit Leaves Root StemEdible Uses: SweetenerRoot - baked[173]. Pith of the trunk - dried and steamed until soft[173]. Sweet and starchy, it is used to make porridge or a sweet drink[173]. The root and stems are rich in fructose, the yields compare favourably with Sugar Beet (Beta vulgaris altissima)[153]. Edible shoots - a cabbage substitute[105, 128, 173]. The leaves are very fibrous even when young, we would not fancy eating them[K]. Edible fruit[2, 105, 177]. The fruit is about 6mm in diameter[200].

tcanta Basketry FibreThe leaves contain saponins, but not in commercial quantities[153]. The leaves contain a strong fibre, used for making paper, twine, cloth, baskets, thatching, rain capes etc[1, 46, 61, 128, 153]. The whole leaves would be used for some of these applications. This species makes very strong rain capes[153]. The midrib of the leaves provides a fine red-coloured strip for plaiting. It makes a very strong rope, lasting longer in water than Phormium tenax[153].

nrakta New Zealand. ksacta Wetter mountains in North and South Islands[44]. Openings in wet forests[260].

propta Seed - pre-soak for about 10 minutes in warm water and sow in late winter to early spring in a warm greenhouse[78, 164]. The seed usually germinates in 1 - 3 months at 25°c[164]. There is usually a good percentage germination[78]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring after the last expected frosts and give the plants some protection in their first winter outdoors[K]. Stem cuttings cut off the main stem just below the head and then saw off 5cm thick blocks of stem and place them 3cm deep in pure peat in a heated frame. Keep them moist until they are rooting well, then pot them up into individual pots. Plant out in late spring after the last expected frosts. Suckers. These are best removed in early spring and planted out in situ. Protect the division from wind and cold weather and do not allow the soil to become dry until the plant is established. Divisions can also be potted up and grown on until established, planting them out in the summer.

nwatta Prefers a good sandy loam rich in humus[1, 11]. Succeeds in full sun or light shade[188]. Likes a rich soil[11]. Plants grow well in coastal areas[260]. Plants are not very hardy in Britain, they tolerate temperatures down to about -3°c[260] though one report says that they can survive occasional lows down to about -10°c[11]. They succeed outdoors in the milder areas of Britain[11]. This species is more tender than C. australis[49, 59]. A very ornamental plant[1], it should be planted in its permanent position as soon as possible after the first winter[11]. Mice often kill young plants by eating out the pith of the stem[11].

#### 8.2.72 Aristotelia serrata

7 tlin 10 cvuc 3 kcak 0 tcan 1 dwat 7.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Aristotelia serrata is a deciduous Tree growing to 7.5 m (24ft 7in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower in May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 46, 61, 173]. A delicious taste[153]. The fruit is about 7mm in diameter[200].

tcanta Charcoal Dye WoodYields a blue/black dye[153]. No further details are given. The wood is used in cabinet making, turnery, inlay etc[46, 61] as well as for making charcoal[46, 128].

dwatta Antirheumatic Ophthalmic PoulticeAn tirheumatic, ophthalmic, poultice[61].

1329

nrakta New Zealand. ksacta Forest and scrub from

lowland to montane areas in North, South and Stewart Islands[44, 173].

propta Seed - sow spring in a greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Once the plants are at least 20cm tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Consider giving them some protection from the cold for at least their first winter outdoors. Cuttings of half-ripe wood, July/August in a frame[11]. Cuttings of mature wood of the current season's growth in early winter[1]. Take cuttings 15 - 30cm long and plant them in pots or the open soil in a greenhouse. They normally root very easily and can be potted up in early summer then planted out late the following spring[K].

nwatta Prefers a slightly acid, moderately fertile well-drained soil in full sun with shelter from cold drying winds[200]. Plants grow best in light shade[219]. Plants are only hardy in the milder and moister areas of Britain[1, 11], growing well in light woodland[166]. If cut back in severe winters they will often resprout from the sturdier branches[219]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. In its native New Zealand, this is one of the first plants to colonize areas of cleared woodland or waste ground[219]. Plants do not really require pruning[219]. Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.73 Drimvs winteri

Winter's Bark

7 tlin 10 cyuc 3 kcak 3 tcan 2 dwat 7.5 m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Drimys winteri is an evergreen Shrub growing to  $7.5 \mathrm{~m}$  (24ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from January to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The sap of this plant can cause serious inflammation if it comes into contact with the eyes[139].

kcakta Edible Parts: Edible Uses: CondimentThe aromatic pungent bark is powdered and used as a pepper substitute in Brazil, Chile and Argentina[2, 46, 69, 183]. It is rich in vitamin C[22].

tcanta Essential Parasiticide WoodThe powerfully aromatic bark contains resinous matter and 0.64% of aromatic essential oil[245]. Wood - not durable, heavy (it sinks in water) - interior of houses, boxes etc. It burns badly with a smell[46, 61, 69, 139].

dwatta Antidandruff Antiscorbutic Aromatic Febrifuge Parasiticide Skin Stimulant Stomachic Vitamin CThe bark is a pungent bitter tonic herb that relieves indigestion[238]. It is antiscorbutic, aromatic, febrifuge, skin, stimulant and stomachic. An infusion of the bark is used in the treatment of indigestion, colic, dandruff and scurvy[4, 46, 69, 139]. Zall It is also used as a parasiticide[4, 46, 69, 139]. The bark is harvested in the autumn and winter and is dried for later use[238].

nrakta Southern S. America - Chile, Argentina. ksacta The dominant tree in moister lowland sites to Tierra Del Fuego[69]. Boggy sites by streams etc in rich soils[139].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow on the plants for at least their first winter in a cold frame. Plant them out in late spring or early summer, after the last expected frosts. Layering in March/April. Takes 12 months[78]. Cuttings of half-ripe wood, 10 - 15 cm with a heel, July/August in a frame. Approximately 60% take[78]. Cuttings of mature wood of the current year's growth with a heel of older wood. November in a cold frame[78].

nwatta Requires a light lime-free soil in semi-shade[202]. Tolerates chalk in the soil[11]. Requires a deep moist soil[11]. Dislikes dry conditions[139]. Prefers

a warm sandy loam with some shelter[1]. Fairly wind resistant[49, 166]. Another report says that the plant resents severe wind-chill[202]. Succeeds against a wall at Kew[K] and it thrives in an open position in S.W. England[11, 49, 59]. Tolerates temperatures down to about -10°c[184]. This species is less hardy than D. lanceolata but it usually recovers from damage[120]. Another report says that it is hardier than D. lanceolata[200]. A very ornamental plant[11]. The sub-species D. winteri andina. Reiche, is a slow growing dwarf form seldom exceeding 1 metre in height[182]. It usually commences flowering when about 30cm tall[238]. A polymorphic species[139]. The flowers have a delicate fragrance of jasmine, whilst the bark has a powerful aromatic smell[245]. This plant was a symbol of peace to the indigenous Indian tribes of S. America in much the same way as an olive branch was used in Greece[139]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.74 Actinidia callosa henryi

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Actinidia callosa henryi is a deciduous Climber growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from May to June, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The fruit is grayish-green when fully ripe and can vary from 15 - 50mm in diameter[266]. It contains a number of small seeds, but these are easily eaten with the fruit[K].

nrakta E. Asia - S.W. China. ksacta Climbing into trees in forests, thickets and valleys at elevations of 500 - 2600 metres in western and southern China[266].

propta Seed - sow spring in a greenhouse[133]. It is probably best if the seed is given 3 months stratification[113], either sow it in a cold frame as soon as it is ripe in November or as soon as it is received. Fresh seed germinates in 2 - 3 months at 10°c, stored seed can take longer[133]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in the greenhouse for at least their first winter. When the plants are 30cm or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts[K]. Most seedlings are male[126]. The seedlings are subject to damping off, they must be kept well ventilated[113]. Cuttings of softwood as soon as ready in spring in a frame[K]. Cuttings of half-ripe wood, July/August in a frame. Very high percentage[113]. Cuttings of ripe wood. October/November in a frame.

nwatta Prefers a sound loamy neutral soil[1, 200]. Succeeds in semi-shade but full sun is best for fruit production[200]. Prefers a sheltered position[200]. Plants are not fully hardy in much of Britain[219]. Young spring growth is susceptible to frost damage[160]. Fruits are formed on second year wood and also on fruit spurs on older wood[126], any pruning is best carried out in the winter[219]. This is a climbing plant, supporting itself by twining around branches etc[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

### 8.2.75 Phyllostachys propingua

7tlin 10 cyuc 3 kcak 0 tcan 0 dwat 6 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys propinqua is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium

easy, the suckers can be planted out direct into their permanent positions. Layering.

mwatta An easily grown plant, succeeding in most soils[11]. It does not require a rich soil, flowering and fruiting better in a well-drained soil of moderate quality[11]. Succeeds in impoverished soils[200]. Requires a sunny position[200]. Tolerates maritime exposure[200]. This species is not very hardy outside the milder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200].

# 8.2.127 Lilium longiflorum

White Trumpet Lily, Easter lily, Trumpet Lily 7 tlin 9 cyuc 3 kcak 2 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lilium longiflorum is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - cooked[177]. Mild flavoured and slightly sweet[183]. A starch is also extracted from the bulb[105, 183]. The bulb is 25 - 50mm in diameter[266]. It can be used as a vegetable in similar ways to potatoes(Solanum tuberosum). Young leaves and stems - cooked[105, 177, 183]. Eating the leaves and stems severely harms the vitality of the bulb and is not recommended. Flowers[183]. No further details are given. The flower buds are eaten according to another report[177].

tcanta EssentialAn essential oil is obtained from the flowers, used in perfumery[46, 58, 61].

dwatta Antiasthmatic Antitussive Expectorant SedativeThe bulb is antiasthmatic, antitussive, expectorant, sedative and tonic (nutritive)[174, 176]. It is used in the treatment of coughs, haemoptysis, insomnia and fidgetiness in the later stage of febrile disease[176].

nrakta E. Asia - Southern Japan, in the Ryukyu Islands. ksacta By the coast, often in pockets of coral rock[143].

propta Seed - immediate epigeal germination[130]. Sow thinly in pots from late winter to early spring in a cold frame. Should germinate in 2 - 4 weeks[163]. Great care should be taken in pricking out the young seedlings, many people prefer to leave them in the seed pot until they die down at the end of their second years growth. This necessitates sowing the seed thinly and using a reasonably fertile sowing medium. The plants will also require regular feeding when in growth. Divide the young bulbs when they are dormant, putting 2 - 3 in each not, and grow them on for at least another year before planting them out into their permanent positions when the plants are dormant[K]. Division with care in the autumn once the leaves have died down. Replant immediately[200]. Bulb scales can be removed from the bulbs in early autumn. If they are kept in a warm dark place in a bag of moist peat, they will produce bulblets. These bulblets can be potted up and grown on in the greenhouse until they are large enough

nwatta Landscape Uses: Container, Specimen, Prefers an open free-draining humus-rich loamy soil with its roots in the shade and its head in the sun[200]. Lime tolerant.[200], plants grow well in limestone soils[260]. Plants deteriorate rapidly if grown in deep shade[143]. A very ornamental plant[1] it is often cultivated for the cut flower trade[260]. It is only hardy outdoors in the mildest areas of Britain and even there needs to be grown in a warm sheltered position with protection from early frosts[143]. The dormant bulbs will withstand soil temperatures down to at least -5°c[214]. It can be grown as an annual, the plants can flower in 6 months from seed[143]. The flowers diffuse a pleasant jasmine-like perfume[245]. Hand pollination is required in order to ensure fertilization[143]. Stem rooting, plant the bulbs 20cm deep[143]. Early to mid autumn is the best time to plant out the bulbs in cool temperate areas, in warmer areas they can be planted out as late as late autumn[200]. The plant should be protected against rabbits and slugs in early spring.

If the shoot tip is eaten out the bulb will not grow in that year and will lose vigour[200]. Special Features: Attractive foliage, Suitable for cut flowers, Fragrant flowers, Attractive flowers or blooms. The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a clumper with limited spread [1-2]. The root pattern is a bulb.

#### 8.2.128 Arctostaphylos tomentosa

Downy Manzanita, Woollyleaf manzanita, Brittleleaf manzanita, Dacite manzanita, Rosy manzanita, San 7 tlin 10 cvuc 3 kcak 3 tcan 3 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli fyifxre7t hjonli

drutta Arctostaphylos tomentosa is an evergreen Shrub growing to 1.5 m (5th). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked[2, 92, 105, 161]. Sweet, dry and mealy[61]. An important food for native tribes, it can also be dried for winter use[177]. When dried and baked into a bread it is relished by the native Indian tribes[2]. If harvested when not quite ripe, it can be used like a tart apple[2]. A cooling sub-acid drink can be made from the fruit[2, 257]. The fruit is about 8 - 10mm in diameter[200]. Seed - ground into a powder and used to make mush, biscuits etc[92, 257]. The seed is very small and would be difficult to separate from the fruit. It would be easier to dry the whole fruit, grind this into a powder and use it in soups etc[K].

tcanta Dye WoodA yellowish-brown dye is obtained from the leaves, it does not require a mordant[168]. The wood is used for making fine furniture[61].

dwatta Antiseptic Appetizer Astringent Diuretic Stomachic UrinaryThe dried leaves are used in the treatment of a variety of complaints[4]. These leaves should be harvested in early autumn, only green leaves being selected, and then dried in gentle heat[4]. A tea made from the dried leaves is strongly astringent, diuretic and an antiseptic for the urinary tract[4, 222]. It is much used for kidney and bladder complaints and inflammation of the urinary tract, but it should be used with caution[4, 21, 46, 172] because it contains arbutin which hydrolyzes into the toxic urinary antiseptic hydroquinone[222]. An infusion of the bark powder has been used in the treatment of lung haemorrhages[257]. A cider made from the fruit has been used as an appetizer to create appetite and treat stomach complaints[257]. Although the report does not specify, the cider was probably unfermented[K]

nrakta South-western N. America - California. ksacta Sandy places[71] on the edge of Pinus radiata forests and on windy coastal bluffs below 150 metres[166].

propta Seed - best sown in a greenhouse as soon as it is ripe. Pre-soak dried seed in boiling water for 10-20 seconds or burn some straw on top of them and then stratify at 2-  $5^{\circ}{\rm c}$  for 2 months[11, 200]. The seed usually germinates in 2-3 months at  $15^{\circ}{\rm c}[134]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or greenhouse for at least their first winter. Plant out in late spring or early summer. Cuttings of side shoots of the current season's growth, 5-8cm with a heel, August to December in a frame. The cuttings are very slow and can take a year to root[1, 78]. Division in early spring. Take care

but it inhibits the growth of legumes[18, 20, 54]. This plant is a bad companion for alfalfa, each species negatively affecting the other[201]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 8.2.124 Impatiens pallida

Pale Jewelweed, Pale touch-me-not 7 tlin 10 cyuc 3 keak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslin hpa7tmwatli xre7t hionli

drutta Impatiens pallida is a ANNUAL growing to 1.5 m (5ft) by 0.6 m (2ft in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

poista Regular ingestion of large quantities of these plants can be dangerous due to their high mineral content[172]. This report, which seems nonsensical, might refer to calcium oxalate. This mineral is found in I. capensis and so is probably also in other members of the genus. It can be harmful raw but is destroyed by thoroughly cooking or drying the plant[K]. People with a tendency to rheumatism, arthritis, gout, kidney stones and hyperacidity should take especial caution if including this plant in their diet[238].

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves and shoots - cooked[62]. Added to sukiyaki, chow mein and other oriental dishes[183]. When used as a vegetable on their own the cooking water should be changed once or twice during the cooking[183]. Some caution is advised, see the notes on toxicity at the top of the record. Seed[62]. No more details are given but the seeds are difficult to harvest in quantity, mainly because of their exploding seed capsules which scatter the ripe seed at the slightest touch[K].

tcanta FungicideA fungicide is obtained from the plant. It is used to treat skin diseases[62]. There are no more details but it is probably obtained from the fresh juice of the plant and can be concentrated by boiling up the juice.

dwatta Skin StingsThe whole plant is diuretic, emetic and purgative[238]. It is only used externally, the soothing and medicinal sap is a proven remedy for nettle stings and poison ivy rash[62, 207, 222, 238, 257] and is also used in the treatment of warts, corns, ringworm and haemorrhoids[238].

nrakta Eastern N. America - Newfoundland to Saskatchewan, south to Georgia. ksacta Moist woodland and wet meadows, usually on calcareous soils[43].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer.

nwatta Succeeds in any reasonably good soil[1]. Grows well in heavy clay soils. Prefers a moist well-drained humus rich soil in a cool site[200]. The plant is hardy to about -5°c[238]. It should be possible to grow it as a spring-sown annual in most parts of Britain. This plant has seed capsules that spring open forcibly as the seed ripens to eject the seed a considerable distance. The capsules are sensitive to touch even before the seed is ripe, making seed collection difficult but fun[K].

#### 8.2.125 Lavatera thuringiaca

Lavatera. Tree lavatera

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 1.8 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lavatera thuringiaca is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers LeavesEdible Uses: Young leaves - raw or cooked. A mild flavour, but the leaves are tough and not very worthwhile[K]. Leaves of the cultivar 'Barnsley' are less tough and are reasonably tasty, a plant at Kew had also produced quite a few leaves in the winter and so it is a potential winter salad[K]. Flowers - raw. A pleasant mild flavour, they make a decorative addition to the salad bowl[K]. Many named cultivars have considerably larger flowers than the type species and are thus much more worthwhile for the salad bowl[K].

tcanta FibreA strong fibre is obtained from the stems, it is used for making string, bags, paper etc[74].

nrakta S.E. Europe to W. Asia - Armenia to Caucasia. ksacta Hills, thickets and waysides[100], by streams to 2800 metres[93]

propta Seed - sow spring in a cold frame and only just cover the seed[200]. Germination is usually quick and good. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer[K]. Basal cuttings in spring. Cuttings of softwood in June/July[188].

nwatta An easily grown plant, succeeding in any ordinary garden soil[1]. Prefers a light well-drained moderately fertile soil in full sun[200]. A soil that is too rich encourages foliar growth at the expense of flowering[200]. Tolerates maritime exposure[200]. Plants are hardy to about -20°c[187]. There are many named forms selected for their ornamental value[200]. The cultivar 'Barnsley' usually produces new shoots from the base in the autumn and winter. It is therefore a potential winter salad plant, though the texture of the leaves is not that wonderful[K].

#### 8.2.126 Lycium carolinianum

Christmas Berry, Carolina desert-thorn 7 tlin 10 cyuc 3 kcak 3 tcan 2 dwat 1.5 m hkuc htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lycium carolinianum is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure

pcista Although no records of toxicity have been seen for this species, it does belong to a family that contains many poisonous plants. Some caution should be applied, especially towards leaves or unripe fruits, though ripe fruits are almost certainly edible.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Rather pleasant eating, the fruit has a slightly salty taste[183]. The fruit is a berry up to 12mm in diameter[200]. Only the fully ripe fruits should be eaten[Kl.

tcanta Soil stabilizationPlants have an extensive root system and can be planted to stabilize banks[200].

dwatta CancerThe fruit of many members of this genus is a very rich source of vitamins and minerals, especially in vitamins A, C and E, flavanoids and other bio-active compounds. It is also a fairly good source of essential fatty acids, which is fairly unusual for a fruit. It is being investigated as a food that is capable of reducing the incidence of cancer and also as a means of halting or reversing the growth of cancers [214].

nrakta South-eastern N. America - S. Carolina to Florida and Texas. ksacta Not known

propta Seed - sow early spring in a greenhouse. Germination is usually good and fairly quick. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Pinch out the shoot tips of the young plants in order to encourage bushy growth[78]. Cuttings of half-ripe wood, 5 - 10cm with a heel if possible, July/August in individual pots in a frame. Good percentage[78]. Cuttings of mature wood of the current season's growth, autumn to late winter in a cold frame. High percentage[78, 2001. Division of suckers in late winter. Very

(loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots -cooked[195]. They are usually boiled in at least one change of water. The shoots, which are 3 - 4cm in diameter[266], are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta WoodThe canes are split into splints and used for weaving wares and are also used whole as handles of farm tools and appliances[266].

nrakta E. Asia - China, ksacta Not known

propta Seed. - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position and plenty of moisture in the growing season. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It dislikes prolonged exposure to hard frosts. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. Closely related to P. meyeri[195].

#### 8.2.76 Phyllostachys arcana

Half-Black Bamboo

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phyllostachys arcana is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is polinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots cooked[195]. The shoots, which are about 3cm in diameter[266], are harvested in the spring when about 8cm above the ground, cutting them about 5cm below soil level. They are said to be of good quality[183] and have a delicious flavour[266].

tcanta WoodThe hard canes are used as handles of farm appliances or as pillars of bamboo appliances[195, 266]. They are also used for matting and making lanterns[195].

nrakta E. Asia - China. ksacta Not known

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from

established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Prefers a rich damp soil with shelter from cold harsh winds and prolonged frosts. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122].

#### 8.2.77 Smilax laurifolia

Laurel Greenbrier

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Smilax laurifolia is an evergreen Climber growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root -cooked[2, 102, 161, 177]. Rich in starch[46, 105], it can be dried and ground into a powder to be used as a flavouring in soups etc or for making bread[257]. The root can be up to 15cm thick[235]. Young shoots - cooked. Used as an asparagus substitute[2, 46, 102, 161].

dwatta Astringent Birthing aid Poultice Rubefacient TonicThe stem prickles have been rubbed on the skin as a counter-irritant to relieve localised pains, muscle cramps and twitching[222]. A tea made from the leaves and stems has been used in the treatment of rheumatism and stomach problems[222]. The wilted leaves are applied as a poultice to boils[222]. A tea made from the roots is used to help the expelling of afterbirth[222]. Reports that the roots contain the hormone testosterone have not been confirmed, they might contain steroid precursors, however[222]. The root bark is astringent and slightly tonic[257]. An infusion of the root bark has been used as a wash in treating burns, sores and pox[257].

nrakta South-eastern N. America - New Jersey to Florida and Texas. ksacta Swamps and low ground[43]. Moist woods and thickets[235]. Bays, bogs, pocosins, swamp margins, marshy banks[270].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus. seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwatta Succeeds in most soils in sun or semi-shade[200]. This species is not very hardy in Britain[1]. It succeeds outdoors in S.W. England, but even there it is best when grown against a wall[11]. The fruit takes two growing seasons to

Male and female plants must be grown if seed is required.

#### 8.2.78 Himalayacalamus falconeri

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Himalavacalamus falconeri is an evergreen Bamboo growing to 6 m (19ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots cooked and used as a vegetable[220, 272]. The young shoots are widely collected in Nepal and Bhutan, though this often conflicts with the other main use of the plant as a material for weaving[220, 267].

tcanta Basketry WeavingThe canes are thin walled, very light and pliable, they are used for basket making and other woven structures[195, 272]. The plant is frequently harvested from the wild for this purpose[220].

nrakta E. Asia - Himalayas. ksacta Cool broad-leaved forests, 2000 - 2500 metres[220].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings. Rhizome cuttings.

nwatta Prefers a humus rich friable sandy loam in a sunny position or in shade [200]. Intolerant of winter wet and of temperatures below about -6°c[200]. According to some authorities, the correct name for this species should be Himalayacalamus falconeri[220]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. Usually only about 3 metres tall in Britain, plants can reach 10 metres in height in favoured areas. The rootstock is caespitose.

# 8.2.79 Passiflora incarnata

Maypops - Passion Flower, Purple passionflower, Apricot Vine, Maypop, Wild Passion Flower, Purple Pa 7 tlin 11 cyuc 3 kcak 0 tcan 3 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Passiflora incarnata is an evergreen Climber growing to 6 m (19ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from June to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Sedation. Hypersensitivity reactions noted. Can potentiate the action of central nervous system depressants like alcohol [301].

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Fruit - raw or cooked in jellies, jams etc[2, 3, 21, 46, 61]183].

ripen[235]. The stems have viscious thorns[270]. Dioecious. A sweet flavour[4], it is best when used as a ielly[95]. High in niacin[160]. Fairly large, the fruit is up to 5cm in diameter[200] though it contains relatively little edible pulp and a lot of seeds[K]. Leaves - raw or cooked. Said to be delicious as a cooked vegetable or when eaten in salads[183]. Flowers cooked as a vegetable or made into syrup[183].

> dwatta Antidepressant Antispasmodic Astringent Diaphoretic Epilepsy Homeopathy Hypnotic Narcotic Sedative Vasodilator Women's complaintsMaypops is a valuable sedative and tranquillising herb with a long history of use in North America[254]. It is frequently used in the treatment of insomnia, epilepsy, hysteria etc[254]. The leaves and stems are antispasmodic, astringent, diaphoretic, hypnotic, narcotic, sedative, vasodilator and are also used in the treatment of women's complaints[4, 7, 21, 46, 61, 165, 192, 207, 2381. The plant is harvested after some of the berries have matured and is then dried for later use[4]. It is used in the treatment of insomnia, nervous tension, irritability, neuralgia, irritable bowel syndrome, pre-menstrual tension and vaginal discharges[4, 21, 165, 192, 207]. An extract of the plant depresses the motor nerves of the spinal cord[213], it is also slightly sedative, slightly reduces blood pressure and increases respiratory rate[222]. The plant contains alkaloids and flavonoids that are an effective non-addictive sedative that does not cause drowsiness[238]. The plant is not recommended for use during pregnancy[238]. A poultice of the roots is applied to boils, cuts, earaches, inflammation etc[222]. The dried plant is exported from America to Europe for medicinal usage[207]. A homeopathic remedy is made from the plant[4]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Passiflora incarnata for nervousness and insomnia (see [302] for critics of commission E).

> nrakta Eastern N. America - Virginia and Kentucky. south to Florida and Texas. ksacta Sandy thickets and open soils[43]. Fields, roadsides, fence rows and thickets[192].

> propta Pre-soak the seed for 12 hours in warm water and then sow late winter or early spring in a warm greenhouse. If sown in January and grown on fast it can flower and fruit in its first year[88]. The seed germinates in 1 - 12 months at 20°c. Prick out the seedlings into individual pots when they are large enough to handle. It you are intending to grow the plants outdoors, it is probably best to keep them in the greenhouse for their first winter and plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Mulch the roots well in late autumn to protect them from the cold. Cuttings of young shoots, 15cm with a heel, in spring[1]. Leaf bud cuttings in spring. Cuttings of fully mature wood in early summer. Takes 3 months. High percentage[3].

> nwatta Landscape Uses: Arbor, Container, Seashore, Reguires a well-drained soil with plenty of moisture in the growing season, otherwise it is not fussy[1]. Another report says that it prefers a well-drained sandy slightly acid soil in full sun[238]. In a well-drained soil the roots are hardy to about -20°c, although top growth is killed back by frost[160, 200]. The top growth is cut back almost to the ground each year by some people and the plant treated as a herbaceous perennial[88]. The roots should be mulched in winter to prevent them from freezing. Plants thrive in a short growing season[160]. A climbing plant, supporting itself by means of tendrils[222]. Resistant to pests and diseases[160]. Plants in this genus are notably resistant to honey fungus[200]. Cultivated for its edible fruit by the North American Indians[2, 46]. Plants yield from 5 to 20 fruits annually in the wild[160]. Outdoor grown plants should have their roots restricted in order to encourage fruit production instead of excessive vegetative growth[1]. Hand pollinate using pollen from a flower that has been open for 12 hours to pollinate a newly opened flower before midday[88]. Special Features: North American native. Attracts butterflies. Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. Herbaceous. A suckering vine sending up suckers some distance main plant [1-2]. The root pattern is stoloniferous rooting from creeping stems above the ground [1-2].

especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit is about 6mm in diameter[200].

tcanta DyeA green dye is obtained from the roots[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168].

dwatta Antibacterial Antirheumatic Antitumor Dysentery Febrifuge Laxative Salve TonicThe bark is antirheumatic and febrifuge[257]. A decoction has been taken internally in the treatment of rheumatism, aque, consumption and heartburn[257]. A decoction has been used as a wash for cuts and bruises[257]. The liquid obtained from chewing the roots has been used as a salve and to prevent swelling from wounds and abrasions[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta South-western N. America - California, Mexico. ksacta Rocky exposed places and woody slopes below 1200 metres[71].

propta Seed - best sown as soon as it is ripe in a greenhouse[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider giving them some protection from the cold for their next winter. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Foundation, Ground cover, Massing. An easily grown plant, it thrives in any good garden soil[11, 200]. Grows well in heavy clay soils. Dislikes windy positions[49]. Prefers a shady sheltered position[49]. This species is not fully hardy in the colder parts of Britain[3]. The young growth in spring can be damaged by late frosts. Closely allied to M. aquifolium[67]. It hybridizes freely with other members of the genus. Most plants grown in gardens under this name are in fact hybrids[182]. Plants are resistant to honey fungus[88]. Special Features: North American native, Fragrant flowers, Attractive flowers or blooms.

# 8.2.122 Asphodelus aestivus

7 tlin 10 cvuc 3 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asphodelus aestivus is an evergreen Perennial growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year, in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Root Seed StemEdible Uses: Tuber - cooked[4]. Rich in starch[89, 177]. Dried and boiled in water it yields a mucilaginous matter which can be mixed with grain to make a nutritious bread[4, 105]. Boiling destroys the acrid principle in the tubers[4], rendering them quite pleasant to eat[K]. Flowering stalk - cooked[89, 148]. Seed - roasted[89, 148].

tcanta Adhesive DyeThe dried tuber is pulverized and mixed with cold water to make a strong glue[4] that is used by bookmakers and shoemakers[61, 89, 148]. A yellow dye is obtained from the tuber[46, 61].

dwatta Acrid Antispasmodic Diuretic EmmenagogueThe root, gathered at the end of its first year, is acrid, antispasmodic, diuretic, emmenagogue[4]. It was used in the treatment of several diseases by the Greeks and Romans, but is not employed in modern medicine[4].

nrakta S. Europe, N. Africa, W. Asia, ksacta Rocky places, hills, dry places[89] and on poor uncultivated ground[42].

propta Seed - sow March/April in a greenhouse and only just cover the seed. Germination usually takes place in 1 - 3 months at 15°c[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. When the plants are large enough to handle, plant them out into their permanent positions in late spring or early summer. Division in early spring or autumn[111].

nwatta Succeeds in ordinary garden soil, tolerating partial shade[200]. Requires a well-drained soil[1, 200]. Prefers a deep rich sandy loamy soil[1, 111]. Prefers a sunny position and a soil that is not too rich[200]. Grows well on hot dry banks[42]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Plants are evergreen in mild winters[200]. Plants seem to be immune to the predations of rabbits[233]. This species is closely related to A. ramosus[187].

## 8.2.123 Allium atropurpureum

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli hgattcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Allium atropurpureum is a BULB growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate

pcista Although no individual reports regarding this species have been seen, there have been cases of poisoning caused by the consumption, in large quantities and by some mammals, of certain members of this genus. Dogs seem to be particularly susceptible[76].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - raw or cooked. The bulbs are 15 - 30mm wide[200]. Leaves - raw or cooked. Flowers - raw. Used as a garnish on

tcanta RepellentThe juice of the plant is used as a moth repellent. The whole plant is said to repel insects and moles[20]

dwatta Although no specific mention of medicinal uses has been seen for this species, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds (which give them their onion flavour) and when added to the diet on a regular basis they help reduce blood cholesterol levels, act as a tonic to the digestive system and also tonify the circulatory system[K].

nrakta E. Asia - N. India. ksacta Shaded humus rich soils along rocky cliffs, 1900 metres to 2200 metres in the Himalayas[145].

propta Seed - sow spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle - if you want to produce clumps more quickly then put three plants in each pot. Grow them on in the greenhouse for at least their first winter and plant them out into their permanent positions in spring once they are growing vigorously and are large enough. Division in spring. The plants divide successfully at any time in the growing season, pot up the divisions in a cold frame or greenhouse until they are growing well and then plant them out into their permanent positions.

nwatta Prefers a sunny position in a light well-drained soil[1]. Established plants are fairly drought tolerant[190]. Judging by its habit, this plant should also tolerate some shade[K]. This species is only hardy in the milder areas of the country, it should tolerate temperatures down to between -5 and -10°c. The bulbs should be planted fairly deeply[1]. Most members of this genus are intolerant of competition from other growing plants[203]. Grows well with most plants, especially roses, carrots, beet and chamomile,

obtained from this plant is probably the foulest-smelling of all herbs, with a sulphurous garlic-like odour[7, 238]. It is so nauseating to some people that it has been nicknamed 'dung of the devil'[7]. However, in judicious quantities it gives a surprisingly pleasant flavour to many foods[238].

tcanta Essential GumA gum-resin is obtained from incisions in the roots and rhizomes[114]. The stem is removed at the end of the growing season, the root uncovered and a thin slice removed[74]. Another report says that the stem is removed as the plant starts to flower[238]. The gum exudes and hardens and a fresh slice is then made[74]. The gum should be stored in an air-tight container to prevent its strong flavour contaminating nearby substances[238]. The gum is a source of an essential oil which has medicinal properties and is also used as a food flavouring and in perfumery[46,

dwatta Antiasthmatic Antispasmodic Carminative Expectorant Laxative SedativeAsafoetida is a very effective medicinal herb that acts mainly on the digestive system, cleansing and strengthening the gastro-intestinal tract[238]. It is much used in the Ayurvedic tradition[238]. The gumresin contains a volatile oil that is as persistent in aroma as garlic. They leave the body via the respiratory system and aid the coughing up of congested mucous[254]. The pungently flavoured gum-resin that is obtained from the root is alterative, anthelmintic, antiperiodic, antispasmodic, carminative, deobstruent, deodorant, expectorant, laxative, sedative and stomachic[7, 21, 176, 218]. It is used in the treatment of simple digestive problems such as wind, bloating, indigestion and constipation, and also for respiratory problems such as bronchitis, bronchial asthma and whooping cough[254]. It is also used as a circulatory stimulant, lowering blood pressure and thinning the blood[7, 21, 165, 176, 254]. The resin has a synergistic effect on other herbal preparations such as camphor, valerian and nux-vomica[7]. It is used in tincture as a mild cardio-tonic[7]. As an aphrodisiac [301]. See below under 'Uses notes' for details on harvesting the resin.

nrakta W. Asia - Afghanistan to Iran, ksacta Deserts[74]. propta Seed - best sown as soon as the seed is ripe in a greenhouse in autumn[1]. Otherwise sow in April in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle. Plant them out into their permanent positions whilst still small because the plants dislike root disturbance[1]. Give the plants a protective mulch for at least their first winter outdoors. Division in autumn. This may be inadvisable due to the plants dislike of root disturbance

nwatta Succeeds in most soils[1]. Prefers a deep fertile soil in a sunny position[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Plants have a long taproot and are intolerant of root disturbance[200]. They should be planted into their final positions as soon as possible. Monocarpic, the plant takes some years before it flowers and dies after flowering[74]. In Britain, the plants usually flower after about 5 years[238]. The whole plant, especially when bruised, has an unpleasant smell like stale fish[245].

#### **8.2.119** Rubus almus

Mayes Dewberry, Garden dewberry

7 tlin 10 cvuc 3 kcak 1 tcan 0 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rubus almus is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Good quality[177]. A dewberry, it is very juicy[71]. The oblong fruit is about 30mm long[200].

tcanta DyeA purple to dull blue dye is obtained from the

nrakta Southern N. America - north-eastern Texas, ksacta Not known

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one

month stratification at about 3°c and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Tip layering in July. Plant out in autumn. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. Plants in this genus are notably susceptible to honey fungus[200].

#### 8.2.120 Asparagus acutifolius

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 1.5 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nvanhien hionli

drutta Asparagus acutifolius is an evergreen Perennial growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime

kcakta Edible Parts: StemEdible Uses: Young shoots cooked[22, 46, 61]. An asparagus substitute, it is preferred by gourmets for its stronger flavour[132, 183]. Excellent when seasoned with oil and lemon juice[183]. Thin, bitter and often stringy according to another report[2]. Very aromatic[132]. A uniquely bitter aromatic flavour[183]. The new shoots are rather thin and are not produced in abun-

nrakta Europe - Mediterranean. ksacta Bushy and dry sunny places, mainly on limestone[45, 89, 132].

propta Seed - pre-soak for 12 hours in warm water and then sow in spring or as soon as the seed is ripe in early autumn in a greenhouse. It usually germinates in 3 - 6 weeks at 25°c[134]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a sunny position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Division in early spring as the plant comes into

nwatta An easily grown plant, succeeding in any good garden soil[200]. Prefers a rich sandy loam[1]. Plants tolerate considerable neglect on our Cornish trial grounds[K]. Plants are very tolerant of maritime exposure[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring, even on mature plants, is frosttender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Dioecious. Male and female plants must be grown if seed is required.

# 8.2.121 Mahonia pinnata

California Barberry, Wavyleaf barberry, Island barberry, Creeping Holly Grape

7 tlin 8 cyuc 3 kcak 2 tcan 2 dwat 1.8 m hkuc

1348

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Mahonia pinnata is an evergreen Shrub growing to 1.8 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 3, 105, 161]. An acid flavour but rather nice raw,

#### 8.2.80 Arbutus andrachne

Grecian StrawberryTree

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 6 m hkuc

htut cyutli hgatkyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Arbutus andrachne is an evergreen Tree growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from March to April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 22, 46, 105, 183, K]. A luscious, juicy texture with a sweet but insipid flavour[K]. Many people do not like eating more than a few of the raw fruits, though I find them very acceptable[K]. They make a good cooked fruit in preserves etc[K]. The fruit is about 15mm in diameter[200].

tcanta Hedge Hedge WoodPlants can be grown as a hedge, they are tolerant of some trimming[188]. Wood - hard, close-grained.

nrakta S.E. Europe. W. Asia. ksacta Evergreen scrub and rocky slopes[45] on limestone, serpentine and igneous rocks in areas that are very dry in summer[184].

propta Seed - best surface sown in a cold frame as soon as it is ripe. Stored seed should be soaked for 5 - 6 days in warm water and then surface sown in a shady position in a greenhouse [78]. Do not allow the compost to become dry. 6 weeks cold stratification helps[134]. The seed usually germinates well in 2 - 3 months at 20°c[134]. Seedlings are prone to damp off[184], they are best transplanted to individual pots as soon as they are large enough to handle and should be kept well ventilated. Grow them on in a greenhouse for their first winter and then plant out in late spring after the last expected frosts[K]. Basal cuttings in late winter[200]. Cuttings of mature wood of the current season's growth, November/December in a frame. Poor percentage[78]. Layering of young wood - can take 2 years[1, 200].

nwatta Requires a nutrient-rich well-drained moistureretentive soil in a sunny position with shelter from cold drying winds, especially when young[200]. Requires a lime-free soil according to some reports[1, 134], but it thrives on a limy soil according to other reports[11, 182, 200]. Established plants are drought tolerant. Plants are hardy to about -15°c[184]. The flowers are sweetly scented[245]. Dislikes being transplanted, it should be placed in its final position whilst young, giving some protection in its first winter outdoors[11, 134]. Plants are very slow growing. Most plants cultivated under this name are in fact A. x andrachnoides 'Serratula'[200].

#### 8.2.81 Schisandra henryi

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 6 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Schisandra henryi is a deciduous Climber growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[11, 177].

nrakta E. Asia - China from W. Hupeh to Szechwan. ksacta Thickets, in rich forests and woodland[109]. Forests, ravines, slopes and thickets at elevations of 500 - 2500 me-

propta Seed - best sown in the autumn in a cold frame[200, 238]. Pre-soak stored seed for 12 hours in warm

1333

water and sow in a greenhouse in the spring[238]. Germination can be slow and erratic. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for their first 2 years. Plant them out into their permanent positions in early summer. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame. Overwinter in the greenhouse and plant out in late spring[11, 78]. Good percentage[78]. Layering of long shoots in the autumn[200].

nwatta Prefers a rich well-drained moisture retentive soil[11, 200]. Prefers a slightly acid soil but tolerates some alkalinity if plenty of organic matter is added to the soil[200]. Requires some protection from the most intense sunlight[200]. Plants succeed in guite deep shade and are suitable for north-facing walls[219]. Plants are intolerant of drought[K]. Plants are not very cold-hardy in Britain, tolerating temperatures down to about -7°c[200]. They succeed outdoors in the milder areas of the country, especially if given the protection of woodland or a wall[K]. The young growth in spring can be damaged by late frosts. A very ornamental plant[1], it climbs by twining around supports[188]. Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.82 Muehlenbeckia complexa

Maidenhair Vine

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Muehlenbeckia complexa is a deciduous Climber growing to 5 m (16ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to September, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Sweet and juicy[173]. Botanically speaking it is actually the swollen flowers that are eaten![K].

tcanta Hedge HedgeVery salt and wind hardy, it is an excellent plant for clothing wire netting fences in very exposed positions, making a good windbreak hedge[29]. It responds well to trimming and can be grown as a free-standing shrub or hedge[260]. The plant makes an excellent ground cover when it is grown in a sunny position[K].

nrakta New Zealand. ksacta Coastal, lowland and lower montane forests, especially marginal, also in open and rocky places in North South and Stewart Islands[44].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8 cm with a heel, July/August in a frame. Pot up in autumn and overwinter in a cold frame. High percentage[78]. Plant out in late spring. Cuttings of mature wood of the current season's growth, 5 -10cm with a heel. October/November in a cold frame. High percentage[78].

nwatta Requires a well-drained soil in sun or semishade[200]. Very tolerant of maritime exposure[29]. This species is hardy to about -5°c[260]. It does not withstand hard frosts, growing very well in south-western Britain but being killed back to the ground by severe frosts at Kew and further north[11, 219]. A climbing plant that supports itself by twining around other plants etc[219], though it can also support itself and grow more like a shrub[260].. Polymorphic, there are many sub-species[44]. Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.83 Illicium verum

Ba Jiao Hui Xian, Staranise tree

7 tlin 10 cyuc 3 kcak 0 tcan 3 dwat 5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Illicium verum is an evergreen Tree growing to 5 m (16ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from March to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The fruit is poisonous in quantity[19, 177].

kcakta Edible Parts: FruitEdible Uses: The fruit is used as a flavouring in curries, teas and pickles[2, 132, 177, 238]. It is an ingredient of 'five spice powder', used in Chinese and Vietnamese cuisine[238]. The fruit is also chewed after meals in order to sweeten the breath[4]. Caution is advised because it is said to be poisonous in quantity[19, 177]. The essential oil is used to flavour liqueurs, soft drinks and bakery products[238].

tcanta Essential IncenseThe pounded bark is used as an incense[4].

dwatta Antibacterial Appetizer Carminative Expectorant Homeopathy StimulantThe fruit is antibacterial, carminative, diuretic, odontalgic, stimulant, and stomachic[4, 21, 61, 176, 240]. It is taken internally in the treatment of abdominal pain, digestive disturbances and complaints such as lumbago 176, 238]. It is often included in remedies for digestive disturbances and cough mixtures, in part at least for its pleasant aniseed flavour[238]. An effective remedy for various digestive upsets, including colic, it can be safely given to children[254]. The fruit is also often chewed in small quantities after meals in order to promote digestion and to sweeten the breath[4, 238]. The fruit has an antibacterial affect similar to penicillin[176]. The fruit is harvested unripe when used for chewing, the ripe fruits being used to extract essential oil and are dried for use in decoctions and powders[238]. A homeopathic remedy is prepared from the seed[4].

nrakta E. Asia - China, Vietnam. ksacta Light woodland and thickets[200]. Forests at elevations of 200 - 1600 metres in S and W Guangxi Province, China[266].

propta Seed it does not require pre-treatment and can be sown in early spring in a greenhouse[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts, and give some protection from the cold over the winter for the first year or two. Layering in early spring. Takes 18 months[78]. Cuttings of half-ripe wood, August in a frame[113]. Pot up the cuttings when they start to root and grow them on in the greenhouse for their first winter, planting out after the last expected frosts.

nwatta Prefers a light, moist well-drained loam and a sheltered position[1, 11] Prefers a humus-rich lime-free soil[182, 200]. Succeeds in sun or semi-shade[200]. This species is not very cold-hardy, it tolerates temperatures down to between -5 and -10°c and requires a very sheltered position or the protection of a wall when grown in Britain[200]. Chinese anise is extensively cultivated in China for its fruit and medicinal essential oil[200]. It is planted in the grounds of temples in Japan, and also on tombs[4]. Plants seldom grow larger than about 3 metres in Britain, but eventually reach about 18 metres tall in their native habitat[200].

# 8.2.84 Phyllostachys angusta

Stone Bamboo

7 tlin 10 cyuc 3 kcak 2 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys angusta is an evergreen Bamboo growing to 5 m (16ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can

grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Shoots StemEdible Uses: Young shoots in spring - cooked. The shoots, which are 3 - 4cm in diameter[266], are harvested when about 8cm above the ground, cutting them about 5cm below soil level. They are usually boiled and are free from bitterness[195].

tcanta WoodCanes are very hard and are used in making fine furniture[195]. The tough splints from culms are good for weaving fine bamboo articles[266].

nrakta E. Asia - China. ksacta Not known

propta Seed - surface sow as soon as it is ripe in a greenhouse at about  $20^{\circ}\mathrm{c}$ . Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3-6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Prefers a rich damp soil in a sheltered position and some shade[200]. Grows well in a woodland. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Closely related to P. flexuosa[200, 266]. This is a good companion species to grow in a woodland because the plants have shallow root systems that do not compete with deep tree roots[195]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122].

# 8.2.85 Drimys lanceolata

Mountain Pepper

7 tlin 10 cyuc 3 kcak 4 tcan 1 dwat 4.5 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhien hionli

drutta Drimys lanceolata is an evergreen Shrub growing to 4.5 m (14ft) by 2.5 m (8ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil. The plant can tolerates strong winds but not maritime exoosure.

kcakta Edible Parts: Fruit SeedEdible Uses: Condiment-The fruit and seed are used as a pepper and allspice substitute[1, 2, 11, 46, 61, 105, 183]. A pungent flavour[183, 193]. The aromatic berries are edible according to one report[238], whilst another says that they taste somewhat like cinnamon.

tcanta Hedge Hedge WoodThis species makes an excellent windbreak in woodland, it is widely grown as a hedge in mild temperate regions[238]. Wood - soft, only moderate strength[154].

dwatta Antiscorbutic StomachicAntiscorbutic, stomachic[152].

nrakta Australia - New South Wales, Tasmania and Victoria. ksacta Moist places in mountain forests and also in alpine zones to 1500 metres[152].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe

and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3]. The red fruit has an acid lemony flavour with a firm but juicy texture, it is rather nice raw, especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit can be up to about 6mm in diameter[200], though on specimens we have seen fruiting in Britain the fruit is only 3mm in diameter[K].

tcanta DyeA green dye is obtained from the roots[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168]. A green dye is obtained from the leaves[168].

dwatta Antibacterial Antitumor Dysentery TonicBerberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta South-western N. America - S. California. ksacta Sandy and gravelly places in sage bush scrub or chaparral[71, 184].

propta Seed - best sown as soon as it is ripe in a greenhouse[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider giving them some protection from the cold for their next winter. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Unlike most members of the genus, this species requires a dry, perfectly drained position in full sun[184], a gritty slightly acid soil is best[200]. It does well in a hot, dry position[166]. Succeeds in a good garden soil[11]. It grows best by a sunny south-facing wall[182]. Plants are not fully hardy in all parts of Britain, they probably tolerate temperatures down to about -10°c when fully dormant[184], though the young growth in spring can be damaged by late frosts. This species is closely allied to M. haematocarpa and M. fremontii[182]. It hybridizes freely with other members of the genus. Grows and flowers well at the University Botanical Gardens in Oxford[67]. A plant on a south-facing wall at Kew produced a good crop of fruit in 1999[K]. Plants are resistant to honey fungus[88].

#### 8.2.117 Ouercus fruticosa

7 tlin 10 cyuc 3 kcak 2 tcan 2 dwat 2 m hkuc htut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus fruticosa is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[105, 177]. The seed is about 15mm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds,

one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[200]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta S.W. Europe. ksacta Sandy places in lowland and mountains.

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly. Division of suckers in the dormant season.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Prefers warmer summers than are usually experienced in Britain, but plants usually grow well in Britain[200]. Produces suckers[200]. Plants are often very low growing, to about 30cm tall, and spread out to form a carpet[200]. The seed ripens in its first vear[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a nonsuckering single trunk [1-2].

#### 8.2.118 Ferula foetida

Asafoetida - Devil's Dung. Hing (Indian), Asafetida 7 tlin 10 cyuc 3 keak 0 tcan 3 dwat 2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Férula foetida is a PERENNIAL growing to 2 m (6ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Do not use orally. Avoid during pregnancy as possible increased bleeding. Topical use may cause skin irritation [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment GumLeaves and young shoots - cooked as a vegetable[2, 4, 177, 183]. The plant has a foetid odour, but this disappears when it is boiled[2]. The cabbage-like folded heads are eaten raw as a delicacy[183]. Root - cooked[2, 4]. It needs to be steeped in order to remove a bitterness[74]. A starch extracted from the roots is used to make a porridge[74]. A gum-resin from the root is used as a food flavouring[171]. It is an essential ingredient of Worcester sauce, it is also used to flavour a wide range of dishes and drinks[183]. It is popular in natural food cuisine as a garlic substitute[183]. The resin

nwatta Unlike most members of the genus, this species requires a dry, perfectly drained position in full sun, a gritty slightly acid soil is best[200]. It does well in a hot, dry position[200] and grows best on a sunny south facing wall[11]. It requires as sunny a position as possible[11, 200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. This plant has been recommended for improvement by selection and breeding as an edible fruit[183]. Closely related to M. haematocarpa, differing mainly in having broadly ovate bracts up to 8mm long[11]. It is also closely related to M. nevinii[200].

#### 8.2.114 Mahonia fremontii

Mahonia Fremont's mahonia

7 tlin 10 cyuc 3 kcak 2 tcan 2 dwat 2.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia fremontii is an evergreen Shrub growing to 2.5 m (8ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is poliniated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[257]. It is usually cooked[177]. An acid flavour but it is rather nice raw, especially when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. A beverage has been made from the fruit[257]. The ovoid fruit is about 15mm long[200].

tcanta DyeA yellow dye has been obtained from the roots[257]. A purple dye has been obtained from the fruit[257].

dwatta Antibacterial Antitumor Bitter Dysentery Hepatic Laxative TonicThe plant has been used as an aid for the gums[257]. The roots are bitter tonic, hepatic and laxative[257]. An infusion has been used to promote digestion[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta South-western N. America. ksacta Dry rocky places, especially in piñon-juniper woods, often in gravelly soils, 900 - 1500 metres in California[67, 71].

propta Seed - best sown as soon as it is ripe in a greenhouse[78]. It usually germinates in the spring[K]. 'Ğreen' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider giving them some protection from the cold for their next winter. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Unlike most members of this genus, this species requires a dry, perfectly drained position in full sun, a gritty slightly acid soil is best[11, 200]. It grows best on a sunny south facing wall in Britain[11] and does well in a hot, dry position[184]. It requires a position sheltered from strong or cold winds[202]. Plants are only hardy in the milder areas of the country, tolerating temperatures down to about -10°c[184]. Plants are slow-growing[202]. Hybridizes freely with other members of this genus[200]. The flowers are refreshingly fragrant[245]. Some named forms have been developed for their ornamental value[182]. This species is of-

ten confused with M. trifoliolata, which differs in only ever having 3 leaflets per leaf[200].

#### 8.2.115 Mahonia fortunei

Fortune's Mahoni

7 tlin 9 cyuc 3 kcak 0 tcan 2 dwat 2 m hkuc pcimhmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Mahonia fortunei is an evergreen Shrub growing to 2 m (6ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from October to December. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Fruit - raw or cooked. An acid flavour, but it makes an acceptable dessert fruit and is especially nice when added to muesli or porridge[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K].

dwatta Antibacterial Antitumor Cancer Dysentery Febrifuge Odontalgic TonicThe leaf is anticancer[218]. A decoction of the root is febrifuge and odontalgic[218]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta E. Asia - China. ksacta Not known

propta Seed - best sown as soon as it is ripe in a greenhouse[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider giving them some protection from the cold for their next winter. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Landscape Uses:Border, Container, Foundation, Pest tolerant, Massing, Specimen, Woodland garden. An easily grown shrub, it thrives in any good garden soil[11] including heavy clays. Prefers a semi-shaded woodland position in a damp, slightly acid to neutral humus-rich soil[200]. Plants are not very hardy in Britain, they do not succeed at Kew Gardens, but grow well in milder areas[11]. The young growth in spring can be damaged by late frosts. Plants are very tolerant of pruning and can be cut right back into old wood if they have outgrown their welcome[182]. Hybridizes freely with other members of this genus. The flowers are very sweetly scented[184]. Due to their habit of flowering in late autumn, fruits are rarely formed in Britain[11]. Special Features:Not North American native, Attractive flowers or blooms.

#### 8.2.116 Mahonia nevinii

Nevin's barberry

7 tlin 10 cyuc 3 kcak 2 tcan 2 dwat 2.4 m hkuc htut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Mahonia nevinii is an evergreen Shrub growing to 2.4 m (7ft 10in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils

wood, 10 - 15 cm with a heel, July/August in a frame. Approximately 60% take[78]. Layering in March/April. Takes 12 months[78]. Cuttings of mature wood of the current year's growth with a heel of older wood, November in a cold frame[78].

nwatta Requires a light lime-free soil in semi-shade[200]. Prefers a fertile moist but well-drained soil[188]. A fairly hardy species, surviving very cold winters in various parts of the country so long as it is in a suitable position[120]. It tolerates temperatures down to about -15°c[184], but plants are liable to be damaged in cold winters. This species is hardier than D. winteri according to one report[120] whilst another says that it is less hardy than D. winteri[200]. All parts of the plant are very aromatic and pungent[182, 184]. Plants in this genus are notably resistant to honey fungus[200]. Plants are usually dioecious though monoecious and hermaphrodite forms are known. Male and female plants must usually be grown if seed is required.

# 8.2.86 Abutilon ochsenii

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Abutilon ochsenii is a deciduous Shrub growing to 4 m (13ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers raw[K]. The flowers are up to 5cm in diameter[219], they have a mild, slightly sweet flavour and a slightly mucilaginous texture[K].

nrakta S. America - Chile. ksacta Not known

propta Seed - sow spring in a greenhouse[200]. Germination should take place within a few weeks. Once the seedlings are large enough to handle, prick them out into individual pots. Grow them on for at least the first winter in a greenhouse and plant out in late spring or early summer, after the last expected frosts. Cuttings of young shoots, June in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts.

nwatta Requires a sunny position or part day shade in a fertile well-drained soil[200]. Dislikes drought[200]. This species is only hardy in the mildest areas of Britain, tolerating temperatures down to between -5 to -10°c when given the protection of a south or south-west facing wall[11, 184, 2001. Plants are often deciduous in cold winters[219]. A deep mulch in winter and tying in growth to the wall will maximise protection in winter[200]. If the plant is cut back by cold weather, it will normally resprout from the base in the spring and can flower on the current year's growth[202]. Plants tend to be short-lived in Britain, dying suddenly without any apparent cause. This is probably because they flower so profusely that they die of exhaustion[11]. They produce an abundance of fertile seed, however, and this normally breeds true to type, though it will hybridise with the closely related A. vitifolium if this species is nearby[11]. Dead-heading plants to prevent seeding can enhance longevity[200]. This species is closely related to A. vitifolium[11]. Tip-prune young plants to promote a bushy habit, older plants can be cut back hard annually in spring if required[200]. Plants in this genus are notably resistant to honey fungus[200].

# 8.2.87 Canna edulis

Achira, Indian shot

7 tlin 10 cyuc 3 kcak 3 tcan 0 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Canna edulis is a PERENNIAL growing to 3 m (9ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from August to October, and the seeds ripen in October. The species

is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Leaves Root SeedEdible Uses: Root - raw or cooked[2, 22, 196]. It is the source of 'canna starch' which is used as an arrowroot[1, 46, 171, 183]. The arrowroot is obtained by rasping the root to a pulp, then washing and straining to get rid of the fibres[2]. This starch is very digestible [196]. The very young tubers can also be eaten cooked[61, 105, 142, 177], they are sweet but fibrousy[97, K]. The root can be very large, sometimes as long as a person's forearm[196]. In Peru the roots are baked for up to 12 hours by which time they become a white, translucent. fibrous and somewhat mucilaginous mass with a sweetish taste[183, 196]. The starch is in very large grains, about three times the size of potato starch grains, and can be seen with the naked eye[183, 196]. This starch is easily separated from the fibre of the root[196]. The roots contain about 25% starch[61]. The dry matter contains about 75 - 80% starch, 6 - 14% sugar, 1 - 3% protein, it is high in potassium, low in calcium and phosphorus[196]. Young shoots - cooked and eaten as a green vegetable[183, 196]. Quite nutritious, containing at least 10% protein[196]. The immature seeds are cooked in fat tortillas[183].

tcanta Fodder Mulch Size StarchThe starch from the roots is sometimes used as a laundry starch or for sizing[196]. The leaves are cut for mulch. Weed barrier. Low windbreak. Animal fodder.

nrakta S. America. W. Indies. ksacta By the coast and in temperate valleys of the Andes[97]. Usually found at the edges of moist thickets or in ditches[196].

propta Seed - pre-soak for 24 hours in warm water and sow February/March in a warm greenhouse at 20°c[1, 138]. Plant the seeds 2 - 5cm deep in individual pots[1]. Scarifying the seed can speed germination, especially if the seed has not swollen after being soaked[124, K]. The seed usually germinates in 3 - 9 weeks[138]. Grow the plants on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of the root clump as the plant comes into growth in the spring. Each portion must have at least one growing point. Pot up the divisions and grow them on in the greenhouse until they are well established and then plant them out in the summer. Root cuttings.

nwatta Requires a deep rich well-drained soil in a sunny position[1, 200]. Tolerates heavy soils[196]. The plant has large leaves and dislikes windy conditions since this can tear the leaves to shreds[200]. Requires ample water in the growing season[196]. Tolerates a pH range from 4.5 to 8[196]. This species is probably hardy in the mildest areas of Britain but even then it should be given a good mulch if left in the ground overwinter[1]. The top growth tolerates light frosts and plants can be grown in areas with winter snow[196]. The tubers can be harvested in late autumn after the top growth has been killed back by frost and stored over winter. They should be kept in a frost-free place covered in moist soil or leaves[1]. According to some botanists this species is no more than a synonym for C. indica[200]. Cultivated for its edible root in the Tropics, there are some named varieties[46, 196]. The root can be harvested within 6 months from planting out, though larger yields are obtained after 8 - 10 months[196]. In the British climate this probably means 2 years growth is required for good yields[K]. Yields in the Andes range from 13 - 85 tonnes per hectare, with 22 - 50 tonnes being average[196]. Plants are rarely troubled by pests or diseases[196]. Most cultivated forms do not produce fertile seed[196]. There are also sterile triploid forms, these contain a significantly higher proportion of starch though their cropping potential is not known[196]. Slugs love the young growth in spring and can cause serious damage to plants[233].

### 8.2.88 Bomarea edulis

7tlin 10 cyuc 3 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Bomarea edulis is a PERENNIAL CLIMBER growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to October, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Tuber - cooked[1. 22, 46, 61, 1771. When boiled the roots make a light and delicate food[2]. Rich in starch, a cream made from this farinaceous matter is wholesome and very agreeable to the

nrakta C. and S. America - Mexico to Peru, ksacta Found in mountains, in oak woodlands to tropical woodlands. Disturbed areas and forests from sea level to 3000 metres.

propta Seed - best sown as soon as it is ripe in a warm greenhouse, it will germinate in a few weeks[1]. Stratify stored seed for 3 weeks at 20°c, then 3 weeks at 5°c[138]. It usually germinates in 1 - 2 months at 20°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in early summer. Division in spring, with care since the roots are brittle. Each portion must have some roots and a growth bud[1]. Pot up the divisions, grow them on in the greenhouse until they are well established and then plant them out into their permanent positions in the summer or late spring of the following year.

nwatta Requires a warm sunny position and a welldrained slightly acid soil[1, 200]. Succeeds in any good soil in sun or partial shade[187]. One report says that plants are possibly hardy in the milder areas of Britain[1]. However a plant has been growing in an outdoor bed at Kew in light woodland for at least 4 years (1992) where it has flowered and produced seed in most years[K]. Another report says that it is hardy to about -10°c[187]. Plants prefer a minimum night temperature of 10°c[138]. Keep the plants almost dry in winter[138] and apply a good thick organic mulch to the roots[200]. The mulch should be removed as growth commences in the spring because the young shoots are very susceptible to slug damage[K]. The edible roots are sold in local markets in S. America[2]. The tubers should be planted about 15cm deep n the soil[233]. This genus is closely related to Alstroemeria species[200].

# 8.2.89 Phyllostachys makinoi

Kei-Chiku, Makino bamboo

7 tlin 10 cvuc 3 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phyllostachys makinoi is an evergreen Bamboo growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots cooked[183]. They are usually boiled in at least one change of water. The shoots are 3 - 8cm in diameter[266], they are harvested in the spring when they are about 8cm above the ground, cutting them about 5cm below soil level.

tcanta WoodThe culms are tough and compact.they are used for building, papermaking and in making furniture, umbrellas, containers and agriculture implements[266]. The canes are a very important source of material for scaffolding and construction in Taiwan[195].

nrakta E. Asia - China, ksacta Open forest at elevations up to 1500 metres[266].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Divisions from the open ground do not transplant well, so will need careful treatment and nurturing under cover in pots until at least late spring[238]. Division is best carried out in wet weather and small divisions will establish better than large clumps[238]. Another report says that you can take large divisions from established clumps and transfer them straight to their permanent positions, misting or drenching them frequently until they are established[200]. Basal cane cuttings in spring.

nwatta Requires a rich damp soil in a sheltered position. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It dislikes prolonged exposure to hard frosts[200]. This is a good companion species to grow in a woodland because the plants are shallow rooted and do not compete with deep rooted trees[195]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122].

#### 8.2.90 Podocarpus nivalis

Alnine Totara

7 tlin 11 cvuc 3 kcak 3 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hna7tmwatli nyanhien hionli

drutta Podocarpus nivalis is an evergreen Shrub growing to 3 m (9ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Superficially similar to Taxus species, but this plant is definitely not poisonous[200].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[1]. Sweet and pleasant to taste[105, 128, 173]. The fruit is about 7mm long[200].

tcanta Plants have a sprawling habit, the branches rooting as they grow, and can be grown as a tall ground cover[208]. They are best spaced about 1.2 metres apart[208].

nrakta New Zealand, ksacta Upper forest margins, subalpine slopes and occasionally in lowland forests of North and South Islands southwards from latitude 36° 50'[44]

propta The seed can be sown at any time of the year in a sandy soil in a warm greenhouse, though it is probably best sown as soon as it is ripe[1]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe terminal shoots, 5 - 10cm long, July/August in a frame[78].

nwatta Landscape Uses:Border, Cascades, Erosion control, Foundation, Ground cover, Massing. Prefers a rich moist non-alkaline soil[167]. Shade tolerant, at least when young[200]. This species is hardy to about -25°c[200], though the plants grow best in mild winter areas with plenty of rainfall and high humidity[200]. They often fruit freely in Britain[200]. A very ornamental plant[1], it is very tolerant of trimming[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Not North American native, Inconspicuous flowers or blooms.

# 8.2.91 Raphanus sativus caudatus

Rat-Tail Radish

7 tlin 10 cyuc 3 kcak 0 tcan 3 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

position in a cold frame, planting them out once they are well established in the summer.

nwatta An easily grown plant, it succeeds in ordinary garden soil[1]. It is adapted to a wide range of soil types, including upland clay, but seems to do best on porous fertile lowlands and river bottoms[269]. It does well on heavy clay soils of relatively high fertility and water holding capacity[269]. Temperatures below 13°C tend to inhibit flowering[269]. For best results, it requires a warm sunny position[1]. The plant is reported to tolerate an annual precipitation in the range of 9 to 429cm, an annual temperature in the range of 8.3 to 27.8°C and a pH of 4.9 to 8.2[269]. This species is not very winter hardy, tolerating occasional temperatures down to about -5°c so long as the soil is not too wet. It is best adapted to warm humid summer-rainfall areas in the subtropics, not growing well in strictly tropical areas[269]. A very aggressive plant[46], spreading freely at the roots and only suitable for large areas[233]. It is a parent of the cultivated Sorghum (S. bicolor)[171]. Classified as a short day plant, it does not flower if the daylight hours exceed about 13 hours per day[269].

# 8.2.112 Ferula assa

Asafoetida - Devil's Dung. Hing (Indian), Asafetida 7 tlin 10 cyuc 3 kcak 0 tcan 3 dwat 2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ferula assa-foetida is a PERENNIAL growing to 2 m (6ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Do not use orally. Avoid during pregnancy as possible increased bleeding. Topical use may cause skin irritation [301].

kcakta Edible Parts: Leaves RootEdible Uses: Condiment GumLeaves and young shoots - cooked as a vegetable [2, 4, 177, 183]. The plant has a foetid odour, but this disappears when it is boiled[2]. The cabbage-like folded heads are eaten raw as a delicacy[183]. Root - cooked[2, 4]. It needs to be steeped in order to remove a bitterness[74]. A starch extracted from the roots is used to make a porridge[74]. A gum-resin from the root is used as a food flavouring[171]. It is an essential ingredient of Worcester sauce, it is also used to flavour a wide range of dishes and drinks[183]. It is popular in natural food cuisine as a garlic substitute[183]. The resin obtained from this plant is probably the foulest-smelling of all herbs, with a sulphurous garlic-like odour[7, 238]. It is so nauseating to some people that it has been nicknamed 'dung of the devil'[7]. However, in judicious quantities it gives a surprisingly pleasant flavour to many foods[238].

tcanta Deodorant Essential Gum ParasiticideA gumresin is obtained from incisions in the roots and rhizomes[114]. The stem is removed at the end of the growing season, the root uncovered and a thin slice removed [74]. Another report says that the stem is removed as the plant starts to flower[238]. The gum exudes and hardens and a fresh slice is then made[74]. The gum should be stored in an air-tight container to prevent its strong flavour contaminating nearby substances[238]. The gum is a source of an essential oil which has medicinal properties and is also used as a food flavouring and in perfumery[46, 57, 61].

dwatta Alterative Antiperiodic Antispasmodic Aphrodisiac Cardiotonic Carminative Deobstruent Deodorant Expectorant Laxative Parasiticide Sedative Stimulant TonicAsafoetida is a very effective medicinal herb that acts mainly on the digestive system, cleansing and strengthening the gastro-intestinal tract[238]. It is much used in the Ayurvedic tradition[238]. The gum-resin contains a volatile oil that is as persistent in aroma as garlic. They leave the body via the respiratory system and aid the coughing up of congested mucous[254]. The pungently flavoured gum-resin that is obtained from the root is alterative, anthelmintic, antiperiodic, antispasmodic, carminative, deobstruent, deodorant, expectorant, laxative, sedative and stomachic[7, 21, 176, 218]. It is used in the treatment of simple digestive problems such

as wind, bloating, indigestion and constipation, and also for respiratory problems such as bronchitis, bronchial asthma and whooping cough[254]. It is also used as a circulatory stimulant, lowering blood pressure and thinning the blood[7, 21, 165, 176, 254]. The resin has a synergistic effect on other herbal preparations such as camphor, valerian and nux-vomica[7]. It is used in tincture as a mild cardio-tonic[7]. As an aphrodisiac [301]. See below under 'Uses notes' for details on harvesting the resin.

nrakta W. Asia - Afghanistan to Iran. ksacta Deserts[74]. propta Seed - best sown as soon as the seed is ripe in a greenhouse in autumn[1]. Otherwise sow in April in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle. Plant them out into their permanent positions whilst still small because the plants dis-

like root disturbance[1]. Give the plants a protective mulch for at least their first winter outdoors. Division in autumn. This may be inadvisable due to the plants dislike of root disturbance

nwatta Succeeds in most soils[1]. Prefers a deep fertile soil in a sunny position[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Plants have a long taproot and are intolerant of root disturbance[200]. They should be planted into their final positions as soon as possible. Monocarpic, the plant takes some years before it flowers and dies after flowering[74]. In Britain, the plants usually flower after about 5 years[238]. The whole plant, especially when bruised, has an unpleasant smell like stale fish[245].

# 8.2.113 Mahonia swasevi

Texas Mahonia Texas barberry

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 2.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia swaseyi is an evergreen Shrub growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It. cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw but more usually cooked in preserves[183]. Pleasantly acid. it can also be dried and used as raisins[183]. Unfortunately, there is relatively little flesh and a lot of seeds[K]. The fruit, which can be dry or juicy, is up to 15mm in diameter[183]. 270]. The roasted seed is a coffee substitute[183].

dwatta Antibacterial Antitumor Dysentery TonicBerberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta South-western N. America. ksacta Besides rocky streams in Texas. Endemic to the Edwards Plateau in Texas, where it grows on limestone ridges and canvons at elevations of 150-600 metres[270].

propta Seed - best sown as soon as it is ripe in a greenhouse[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider giving them some protection from the cold for their next winter. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

treat skin irritations including that caused by poison oak[213, 257]. A poultice of the baked bulbs has been used as an antiseptic on skin sores[257].

nrakta South-western N. America - California. ksacta Dry open hills and plains, occasionally in woods, below 1500 metres[71]

propta Seed - sow spring or summer 2mm deep in a peat/sand mix. Germination usually takes place within 1 - 6 months at 15°c, but it can be slow and erratic. Sow the seed thinly so that the seedlings do not need to be thinned and grow them on in the pot for their first year of growth, giving an occasional liquid feed o ensure that they do not become mineral deficient. When dormant, pot up 3 young bulbs per pot and grow them on for at least another 2 years before planting them out into their permanent positions in the spring[164]. Division of offsets when the bulb dies down in late summer. Larger offsets can be planted out direct into their permanent positions but it is best to pot up the smaller bulbs and grow them on for at least a year in the greenhouse.

nwatta Succeeds in any reasonably good well-drained soil[1, 42]. Prefers a rich well-drained moisture retentive soil[164]. Tolerates partial shade[164]. Dislikes dry soils according to one report[200] but plants grow in dry soils in the wild[71]. Plants are frost hardy but they come into new growth in the autumn and so need to be grown in a warm sheltered position, especially in colder areas of the country[188]. The bulbs can be damaged by heavy frosts[169]. The roots are brittle so any transplanting should be done with care[169].

# 8.2.110 Yucca whipplei

Our Lord's Candle

7 tlin 11 cvuc 3 kcak 3 tcan 0 dwat 2 m hkuc

hmim cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Yucca whipplei is an evergreen Shrub growing to 2 m (6ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit Seed StemEdible Uses: Fruit - raw or cooked. Flowers - raw or cooked[46, 61, 84]. They are delicious raw, and can also be dried, crushed and used as a flavouring[84, 164]. Young flowers have been parboiled and eaten, whilst older flowers have been boiled in three lots of water before being eaten[257]. This suggests the flowers are quite bitter[K]. Flowering stem - raw or cooked[161]. It is best used when fully grown, but before the flower buds expand[95]. It can be peeled, cut into sections then cooked and used like asparagus[95, 164]. The roasted stems have been dried, ground into a powder then mixed with water to make cakes[257]. Seed - cooked. It can be ground into a powder or cooked and used as a gruel[46, 61, 161].

tcanta Fibre SoapA fibre obtained from the leaves is used for making ropes, baskets and mats[61, 82]. It is fine and white[92]. The leaves are used as paint brushes[92]. The roots are rich in saponins and can be used as a soap substitute[82]. Carbon Farming - Industrial Crop: fiber.

nrakta South-western N. America - S. California, Mexico. ksacta Dry, grassy and often stony slopes to 1200 metres[84].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept

at a temperature of 20°c. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established [78]. Division of suckers in late spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the following spring.

nwatta Industrial Crop: Fiber Management: Standard Regional CropThrives in any soil but prefers a sandy loam and full exposure to the south[11]. Requires a sunny position[11]. Prefers a hot dry position[166], strongly disliking winter wet[11]. Established plants are very drought tolerant[200]. Plants are hardier when grown on poor sandy soils[200]. Plants are hardy to at least -5°c[200] and tolerate short periods down to -10°c[187]. They grow well in the warmer maritime areas of Britain but need protection from winter rains[182]. Plants have survived to flowering at Kew and at Bodnant in N. Wales[187]. Cultivated as a fibre plant in Mexico[61]. A very ornamental plant[1], it requires late summer and autumn warmth to initiate flowering[11]. The flowers are sweetly scented[187]. Usually monocarpic, living for a number of years without flowering and dying after it does flower[11, 164]. Plants do produce suckers, however, and can be propagated by this means[78]. The flowers of most members of this genus can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush. This species, however, is self-fertile and does not require the Yucca moth for pollination, setting fruit without hand pollination[11]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]. Carbon Farming - Cultivation: regional crop. Management: standard.

# 8.2.111 Sorghum halepense

Iohnson Grass

7 tlin 10 cyuc 3 kcak 3 tcan 1 dwat 2 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sorghum halepense is a PERENNIAL growing to 2 m (6ft) by 1.2 m (4ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate droudht.

pcista The pollen can induce hay fever[269].

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked. It can be used whole in a similar manner to rice or millet, or it can be ground into a flour and used as a cereal in making bread, cakes etcl 46. 1051.

tcanta BiomassThe plant is a potential source of biomass with yields of up to 19 tonnes per hectare [269].

dwatta Demulcent DiureticThe seed is demulcent and diuretic[240].

nrakta Europe to Asia, ksacta Dry open habitats[50].

propta Seed - sow April in a greenhouse and only just cover the seed. Germination should take place within 2 weeks. Prick out the seedlings into individual pots once they are large enough to handle and plant them out after the last expected frosts. Division in mid spring as the plant comes into new growth. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded

drutta Raphanus sativus caudatus is a ANNUAL. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves SeedpodEdible Uses: Young leaves - raw or cooked[177]. A somewhat hot taste. Flowers - raw. A nice spicy addition to salads. Young seedpods - raw[1, 4, 27, 37]. Crisp and juicy, they must be eaten when young because they quickly become tough and fibrous. They can grow more than 60cm long, but they tend to become tough and fibrous when more than 30cm long[183].

tcanta Fodder Green manure RepellentThe growing plant repels beetles from tomatoes and cucumbers[20, 201]. It is also useful for repelling various other insect pests such as carrot root fly[201]. There is a fodder variety that grows more vigorously and is used as a green manure[87].

dwatta Anthelmintic Antibacterial Antifungal Antiscorbutic Antispasmodic Astringent Cancer Carminative Cholagogue Digestive Diuretic Expectorant Laxative Poultice StomachicRadishes have long been grown as a food crop, but they also have various medicinal actions. The roots stimulate the appetite and digestion, having a tonic and laxative effect upon the intestines and indirectly stimulating the flow of bile[254]. Consuming radish generally results in improved digestion, but some people are sensitive to its acridity and robust action[254]. The plant is used in the treatment of intestinal parasites, though the part of the plant used is not specified[147]. The leaves, seeds and old roots are used in the treatment of asthma and other chest complaints[218]. The juice of the fresh leaves is diuretic and laxative[240]. The seed is carminative, diuretic, expectorant, laxative and stomachic[176, 218, 240]. It is taken internally in the treatment of indigestion, abdominal bloating, wind, acid regurgitation, diarrhoea and bronchitis[238]. The root is antiscorbutic, antispasmodic, astringent, cholagogue, digestive and diuretic[21, 218]. It is crushed and used as a poultice for burns, bruises and smelly feet[218]. Radishes are also an excellent food remedy for stone, gravel and scorbutic conditions[4]. The root is best harvested before the plant flowers[21]. Its use is not recommended if the stomach or intestines are inflamed[21]. The plant contains raphanin, which is antibacterial and antifungal[218, 238]. It inhibits the growth of Staphylococcus aureus, E. coli, streptococci, Pneumococci etc[176]. The plant also shows anti-tumour activity[218].

nrakta This plant's origin is uncertain, it possibly arose out of cultivation[200]. ksacta Not known in a truly wild situation

propta Seed - sow spring in situ. Germination should take place within 2 weeks.

nwatta Prefers a rich soil with ample moisture[16, 52]. Dislikes very heavy or acid soils[16, 37]. Plants are susceptible to drought and require irrigation during dry spells in the summer or the root quality will rapidly deteriorate and the plant will go to seed. The rat-tailed radishes are some times cultivated for their large edible seedpods, there are some named varieties[183]. This group of radishes does not produce roots of good quality, it is cultivated mainly for the edible young seedpods which are harvested in the summer. Radishes are a good companion plant for lettuces, nasturtiums, peas and chervil, tomatoes and cucumbers[18, 20]. They are said to repel cucumber beetles if planted near cucumber plants and they also repel the vine borers which attack squashes, marrows and courgettes[238]. They grow badly with hyssop[18, 20] and with grape vines[201].

#### 8.2.92 Vaccinium modestum

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli xre7t hjonli

drutta Vaccinium modestum is a deciduous Shrub growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to September; and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable

pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. Pleasant tasting[1, 200]. The fruit is upto 1cm in diameter[266].

nrakta E. Asia - China to the Himalayas. ksacta Cliffs, Abies forests, alpine meadows and thickets at elevations of 3100 - 4000 metres[266].

propta Seed - sow late winter in a greenhouse in a lime-free potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Plants in this genus are notably resistant to honey fungus[200].

# 8.2.93 Melianthus major

Honey Flower

7 tlin 10 cyuc 3 kcak 1 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Melianthus major is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The root is poisonous[73].

kcakta Edible Parts: NectarEdible Uses: SweetenerThe honey-like nectar from the flowers is eaten[2, 105, 177, 183]. Deliciously sweet, a tiny bit seems to go a long way - which is very useful since the plant does not produce that much in the British climate[K]

tcanta DyeA violet dye is obtained from the flowers[168]. dwatta Antidote Emetic VulneraryVulnerary[46, 61]. The root is poisonous and emetic, but is used as a remedy against snake bites[240].

nrakta S. Africa and India. ksacta Damp sandy ar-

propta Seed - sow spring in a warm greenhouse[188]. Prick out the seedlings into individual pots when they are large enough to handle. Grow on the seedlings for at least their first winter in a greenhouse and plant out in late spring or early summer after the last expected frosts[K]. Cuttings of greenwood stem tips in a frame in summer[200]. Suckers in spring[200]. They can be planted out immediately or potted up and kept in a frame for their first winter.

nwatta Requires a well-drained moisture retentive soil in full sun or light shade[200]. Prefers a rich loamy soil[1]. Fertile soils give good foliage effects but the plant flowers better on a poor soil[200]. A very ornamental plant it is only hardy in the milder areas of Britain[1], flowering freely in Cornwall[59]. In colder parts of the country it can be grown as a herbaceous perennial, dying down in winter but regrowing from the base in the spring[166, 200]. In these areas

the rootstock must be well mulched[200]. The top growth is possibly hardy for short periods down to -10°c, whilst the rootstock is possibly hardy to -15°c if it is well mulched[187]. The flowers have a honey-like scent[245]. The bruised leaves have a strong aroma somewhat like peanut butter[K]. Plants are often used in sub-tropical bedding schemes[1]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 8.2.94 Arthropodium milleflorum

Pale Vanilla Lilv

7 tlin 10 cvuc 3 kcak 0 tcan 0 dwat m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arthropodium milleflorum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root -cooked[144]. Rather watery with a slightly sweet or bitter flavour[193]. Plants produce about 4 - 5 tubers up to 3cm long[193].

nrakta Australia - New South Wales, Tasmania, Victoria. ksacta Found in a variety of habitats from the coast to alpine areas. Eucalyptus forests, woodlands and sub-alpine meadows, favouring moist grassy sheltered slopes[193].

propta Seed - sow late winter in a cold greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in a greenhouse. Plant out in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Prefers a well-drained sandy peaty loam in a warm, sheltered sunny position[200]. Succeeds in areas where temperatures seldom fall much below freezing so long as it is given a sunny sheltered position and a well-drained soil[200]. Plants are hardy to at least -7°c in Australian gardens[157], though this cannot be translated directly to British gardens due to our cooler summers and colder longer and wetter winters. The plant has a strong scent of vanilla, this is especially noticeable on warm days[157].

#### 8.2.95 Salvia apiana

White Sage, Compact white sage 7 tlin 10 cyuc 3 kcak 0 tcan 1 dwat 3 m hkuc htut cyutli kyuctcup hwicil hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia apiana is a PERENNIAL growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from April to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Seed StemEdible Uses: Condiment DrinkSeed - raw or cooked. It can be ground into a powder and used as a mush[177, 257]. The seed has been mixed with cereals such as oats or wheat, toasted then ground into a fine powder and eaten dry[257]. The seed can also be soaked overnight and used as a drink in water or fruit juice or eaten with cereals[61, 183]. The seed is also used as a spice[105]. The leaves are used in cooking[183]. They can be used as a flavouring in seed mushes[257]. Stem tops[105, 177]. The young stalks can be eaten raw[257]. Ripe stem tops can be peeled and eaten raw[257].

tcanta Hair IncenseThe leaves have been crushed in water and used as a hair shampoo, dye and hair straightener[257]. A poultice of the freshly crushed leaves can be applied to the armpits to treat body odours[257]. The leaves have been burnt as an incense to fumigate a house after a case of contarious diseases such as measles[257].

dwatta Blood tonic OphthalmicAn infusion of the leaves is used as a blood tonic and as a treatment for coughs and

colds[257]. The leaves can be eaten, or used as a sweat bath, in the treatment of colds[257]. The seeds have been used as eye cleaners[257]. No more information is given here, but in other instances the seed has been placed in the eye, it then forms a gelatinous covering to which any foreign matter in the eye adheres. The seed is washed out of the eye by the eyes own tears[K].

nrakta South-western N. America - California. ksacta Dry benches and slopes below 1500 metres[71].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Plants grow best in a dry climate and can be killed by excessive winter wet[200, 260]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between 5 and -10°c[200]. The seed is sold in health food shops for its use in making a drink[183]. A good bee plant[61]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 8.2.96 Atriplex lentiformis

Quail Bush, Big saltbush, Quailbush, 7 tlin 10 cyuc 3 kcak 2 tcan 1 dwat 3 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli nyanhjen hjonli

drutta Atriplex lentiformis is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to September, and the seeds ripen from July to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It brefers dry or moist soil and can tolerate droudht.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and young shoots - cooked[171]. Seed - cooked[161, 177]. It can be used as a piñole or be ground into a meal and used as a porridge, a thickener in soups or added to flour for making bread[257]. The seed is rather small and fiddly to use[257].

tcanta Miscellany SoapThe crushed leaves and roots have been used as a soap for washing clothes etc[257].

dwatta Miscellany PoulticeThe fresh leaves can be chewed, or the dried leaves smoked, in the treatment of head colds[257]. The crushed flowers, stems and leaves can be steamed and inhaled to treat nasal congestion[257]. A poultice of the powdered roots has been applied to sores[257].

nrakta South-western N. America - California, Arizona, Nevada, Texas and Mexico. ksacta Saline to essentially nonsaline drainages, stream and canal banks, roadsides, warm desert shrub, saltbush, and riparian communities at elevations of 70 - 1000 metres[270].

propta Seed - sow April/May in a cold frame in a compost of peat and sand. The seed usually germinates in 1 - 3 weeks at 13°c[134]. Pot up the seedlings when still small into individual pots, grow on in a greenhouse for the first winter and plant out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy. Pot up as soon as they start to root (about 3 weeks) and plant out in their permanent positions late in the following spring[K]. Cuttings of mature wood of the current season's growth, November/December in a frame. Very easy. Pot up in early spring and plant out in their permanent position in early summer[K].

nwatta Landscape Uses: Border, Container, Espalier, Standard, Specimen. Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1, 11, 200]. A calcifuge plant, preferring a pH between 5 and 7[11, 200]. Dislikes cold winds[11]. Prefers the partial shade of a light woodland[200], growing well in a woodland clearing[166]. Many cultivars tolerate full sun, in fact one report says that the species flowers better in a sunny position[182] and another that the plant prefers a hot sunny position[188]. Plants are hardy to about -10°c[184]. Another report says that this species is very cold hardy if it is sheltered from cold winds[11]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Another report says that the plant requires hot summers if it is to do well[260]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200]. A very ornamental plant[1], it is closely allied to C. oleifera[11]. The cultivar 'Narumigata' (which is sometimes mistakenly called C. oleifera) is a very reliable shrub in Britain[11]. Plants resent root disturbance and are best planted out into their final positions whilst still young. This species is cultivated in Asia for the oil in its seed, there are many named varieties mostly developed for their ornamental value[182]. The flowers have a delicate sweet perfume[245]. Special Features:Attractive foliage, Not North American native, Extended bloom season in Zones 9A and above, Fragrant flowers, Blooms are very showy.

# 8.2.108 Yucca recurvifolia

Curve-leaf vucca

7 tlin 10 cyuc 3 kcak 2 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Yucca recurvifolia is an evergreen Shrub growing to 2.5 m (8ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Hand. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista The roots contain saponins[222]. Whilst saponins are quite toxic to people, they are poorly absorbed by the body and so tend to pass straight through. They are also destroyed by prolonged heat, such as slow baking in an oven. Saponins are found in many common foods such as beans[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Flowers Fruit StemEdible Uses: Fruit - raw or cooked. Flowers - raw or cooked. They are delicious raw, and can also be dried, crushed and used as a flavouring[164]. A crisp crunchy texture, the flowers are very substantial and need to be well chewed. They have a slightly bitter flavour[K]. Flowering stem - cooked and used like asparaqus[164].

tcanta Fibre SoapA fibre obtained from the leaves is used for making ropes, baskets and mats[82, 169]. The roots are rich in saponins and can be used as a soap substitute[82].

nrakta South-eastern N. America - Georgia to Missouri and Louisiana. ksacta Dunes on coastal plains[72].

propta Seed - sow spring in a greenhouse. Pre-soaking the seed for 24 hours in warm water may reduce the germination time. It usually germinates within 1 - 12 months if kept at a temperature of 20°c. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for at least their first two winters. Plant them out into their permanent positions in early summer and consider giving them some winter protection for at least their first winter outdoors - a simple pane of glass is usually sufficient[K]. Seed is not produced in Britain unless the flowers are hand pollinated. Root cuttings in late winter or early spring. Lift in April/May and remove small buds from base of stem and rhizomes. Dip in dry wood

ashes to stop any bleeding and plant in a sandy soil in pots in a greenhouse until established[78].

nwatta Thrives in any soil but prefers a sandy loam and full exposure to the south[11]. Can succeed in light shade[K]. Plants are hardier when grown on poor sandy soils[200]. Established plants are very drought tolerant[190]. Hardy to at least -15°c[187, 200], this species is the most easily cultivated of the Yuccas, resisting snow, damp and atmospheric pollution[11]. A very ornamental plant[1], there are some named varieties[182]. Closely related to Y. gloriosa[1], and possibly a sterile hybrid[11]. In the plants native environment, its flowers can only be pollinated by a certain species of moth. This moth cannot live in Britain and, if fruit and seed is required, hand pollination is necessary. This can be quite easily and successfully done using something like a small paint brush. Individual crowns are monocarpic, dying after flowering[233]. However, the crown will usually produce a number of sideshoots before it dies and these will grow on to flower in later years[233]. Plants in this genus are notably resistant to honey fungus[200]. Members of this genus seem to be immune to the predations of rabbits[233]

# 8.2.109 Chlorogalum pomeridianum

Soap Lily, Wavyleaf soap plant

7 tlin 10 cyuc 3 kcak 0 tcan 2 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chlorogalum pomeridianum is a BULB growing to 2 m (6ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The bulb contains saponins. Although fairly toxic, these substances are very poorly absorbed by the body and most of them simply pass straight through. Saponins are found in a number of common foods, including many beans. They are destroyed by thorough cooking[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Leaves RootEdible Uses: Bulb-cooked[2, 71, 94, 105]. A slow baking in its skin will remove any soapiness in the taste[92]. The bulb should be peeled before being eaten since the skin is fibrous[183]. The bulb can also be peeled and then boiled, though the water it is cooked in should be thrown away[94]. Although wholesome and nutritious when thoroughly cooked, the raw bulb should not be eaten because it contains saponins[K]. The bulb is very large and can be up to 15cm in diameter[200]. Young leaves -raw or cooked[105]. Used as a potherb when harvested in the spring, they are very sweet when slowly baked[92, 183, 257]

tcanta Adhesive Fibre SoapA glue can be made from the sap that is expressed from baking bulbs[92, 94, 257]. The bulbs can be boiled into a liquid starch which can then be used to twined baskets to close the interstices so that seeds do not fall through[257]. A soap is obtained from the bulb[21, 46, 61, 169]. The bulb is stripped of its outer fibrous covering and rubbed on clothes or hands in water to produce a lather[92, 95]. It is very good for delicate fabrics and has a gentle affect upon the skin[92, K]. The bulb can also be dried for later use, it can then be grated as required and used as soap flakes[92]. A fibre obtained from the outer covering of the bulb is used to make small brushes or as a filling for mattresses etc[92, 94, 169, 257].

dwatta Antidandruff Antirheumatic Antiseptic Diuretic Laxative Poultice SkinSoap Illy bulbs contain saponins, a medicinally active ingredient that is of particular value as an antiseptic wash. Saponins are somewhat toxic (see the notes above on toxicity) and so any internal use of this plant should be carried out with great care[K]. The bulb is antiseptic, carminative, diuretic and laxative[94, 257]. A decoction has been used to treat wind in the stomach[257]. Externally, the bulbs have been rubbed on rheumatic joints[257]. The pounded bulbs were mixed with water and used as a hair wash in the treatment of dandruff, to prevent lice and also to

female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Flowers - raw or cooked. A delicious sweet flavour, they are excellent on their own or as part of a mixed salad[K]. The flowers produce nectar all the time they are open so, assuming the plant is grown indoors and is not visited by pollinating insects, the sweetness increases the longer the flower is open[K].

nrakta Hybrids of garden origin involving several species, especially A. megapotanicum and A. pictum. ksacta Not known in the wild

propta Seed - sow spring in a greenhouse[200]. Germination should take place within a few weeks. Once the seedlings are large enough to handle, prick them out into individual pots. Grow them on for at least the first winter in a greenhouse and plant out in late spring or early sumer, after the last expected frosts. This species is a hybrid, so the seedlings will not be true to type. Cuttings of young shoots, June in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts.

nwatta Requires a sunny position or part day shade in a fertile well-drained soil[200]. Dislikes drought[200]. All members of this genus have edible flowers - the leaves will also be edible but in our experience although they have a mild flavour the texture is not that pleasant. There has been much hybridisation within the genus by growers wishing to produce ornamental flowering plants and it is now rather difficult to assign species names for many of these cultivars. Consequently, this entry has been used to cover a range of hybrid forms of complex parentage involving several species but especially A. megapotanicum and A. pictum. Several cultivars are hardy in the mildest areas of Britain, tolerating temperatures down to about -5°c when given the protection of a south or south-west facing wall[11, 200]. Plants are often deciduous in cold winters[219]. A deep mulch in winter and tying in growth to the wall will maximise protection in winter[200]. If the plant is cut back by cold weather, it will normally resprout from the base in the spring and can flower on the current year's growth[202]. Dead-heading plants to prevent seeding can enhance longevity[200]. Tip-prune young plants to promote a bushy habit, older plants can be cut back hard annually as new growth commences in late winter or early spring if required[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.106 Cephalotaxus oliveri

7 tlin 10 cyuc 3 kcak 4 tcan 0 dwat 3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cephalotaxus oliveri is an evergreen Shrub growing to 3 m (9ft 10in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: Fruit SeedEdible Uses: We have no details for this species but it is in a genus where many of the members have edible seed and fruit[K]. The fruit is up to 3cm long[200]. It is certainly worthy of more research[K]. The fruit does not always ripen in Britain, before full ripeness it has a disgusting resinous flavour that coats the mouth and refuses to go away for hours[K].

tcanta Hedge HedgeVery tolerant of pruning, this plant makes a very good hedge in shady positions[200].

nrakta E. Asia - W. China - Sichuan, Hubei. ksacta An understorey shrub in woodlands[200]. Coniferous and broadleaved forests at elevations of 300 - 1800 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame[113], it should then germinate in the following spring[K]. A hard seedcoat can delay germination, especially in if the seed is not sown as soon as it is ripe[81, K]. Stored seed should be cold-stratified and sown in a cold frame in the spring[200]. Germination can take 18 months or more. Prick out the seedlings as soon as they are large enough to handle and grow them on for at least their first winter under cover. Plant out in late spring after the last expected frosts. Greenwood cuttings of terminal shoots, August/September in a humid cold frame[1, 200]. Difficult[113].

nwatta Prefers a moist well-drained sandy soil but succeeds in most soils though it dislikes dry gravelly or chalky soils[1, 200]. Prefers a position in semi-shade but tolerates full shade[11, 81] and it also succeeds but does not usually thrive in full sun[200]. It grows very well in the mild wet coastal region of W. Scotland where it succeeds even in full sun[200]. Requires a humid sheltered site[200], strongly disliking very exposed positions[1]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Plants are dioecious, but female plants sometimes produce fruits and infertile seeds in the absence of any male plants[11]. However, at least one male plant for every five females should be grown if you are growing the plants for fruit and seed. Plants have also been known to change sex[81]. Male cones are produced in the axils of the previous year's leaves, whilst female cones are borne at the base of branchlets[200].

#### 8.2.107 Camellia sasangua

Camellia, Sasanqua camellia 7 tlin 9 cyuc 3 kcak 4 tcan 1 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Camellia sasanqua is an evergreen Shrub growing to 3 m (9ft) by 1.5 m (5ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from October to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Oil OilEdible Uses: Oil Oil TeaThe oil obtained from the seed is edible if it is refined[46, 105, 142, 183]. It is said to be equal in quality to olive oil[2]. The leaves are mixed with tea to give it a pleasant aroma[2, 183].

tcanta Dye Hedge Hedge Oil Oil SoapA non-drying oil is obtained from the seed - used as a hair-dressing and textile oil[46, 61, 171, 177]. A green dye is obtained from the pink or red petals[168]. A decoction of the plant (could this refer to the oil in the seed??) is used as a soap substitute for washing oily clothes[178]. Plants can be used as a hedge. The cultivar 'Onigoromo' has been especially mentioned for this purpose[188].

dwatta Demulcent ExpectorantDemulcent, expectorant[178].

nrakta E. Asia - Southern Japan in Kyushu and the Islands southwards. ksacta Thickets and grassy slopes in mountains, S. Japan[58]. Forest openings[260].

propta Seed - can be sown as soon as it is ripe in a greenhouse[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10 - 15cm with a heel, August/September in a shaded frame. A high percentage take, but they are slow to root[78]. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leafbud cuttings, July/August in a frame.

nwatta Requires a position in full sun in any well-drained but not too fertile soil[200]. Tolerates saline and very alkaline soils[200]. Succeeds in a hot dry position. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Forms growing in coastal and near coastal regions of California have somewhat broader, merely ovate, rounded leaves, and they have been regarded either at species level as Atriplex breweri S. Watson or as a sub-species of A. lentiformis[270]. Plants are more commonly dioecious, though monoecious forms can also be found[270].

#### 8.2.97 Abutilon x milleri

Trailing Abutilon

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Abutilon x milleri is an evergreen Shrub growing to 3 m (9ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers - raw or cooked. A delicious sweet flavour, they are excellent on their own or as part of a mixed salad[K]. The flowers produce nectar all the time they are open so, assuming the plant is grown indoors and is not visited by pollinating insects, the sweetness increases the longer the flower is open[K].

nrakta A hybrid of garden origin involving A. megapotanicum and probably A. pictum. ksacta Not known in the wild

propta Seed - sow spring in a greenhouse[200]. Germination should take place within a few weeks. Once the seedlings are large enough to handle, prick them out into individual pots. Grow them on for at least the first winter in a greenhouse and plant out in late spring or early sumer, after the last expected frosts. This species is a hybrid, so the seedlings will not be true to type. Cuttings of young shoots, June in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Grow on in the greenhouse for their first winter and plant out in spring after the last expected frosts.

nwatta Requires a sunny position or part day shade in a fertile well-drained soil[200]. Dislikes drought[200]. This species is only hardy in the mildest areas of Britain, tolerating temperatures down to about -5°c when given the protection of a south or south-west facing wall[11, 200]. Plants are often deciduous in cold winters[219]. A deep mulch in winter and tying in growth to the wall will maximise protection in winter[200]. If the plant is cut back by cold weather, it will normally resprout from the base in the spring and can flower on the current year's growth[202]. A hybrid of garden origin, it is similar to A. megapotanicum and probably also has A. pictum blood in it[200]. Dead-heading plants to prevent seeding can enhance longevity[200]. Tip-prune young plants to promote a bushy habit, older plants can be cut back hard annually as new growth commences in late winter or early spring if required[200]. There are some named forms, selected for their ornamental value[200]. There is a variegated form in cultivation, this variegation is as a result of infection by abutilon mosaic virus[184, 200]. Plants in this genus are notably resistant to honey fungus[200].

# 8.2.98 Mahonia haematocarpa

Mexican Barberry, Red barberry 7 tlin 10 cyuc 3 kcak 2 tcan 2 dwat 3.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia haematocarpa is an evergreen Shrub growing to 3.6 m (11ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and fende organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[85, 257]. Juicy and acidic[3], it is used mainly for making jams and jellies in N. America[11, 183]. It makes an acceptable raw fruit and is especially nice when added to porridges or muesli[K]. Unfortunately, there is relatively little flesh and a lot of seeds[K].

tcanta DyeA green dye is obtained from the roots[168]. Yellow according to another report[257]. A green dye is obtained from the leaves[168]. Dark green, violet and dark blue-purple dyes are obtained from the fruit[168].

dwatta Antibacterial Antitumor Dysentery Ophthalmic TonicInner wood shavings can be soaked in water to make an eyewash[257]. Berberine, universally present in rhizomes of Mahonia species, has marked antibacterial effects[218] and is used as a bitter tonic[213]. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218]. The root and root bark are best harvested in the autumn[213].

nrakta South-western N. America - Texas, Colorado, New Mexico and Mexico. ksacta Slopes and flats in desert shrubland, desert grassland, and dry oak woodland; 900-2300 m; Arizona., California., Colorado., Nevada., New Mexico, Tex.; Mexico[266].

propta Seed - best sown as soon as it is ripe in a greenhouse[78]. It usually germinates in the spring[K], 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider giving them some protection from the cold for their next winter. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta Unlike most members of this genus, this species requires a dry, perfectly drained position in full sun, a gritty slightly acid soil is best[11, 200]. It grows best on a sunny south facing wall in Britain[11, 182] and does well in a hot, dry position[184]. It requires a position sheltered from strong or cold winds[202]. Plants are only hardy in the milder areas of the country, tolerating temperatures down to about -10°c when fully dormant[1]. The young growth in spring can be damaged by late frosts. The flowers are fragrant[245]. A very ornamental plant[1], but it does not fruit freely in Britain, the climate is too dull[11]. This species is very closely related to M. fremontii, being distinguished by the fruit which is blue-black in M. fremontii and red in M. haematocarpa[11, 67]. Hybridizes freely with other members of this genus. Resistant to honey fungus[88].

# 8.2.99 Viola mandshurica

Manchurian Violet

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Viola mandshurica is a PERENNIAL growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from April to May, and the seeds ripen from May to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Young leaves and flower buds - raw or cooked[105, 177]. When added to soup they thicken it in much the same way as okra[85, 159]. A tea can be made from the leaves[85]. Root - cooked[105, 177].

nrakta E. Asia - China, Japan, Korea. ksacta Grassy places and fields in lowland and hills all over Japan[58].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5[200]. All members of this genus have more or less edible leaves and flower buds, though those species with yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 1591,

#### 8.2.100 Fortunella margarita

Oval Kumquat

7 tlin 10 cvuc 3 kcak 1 tcan 0 dwat m hkuc

htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Fortunella margarita is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clav) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: PectinFruit - raw or cooked[183]. They can also be used in jellies, preserves etc or as a flavouring[183]. The whole fruit, rind as well, is eaten raw. It is best to first squeeze and massage the fruit in order to combine the flavours of the flesh and the rind[183]. After ripening the fruit gradually loses water content, becomes richer in flavour and is then at its best for making preserves[183]. The fruit is up to 4cm in diameter[200]. The fruit is rich in pectin, the inner peel containing about

nrakta E. Asia - S. China. ksacta Not known

propta Seed - best sown as soon as it is ripe in a warm airy position in a greenhouse. When they are large enough to handle, prick out the seedlings into individual pots and grow them on in a greenhouse for at least their first two winters. Plant out in late spring or early summer after the last expected frosts and give some winter protection from the cold

nwatta Prefers a moderately heavy loam with a generous amount of compost and sand added and a very sunny position[200]. Prefers a pH of 5 to 6[200]. Plants are intolerant of water logging[200]. This species is not hardy in the colder areas of the country, when dormant it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Kumquats are sometimes cultivated in China for their edible fruit, there are some named varieties[200]. They are hardier than the various Citrus species since they cease growth when temperatures drop below 13°c but, for best results, they are best grown in a climate where temperatures do not fall lower than between 4 and 10°c[3]. This is because the fruit is sweeter when it ripens in warm conditions[3].

#### **8.2.101** Atriplex nummularia

Giant Saltbush, Bluegreen saltbush 7 tlin 10 cvuc 3 kcak 3 tcan 2 dwat 3.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasilut hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli

drutta Atriplex nummularia is an evergreen Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to July. The species is monoecious (individual flowers are

either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - cooked[K]. Seed - cooked. It can be used as a piñole or be ground into a meal and used as a thickener in soups that are added to flour for making bread.

tcanta Fire retardant Fodder Hedge Soil stabilization-Fodder for sheep and cattle. A fire-retardant hedge in arid, inland areas. Agroforestry Uses: The plant has excellent potential for use as a windbreak[707]. It provides a useful windbreak which, along with readily visible leaves in the lights of cars at night, makes it suitable for roadside plantings. Ornamental. The ornamental foliage can be pruned to make hedges and provides an attractive silvery contrast against darker plants in the garden[343]. With its deep root system, the plant has good potential for use to prevent soil erosion[707]. Other Uses: The wood is a high-quality fuel[707].

dwatta The plant has been used for the treatment of scurvy and blood diseases[1096].

nrakta Australia. Naturalized in South-western N. America, ksacta Alkaline places, mainly below 600 metres in California[71]

propta Seed - sow April/May in a cold frame in a compost of peat and sand. The seed usually germinates in 1 - 3. weeks at 13°c[134]. Pot up the seedlings when still small into individual pots, grow on in a greenhouse for the first winter and plant out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy. Pot up as soon as they start to root (about 3 weeks) and plant out in their permanent positions late in the following spring[K]. Cuttings of mature wood of the current season's growth, November/December in a frame. Very easy. Pot up in early spring and plant out in their permanent position in early summer[K].

nwatta Agroforestry Services: Windbreak Fodder: Bank Management: Coppice Management: der Regional CropRequires a position in full sun in any well-drained but not too fertile soil[200]. Tolerates saline and very alkaline soils[200]. Succeeds in a hot dry position. This species is not hardy in the colder areas of the UK, it tolerates temperatures down to between -5 and -10°c[200]. Plants are usually monoecious but can be dioecious. Prefers an average annual rainfall between 300 - 600 mm. It is unlikely to do well in humid regions.

# 8.2.102 Aristotelia chilensis

7 tlin 10 cvuc 3 kcak 0 tcan 1 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli nvanhien hionli

drutta Aristotelia chilensis is an evergreen Shrub growing to 3 m (9ft) by 5 m (16ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower in May, and the seeds ripen from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, insects. The plant is not self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or dried for winter use[11, 22, 46, 61, 97]. A pleasant taste somewhat like bilberries[2]. The fruit is rather small, about 6mm in diameter[200].

dwatta Astringent Febrifuge PoulticeA wine made from the fruit is said to have medicinal properties[11]. The plant (the exact part is not specified) is astringent, febrifuge and poultice. It is used in the treatment of throat infections and 8.2.104 Arctostaphylos manzanita intestinal tumours[139].

nrakta S. America - Chile, Argentina, ksacta A weedy shrub of cleared forests and waste ground, growing in damp humus rich soils on lower mountain hillsides by rivers between latitudes 31 and 40° south[139].

propta Seed - sow spring in a greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Once the plants are at least 20cm tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Consider giving them some protection from the cold for at least their first winter outdoors. Cuttings of half-ripe wood, July/August in a frame[11]. Cuttings of mature wood of the current season's growth in early winter[1]. Take cuttings 15 - 30cm long and plant them in pots or the open soil in a greenhouse. They normally root very easily and can be potted up in early summer then planted out late the following spring[K].

nwatta Prefers a slightly acid, moderately fertile welldrained soil in full sun with shelter from cold drying winds[200]. Plants are fairly tolerant of maritime exposure[K]. This species is only hardy in the milder and moister areas of Britain[182] and even there can be cut back in severe winters[K]. If the plants are cut back by winter frosts, they normally put up a crowd of vigorous shoots in the spring and these will need thinning[219]. The fruits are freely produced in S.W. England[11]. There is a very good plant at Rosehill near Falmouth[59]. The flowers are very attractive to bees[59]. Dioecious. Male and female plants must be grown if seed is required[182].

# **8.2.103** Melianthus minor

Honey Flower

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Melianthus minor is an evergreen Shrub growing to 2 m (6ft 7in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The root is poisonous.

kcakta Edible Parts: NectarEdible Uses: SweetenerThe flowers are very rich in nectar, this is collected and

nrakta S. Africa and India. ksacta Not known

propta Seed - sow spring in a warm greenhouse[188]. Prick out the seedlings into individual pots when they are large enough to handle. Grow on the seedlings for at least their first winter in a greenhouse and plant out in late spring or early summer after the last expected frosts[K]. Cuttings of greenwood stem tips in a frame in summer[200]. Suckers in spring[200]. They can be planted out immediately or potted up and kept in a frame for their first winter.

nwatta Requires a well-drained moisture retentive soil in full sun or light shade[200]. Prefers a rich loamy soil[1]. Fertile soils give good foliage effects but the plant flowers better on a poor soil[200]. Closely related to M. major, but smaller in all parts[200]. A very ornamental plant it is only hardy in the milder areas of Britain[1], flowering freely in Cornwall[59]. In colder parts of the country it can be grown as a herbaceous perennial, dying down in winter but regrowing from the base in the spring[166, 200]. In these areas the rootstock must be well mulched[200]. The top growth is possibly hardy for short periods down to -10°c, whilst the rootstock is possibly hardy to -15°c if it is well mulched[187]. Plants are often used in sub-tropical bedding schemes[1]. Members of this genus are rarely if ever troubled by browsing deer[233].

Manzanita, Whiteleaf manzanita, Konocti manzanita, Contra Costa manzanita, Roof's manzanita, Wieslan

7 tlin 10 cyuc 3 kcak 3 tcan 1 dwat m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli fyifxre7t hjonli

drutta Arctostaphylos manzanita is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from February to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 46, 61]. An agreeable acid flavour but the fruit is dry and mealy[95]. Hard to digest, the fruit should be eaten in moderation[95]. It can be dried and ground into a powder[105, 161] and then used as a flavouring in soups, bread etc[213, 257]. A cooling drink can be made from the fruit[161]. The berries can be crushed to make a sweet, unfermented cider[257]. The fruit is white but becomes redbrown. These are 12 mm across [1-4].

tcanta Dye Fuel SoapA yellowish-brown dye is obtained from the leaves, it does not require a mordant[168]. The leaves can be boiled and the yellowish-red extract used as a cleansing body wash[257]. The wood makes an exceedingly fine fuel[257].

dwatta Appetizer Astringent Poultice StomachicA poultice of the chewed leaves is applied to sores and headaches[257]. The leaves are chewed as a treatment for stomach ache and cramps[257]. An infusion of the leaves is used to treat severe colds and diarrhoea[257]. A cider made from the fruit is used in the treatment of stomach complaints and as an appetizer to create appetite[257].

nrakta South-western N. America - California. ksacta Dry coastal slopes and in canyons up to 1200 metres[71,

propta Seed - best sown in a greenhouse as soon as it is ripe. Pre-soak dried seed in boiling water for 10 - 20 seconds or burn some straw on top of them and then stratify at 2 - 5°c for 2 months[11, 200]. Another report says that the seed requires 60 days warm followed by 60 days cold stratification[160]. The seed usually germinates in 2 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or greenhouse for at least their first winter. Plant out in late spring or early summer. Cuttings of side shoots of the current season's growth, 5 - 8cm with a heel, August to December in a frame. Takes one year[1, 78]. Division in early spring. Take care because the plant resents root disturbance. Pot the divisions up and keep them in a lightly shaded position in a cold frame or greenhouse until they are growing away actively. Layering in spring[200].

nwatta Requires a deep moist well-drained light or medium lime-free loam in sun or semi-shade but plants produce less fruit when they are grown in the shade[200]. Prefers a warm sunny position[3, 166]. Tolerates maritime exposure[49, 166, 182]. Plants are not hardy in the colder parts of Britain, they tolerate temperatures down to between -5 and -10°c[200]. Pollination is often poor in Britain[3]. Another report says that the plant does not fruit in this country[11]. This species is called A. pungens manzanita by some botanists[11]. A specimen seen at Cambridge B.G. was 2.5m tall in 1989[K]. Plants resent root disturbance and should be placed in their final positions as soon as possible[11, 134]. They can tolerate long dry periods [1-4].

#### 8.2.105 Abutilon species

7 tlin 10 cyuc 3 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli drutta Abutilon species is an evergreen Shrub growing to 3 m (9ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to September. The species is hermaphrodite (has both male and

#### 8.2.257 Vetiveria zizanioides

Vetiveria, Vetivergrass

7 tlin 11 cyuc 2 koak 0 tcan 0 dwat 1.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vetiveria zizanioides is an evergreen Perennial growing to 1.6 m (5ft) by 1.6 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe roots are aromatic and are used as a food flavouring[169]. An essential oil obtained from the roots is used as a flavouring in sherbets, syrup sweets, fruit drinks and canned asparagus[46, 301]. It is used in certain canned foods, such as asparagus and peas, to reinforce the natural odour and taste[310].

tcanta Essential Pot-pourri Soil stabilizationThe aromatic roots are used in pot-pourri and perfumes[169, 272]. The essential oil from the roots is used in perfumery[272]. The plant has deep-rooted and far-ranging roots that make it a valuable plant for controlling soil erosion in cultivated fields. It is often planted along the contour lines for this purpose

dwatta The essential oil obtained from the roots is used medicinally as a carminative, diaphoretic, diuretic, emmenagogue, refrigerant, stomachic, tonic, antispasmodic and sudorific(310]. A stimulant drink is made from fresh rhizomes(310]. The plants are used as an anthelmintic(310].

nrakta Tropics. ksacta Open dry places at elevations up to 1000 metres in Nepal[272].

propta Seed -

nwatta This species cannot tolerate hard frosts. In areas that experience much frost, it is better to divide up the plant in the autumn, potting up the divisions and over-wintering them in a greenhouse before planting them back outdoors in late spring[169]. Vetiveria grass is a fast-growing grass that is non-invasive, very deep rooting, insect and vermin proof. It is drought-resistant, and also withstands inundation. It is much planted in the tropics and sub-tropics where its extensive root system makes it valuable for erosion control. Vetiveria zizanioides (syn Chrysopogon zizanioides) is a plant of the tropics, where it is found at elevations up to 2,500 metres. It grows best in areas where annual daytime temperatures are within the range 22 - 35°c, but can tolerate 12 - 45°c[418]. When dormant, the plant can survive temperatures down to about -15°c, but young growth can be severely damaged at 0°c[418]. It prefers a mean annual rainfall in the range 500 - 2,500mm, but tolerates 200 - 5,000mm[418]. Prefers a moisture-retentive soil in full sun[200]. Succeeds in a very wide range of soils, tolerating occasional waterlogging once established[418]. Plants are very tolerant of saline soils[418]. Prefers a Ph in the range 4.5 - 8, tolerating 3 -9.9[418]. A yield of 1 - 5 tonnes of dried roots per hectare can be harvested annually, at an oil content of 0.7 - 2.5%, this produces 40 - 100 kilos of essential oil[418].

#### 8.2.258 Asclepias asperula

Antelope Horns, Spider milkweed, Trailing Milkweed 7 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asclepias asperula is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides [274]. They

are usually avoided by grazing animals[274]. This species is said to be poisonous to livestock[228].

kcakta Edible Parts: Flowers Leaves Oil Oil Seed SeedpodEdible Uses: Gum Oil Oil SweetenerThe following reports refer to other members of this genus and are possibly also appropriate for this species[K]. Unopened flower buds - cooked. They taste somewhat like peas. They are used like broccoli[183]. Flowers and young flower buds - cooked. Used as a flavouring and a thickener in soups etc[55, 102]. The flower clusters can be boiled down to make a sugary syrup[2, 85]. The flowers are harvested in the early morning with the dew still on them[95]. When boiled up it makes a brown sugar[95]. Young shoots - cooked. An asparagus substitute[2, 4, 43, 55, 62, 95, 183]. They should be used when less than 20cm tall[159]. A slightly bitter taste[159]. Tips of older shoots are cooked like spinach[85, 183]. Young seed pods, 3 - 4 cm long, cooked[2, 43, 55, 85]. They are very appetizing. Best used when about 2 - 4cm long and before the seed floss forms, on older pods remove any seed floss before cooking them[85, 159]. If picked at the right time, the pods resemble okra[183]. The sprouted seeds can be eaten[183]. An edible oil is obtained from the seed[55, 171]. The latex in the stems is made into a chewing gum[46, 61]. It is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112].

tcanta Fibre Gum Latex Oil Oil Pollution Stuffing Wick-The following reports refer to other members of this genus and are possibly also appropriate for this species[K]. A good quality fibre is obtained from the bark, used in making twine. cloth, paper etc[95, 112, 169]. It is of poor quality in wet seasons[112]. It is easily harvested in late autumn after the plant has died down by simply pulling the fibres off the dried stems[169]. The seed floss is used to stuff pillows etc or is mixed with other fibres to make cloth[112, 159, 169, 171]. It is a Kapok substitute, used in Life Jackets or as a stuffing material[112]. Very water repellent, it can yield up to 550 kilos per hectare[112]. The floss has also been used to mop up oil spills at sea. Candlewicks can be made from the seed floss[112, 207]. Rubber can be made from latex contained in the leaves and the stems[46, 57, 102, 159]. It is found mainly in the leaves and is destroyed by frost[112]. Yields are higher on dry soils[112]. Pods contain an oil and a wax which are of potential importance. The seed contains up to 20% of an edible semi-drying oil[74, 112]. It is also used in making liquid soap[74].

dwatta ExpectorantThe plant is used as a snuff in the treatment of catarrh[257].

nrakta South-western N. America. ksacta Sandy or rocky calcareous soils[228].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Landscape Uses:Border, Massing, Specimen. Succeeds in any good soil[187]. Prefers a well-drained light rich or peaty soil[1, 200]. Requires a moist peaty soil and a sunny position[111, 134]. A good bee plant[50, 74]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207]. Many members of this genus seem to be particularly prone to damage by

#### 8.2.154 Picea brachytyla

Sargent Spruce

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 40 m hkuc

htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli frusflatprik hpa7tmwatli hjonli

drutta Picea brachytyla is an evergreen Tree growing to 40 m (131ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It cannot tolerate atmospheric nollution.

kcakta Edible Parts: Flowers Inner bark SeedEdible Uses: TeaYoung male catkins - raw or cooked. Used as a flavouring[172]. Immature female cones - cooked. The central portion, when roasted, is sweet and syrupy[172]. Inner bark - dried, ground into a powder and then used as a thickener in soups etc or added to cereals when making bread[172]. An emergency food when all else fails. Seed - raw. Too small and fiddly to be worthwhile unless you are desperate[172]. A refreshing tea, rich in vitamin C, can be made from the young shoot tips[172].

tcanta WoodWood - soft, not strong. Used for general construction[46, 61]. It is also valued for its use in the pulp industry to make paper[171]. The timber is used for construction, aircraft, machines, and wood pulp[266].

nrakta E. Asia - S.W. China. ksacta Woodlands, 1600 - 2000 metres[109]. Mountain slopes, valleys and river basins at elevations of 1500 - 3800 mtres[266].

propta Seed - stratification will probably improve germination so sow fresh seed in the autumn in a cold frame if possible[80]. Sow stored seed as early in the year as possible in a cold frame [78]. A position in light shade is probably best[78]. Seed should not be allowed to dry out and should be stored in a cool place[80]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first winter. They can be planted out into their permanent positions in early summer of the following year, or be placed in an outdoor nursery bed for a year or so to increase in size. They might need protection from spring frosts. Cuttings of semiripe terminal shoots, 5 - 8cm long, August in a frame. Protect from frost. Forms roots in the spring[78]. Cuttings of mature terminal shoots, 5 - 10cm long, September/October in a cold frame. Takes 12 months[78]. Cuttings of soft to semi-ripe wood, early summer in a frame. Slow but sure.

nwatta Likes abundant moisture at the roots, if grown in drier areas it must be given a deep moist soil[11]. Tolerates poor peaty soils[200]. Succeeds in wet cold and shallow soils but is not very wind-firm in shallow soils[1]. Prefers a pH between 4 to 6[200]. Dislikes shade[200]. Intolerant of atmospheric pollution[11]. Resists wind exposure to some degree[200]. In some upland areas, especially over granitic or other base-poor soils, growth rate and health have been seriously affected by aluminium poisoning induced by acid rain[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. A very fast growing tree after a slow start. Trees might take 10 years to reach 3 metres but can then grow at an average of 50 - 60 cm a year and look set to become big trees (1975)[185]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200].

# 8.2.155 Betula alnoides

7 tlin 10 cyuc 2 kcak 3 tcan 1 dwat 40 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Betula alnoides is a deciduous Tree growing to 40 m (131ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in April, and

the seeds ripen in September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Inner barkEdible Uses: Inner bark - can be dried, then ground into a powder and added to flour for use in making bread, cakes etc[177]. Inner bark is generally only seen as a famine food, used when other forms of starch are not available or are in short supply[K].

tcanta Paper WoodThe thin layer of outer bark is used as a paper[61]. The juice of the bark is used for decorating wood[272]. Wood - moderately hard, close grained, strong, durable[146, 158]. Used for minor construction[272].

dwatta Antidote AntiseborrheicThe plant has been used as an antidote in the treatment of snake bites[240, 243]. A decoction of the bark is used to treat dislocated bones[272].

nrakta E. Asia - Himalayas to S.W. China. ksacta Forests, ravines and streamsides, Himachel Pradesh to S.W. China, 1500 - 2700 metres[51].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[78, 80, 113, 134]. Only just cover the seed and place the pot in a sunny position[78, 80, 134]. Spring sown seed should be surface sown in a sunny position in a cold frame[113, 134]. If the germination is poor, raising the temperature by covering the seed with glass can help[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it can be sown in an outdoor seedbed, either as soon as it is ripe or in the early spring - do not cover the spring sown seed. Grow the plants on in the seedbed for 2 years before planting them out into their permanent positions in the winter[78, 80, 113, 134].

nwatta Succeeds in a well-drained loamy soil in a sheltered position[11, 200]. Grows well in heavy clay soils. Dislikes wet soils[200]. Shade tolerant[200]. This species is not very hardy and does not always succeed outdoors in Britain but some provenances should be hardy[11]. Hybridizes freely with other members of this genus[50]. Trees are notably susceptible to honey fungus[200].

# **8.2.156** Pinus brutia

Calabrian pine, Turkish pine

7 tlin 11 cyuc 2 kcak 3 tcan 3 dwat 30 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frus-

flatpriklwishsom hpa7tmwatli hjonli

drutta Pinus brutia is an evergreen Tree growing to 30 m (98ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. The flowers are pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure

kcakta The resin has been used from ancient times to flavour white wines known as retsina[328]. A sap-sucking insect, Marchalina hellenica, produces large amounts of honeydew, which is harvested by honeybees and sold as 'pine honey'. Pinus brutia was planted outside its native range in Greece from early times for this harvest[329].

tcanta The resin obtained from the stem is used to flavour white wines known as retsina and for the production of turpentine[338]. Its timber is used for fencing posts, telephone posts, building timbers, railway sleepers, carpentry, boxes and crates, hardboard and pulp[328]. The "Lone Pine", a prominent landmark tree at an ANZAC First World War battle at Gallipoli, was this species. Cones from the battlefield were taken home to Australia, and plants sourced from the seeds were planted as living memorials. "Lone Pine" memorials, based on cones brought back from Gallipoli may use this species or Aleppo pine. It is widely planted in coastal areas of the Mediterranean for soil protection and as

windbreaks. Carbon Farming Solutions - Industrial Crop: hydrocarbon (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1]. A popular ornamental tree.

dwatta Oil of turpentine, obtained from the oleo-resin of all pine trees, is antiseptic, antispasmodic, astringent, directic, rubefacient, stimulant and vermifuge[4, 329]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4].

nrakta Origin: Mediterranean. Eastern Mediterranean and Black Sea regions, from the Balkans and Bulgaria to Greece, Turkey and Syria, and through the Caucasus ksacta Relatively open conifer forests, sometimes in pure stands, open mixed woodland with other drought tolerant trees; at elevations from near sea level to 1,500 metres[338].

propta Seed. Direct sow outdoors in fall/autumn

nwatta Industrial Crop: Hydrocarbon Management: Standard Regional TimberClimate: Mediterranean. Humidity: semi-arid. Pinus brutia has a near-coastal natural distribution which coincides with the Mediterranean climate characterized by cool, wet winters and hot, dry summers[338]. It is a moderately cold-hardy plant, able to tolerate temperatures down to around -15°c when fully dormant[329]. Established plants are drought tolerant[338]. The plant regenerates after fire by seed dispersal and can successfully invade maquis vegetation when this does not burn for several years[338]. In contrast with planted forests, natural forests of Pinus brutia have a diverse undergrowth of shrubs and herbs and form important habitat for wildlife[338]. Pinus brutia has been planted extensively in countries around the eastern Mediterranean and Black Sea as it is the easiest pine to grow (with Pinus halepensis) in the Mediterranean climate. Pinus brutia forms natural hybrids with its close congener Pinus halepensis where the two species are sympatric in Turkey, with matings successful only when Pinus halenensis is the nollen donor and Pinus brutia is the female parent[329]. The seed cones are - 8cm wide, ripening a shiny red-brown in spring two years after pollination. They open to release their seed the same summer or 1 - 2 years later, though the seeds are often not shed till winter rain softens the scales. The seeds are grey-brown, 7-8 × 5mm with a broad, auricled 15-20 × 10 mm wing[329]. Carbon Farming Solutions - Cultivation: regional timber. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

#### 8.2.157 Prunus cerasoides

Wild Himalayan Cherry

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 30 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Prunus cerasoides is a deciduous Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: GumFruit - raw or cooked[51, 105, 158, 272]. Acid and astringent, they are only occasionally eaten raw but are more often cooked[183]. The fruit is about 15mm in diameter and contains one large seed[200]. Gum - chewed. Obtained from the trunk, it can be employed as a substitute for gum tragacanth[183], see Astragalus spp. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Beads Dye Gum WoodA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. The seeds are used as beads in necklaces and rosaries[51, 146, 158, 272]. Wood - moderately hard, strong, durable, aromatic[158]. The branches are used as walking sticks[51, 146, 158, 272].

dwatta AstringentThe fruit is astringent[272]. The juice of the bark is applied externally to treat backaches[272]. Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - Himalayas from Himachel Pradesh to S.W. China and Burma. ksacta Forests, 1200 - 2400 metres[51]. Forests in ravines at elevations of 700 - 3700 metres in western China[266].

propta Seed requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Thrives in a well-drained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Requires an open sunny sheltered position[166]. Not very hardy in Britain[1] but it succeeds outdoors in the milder areas of the country[166]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200].

#### 8.2.158 Ouercus semecarpifolia

7tlin10cyuc2kcak0tcan2dwat30m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus semecarpifolia is an evergreen Tree growing to 30 m (98ft 5in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Coffee DrinkSeed - cooked[105, 177]. Up to 3cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute. The sap of the plant is drunk as a tea[272].

has been known to cause stomach upsets to some people. Any toxin the fruit might contain is liable to be of very low toxicity and is destroyed when the fruit is cooked[65, 76].

kcakta Edible Parts: Fruit Leaves RootEdible Uses: Fruit - cooked. It is usually preserved, used in confectionery or as a tea[183]. The fruit is about 4mm in diameter and is borne in large clusters[200]. Some caution is advised, see notes on toxicity above. Stems and leaves - cooked[183]. Some caution is advised, see the notes on toxicity above. Root - cooked. Use with caution, see the notes above on toxicity.

tcanta ParasiticideThe plant is used to make a skin wash to rid the body of parasites[178]. (The part of the plant that is used is not detailed, it is likely to be the leaves or dried flower stalks.)

dwatta Emetic ParasiticideEmetic[178].

nrakta E. Asia - China, Japan. ksacta Thickets and woods in hills and at low elevations in mountains, C. and S. Japan [58].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame, when it should germinate in early spring. Stored seed can be sown in the spring in a cold frame but will probably germinate better if it is given 2 months warm followed by 2 months cold stratification first[78, 98, 113]. Prick out the seedlings into individual pots when they are large enough to handle. If good growth is made, the young plants can be placed in their permanent positions during the early summer. Otherwise, either put them in a sheltered nursery bed, or keep them in their pots in a sheltered position and plant them out in spring of the following year. Division of suckers in spring or autumn

nwatta Tolerates most soils, including chalk[200], but prefers a moist loamy soil[11, 200]. Grows well in heavy clay soils. Tolerates some shade but is best in a sunny position[11. Tolerates atmospheric pollution and coastal situations[200]. There is some confusion over the correct name of this species. It is said to be a synonym of S. javanica by some botanists, but this probably refers to a herbaceous plant, the correct name of which should be S. chinensis. The true S. javanica is a shrub[K].

# 8.2.255 Origanum syriacum

Bible Hyssop

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Origanum syriacum is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe leaves and flowering tops are used as a seasoning, having a flavour reminiscent of a blend of thyme, marjoram and oregano[183]. The dried herb is sometimes mixed with sumac (from Rhus species) to form the spice blend known as 'zatar', this is used along with olive oil as a topping for breads[183]. The Bedouin grind the dried leaves, add salt and eat the dry mixture on bread[177, 183]. The leaves and flowering stems of this species are often dried and supplied commercially as 'oregano', a name that should more accurately be restricted to O vulgare[238].

nrakta S. Europe - E. Mediterranean to W. Asia. ksacta Calcareous rocks and slopes, often in partial shade, 200 -2700 metres in Turkey[93].

propta Seed - sow in a greenhouse in early spring at 10-13°c and only just cover the seed. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings of young barren shoots in lune. Very

easy. Harvest the shoots with plenty of underground stem when they are about 8- 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a rather dry, warm, well-drained soil, but is not fussy as to soil type, thriving on chalk[1]. Prefers slightly alkaline conditions[1]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.256 Tropaeolum tricolorum

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Tropaeolum tricolorum is a PERENNIAL CLIMBER growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: RootEdible Uses: Tuber -cooked[177]. Small[200]. The round tubers are up to 6cm in diameter[260].

nrakta S. America - Chile, Bolivia. ksacta Not known

propta Seed - sow early spring in a greenhouse. Prick the seedlings out into individual pots once they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer, after the last expected frosts. The seed of cultivated plants is usually quite difficult to germinate, though wild-collected seed usually germinates freely[247]. Division of the tubers in the autumn or spring. In cold winter areas the tubers can be harvested in the autumn after top-growth has died down and they can then be stored in a cool frost-free position until planting them out in the spring. Cuttings of basal stems in the spring[200]. Pot them up into individual pots and place them in light shade in a frame until they are established. Plant out in early summer.

nwatta Requires a lime-free soil in a warm sunny position[1, 33, 200]. Prefers a turfy loam or a sandy peaty soil[1]. Requires a fairly dry summer after a moist winter and spring[260]. This is one of the easiest members of the genus to cultivate and usually produces new tubers quite freely[247] This species is not very hardy when grown outdoors in Britain. The top growth will survive light frosts, whilst the tubers, if well mulched, will survive to at least -5°c[1, 200]. New tubers are not formed until late in the season (from September), so a mild autumn is required for good vields[33]. The tubers are formed very near the surface of the soil[90] and will require mulching to protect them from the cold if they are to be left in the ground during the winter[K]. The tubers can also be stored in a cool dry frost-free place over the winter and then planted out in April [200]. This species comes from a dry Mediterranean-type climate and commences growth in early autumn, growing through the winter then flowering in early summer before having a short dormancy in late summer[247]. Consequently, it is only going to succeed outdoors in the very mildest parts of the country and is generally best grown in a cold greenhouse[247, K]. The plant comes from an area with intermittent and unreliable rainfall. It is therefore adapted to remaining dormant for a number of years if the growing conditions are unsuitable and this habit sometimes manifests itself in cultivation, especially if the plants have been potted up recently [247]. A plant at Rosewarne Gardens in North Devon was about 2 metres tall and flowering profusely in late April 1995[K]. A climbing plant, it supports itself by twisting its leaf stalks around other plants etc[219]. The caterpillars of the cabbage white butterfly can be a nuisance and often cause considerable damage to the leaves[219].

kcakta Edible Parts: Leaves RootEdible Uses: Root -cooked[105, 177]. When boiled in two changes of water, it is said to be excellent eating[179]. Leaves - cooked[105, 177, 179]

dwatta Antitussive ExpectorantThe root is a stimulant herb that acts mainly on the respiratory system and the heart[238]. It is antitussive and expectorant[147] and is used internally to treat dry coughs, chronic bronchitis and tuberculosis[238].

nrakta E. Asia - China. Cultivated and naturalised in Japan. ksacta Hillsides and hilly places in China[147].

propta Seed - best sown in a cold frame as soon as it is ripe [200]. The seed can also be sown in spring. Surface sow 2-3 seeds per pot in the spring in order to avoid transplanting [133]. We have found that if transplanted when very small seedlings grow away without difficulty [K]. Germinates in 1-3 months at  $10^{\circ}$ c[133]. Plant out into their permanent positions whilst young. Basal cuttings in spring [238, K]. Division in spring - very difficult because the plant dislikes root disturbance [1].

nwatta Landscape Uses:Border, Massing. Prefers a light rich slightly alkaline soil that is not too dry, and a warm sunny position[1, 200]. Plants are intolerant of root disturbance[1], though they are fast-growing and can become invasive when well-sited[238]. The young growth is extremely attractive to slugs, they have been known to destroy even mature plants[K]. Special Features: Attractive foliage, Attractive flowers or blooms.

# 8.2.253 Chenopodium ambrosioides anthelminticum

Wormseed

7 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 1 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Chenopodium ambrosioides anthelminticum is a ANNUAL/PERENNIAL growing to 1 m (3ft 3in) by 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista The essential oil in the seed and flowering plant is highly toxic. In excess it can cause dizziness, vomiting, convulsions and even death[222, 238]. The plant can also cause dermatitis or other allergic reactions[222]. The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponing are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plant will reduce its content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: TeaLeaves - cooked[2]. The tender leaves are sometimes used as a potherb[183]. Used as a condiment in soups etc[46, 61, 105], it is said to reduce flatulence if eaten with beans[183]. The leaves have a rank taste due to the presence of resinous dots and sticky hairs[85]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Seed - cooked[105, 161]. The seed is small and fiddly, it should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins. An infusion of the leaves is a tea substitute[183].

tcanta Dye InsecticideThe plant is used as a fumigant against mosquitoes and is also added to fertilizers to inhibit insect larvae[238]. Gold/green dyes can be obtained from the whole plant[168].

dwatta Analgesic Antiasthmatic Antifungal Carminative Dysentery Stomachic VermifugeWormseed is a Central American herb that has been used for centuries to expel parasitic worms from the body[254]. The whole plant is analgesic, antiasthmatic, carminative, stomachic and vermifuge[1, 4, 21, 57, 145, 147, 171]. An infusion can be used as a digestive remedy, being taken to settle a wide range of problems such colic and stomach pains[254]. Externally, it has been used as a wash for haemorrhoids, as a poultice to detoxify snake bites and other poisons and is thought to have woundhealing properties[254]. Use with caution and preferably under the supervision of a qualified practitioner[21, 238]. This remedy should not be prescribed for pregnant women[238]. See also the notes above on toxicity. Until fairly recently, this was one of the most commonly used vermifuges, though it has now been largely replaced by synthetic drugs[222]. The seed, or an essential oil expressed from the seed, was used[213]. It is very effective against most parasites, including the amoeba that causes dysentery, but is less effective against tapeworm[213, 238]. Fasting should not precede its use and there have occasionally been cases of poisoning caused by this treatment[213]. The oil is used externally to treat athlete's foot and insect bites[238]. One report says that it is an essential oil that is utilised[240]. This is obtained from the seed or the flowering stems, it is at its highest concentration in the flowering stems before seed is set, these contain around 0.7% essential oil of which almost 50% is the active vermifuge ascaridol[240]. The essential oil is of similar quality from plants cultivated in warm climates and those in cool climates 240]. The leaves are added in small quantities as a flavouring for various cooked bean dishes because their carminative activity can reduce flatulence[222].

nrakta Tropical America. Naturalized in S. Europe[50]. ksacta Mainly found on dry wasteland and cultivated ground[204, 268].

propta Seed - whilst it can be sown in situ in mid to late spring, we have had better results by sowing the seed in a cold frame in early spring. Put a few seeds in each pot and thin to the best plant if necessary. Germination rates are usually very good and the seedlings should appear within a few days of sowing the seed. Plant out in late spring, after the last expected frosts.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. Tolerates a pH in the range 5.2 to 8.3. Plants are annuals or short-lived perennials[238]. They are not very hardy when grown outdoors in Britain and so are best grown as an annual[238]. Plants have often self-sown freely in our Cornish trial grounds, but the seed germinates in the autumn and does not manage to survive the winter[238]. Wormseed is sometimes grown as a medicinal and culinary plant, especially in its native Mexico. This sub-species is more active medicinally than the type species and is the form most often cultivated for its vermicidal activity[4, 46, 50, 238]. It is one of the safest and best vermifuges available[4]. The bruised leaves emit an unpleasant foetid odour[245].

# 8.2.254 Sambucus chinensis

Chinese Elder

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hna7tmwatli xra7t hionli

drutta Sambucus chinensis is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the leaves and stems of some, if not all, members of this genus are poisonous[9, 76]. The fruit of many species (although no records have been seen for this species) tcanta Charcoal Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is a source of tannins[272]. Wood - very hard, close grained, splits in seasoning. Used for construction[272]. An excellent fuel, it also yields a good charcoal[146, 158, 272].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. The juice of the bark is applied externally to treat muscular pains[272].

nrakta E. Asia - China to the Himalayas. ksacta Often the dominant species on north-facing slopes in the Himalayas, from 2400 - 3600 metres[11, 146]. In China it grows right up to the tree-line, where it becomes a thicket-forming shrub[11].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Older trees dislike shade[146]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Trees respond well to coppicing[146, 158]. The seed ripens in its second year[200]. Inclerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.159 Ouercus lobata

Californian White Oak, Valley oak 7 tlin 11 cyuc 2 kcak 0 tcan 2 dwat 30 m hkuc hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus lobata is a deciduous Tree growing to 30 m (98ft 5in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[257]. A staple food for several native North American Indian tribes[257]. Quite large, it is up to 5cm long and 15mm wide[82, 200]. The seed of this species is sweet and low in tannin and needs little if any leeching [183, 229]. Any bitter tanning can be leached out by thoroughly washing the dried and ground up seed in water, though many minerals will also be lost. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The seed can be roasted and then eaten, its taste is something like a cross between sunflower seeds and popcorn[183]. The seed can also be ground into a powder and used in making bread etc[183]. Roasted seed is a coffee substitute.

tcanta Adhesive Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The acorn meal has been used to mend cracks in clay pots[257]. Wood - hard and fine grained but brittle and weak. Of no commercial value, it is used only for fuel[82, 229].

dwatta Astringent Dysentery Poultice SalveAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. A poultice of the ground galls and salt has been used as a treatment for burns, sores and cuts[257]. A decoction of the bark has been used as a cough medicine and a treatment for diarrhoea[257]. The pulverized bark has been used as a dusting powder to dry up running sores, it is particularly useful for babies with sore umbilicus[257].

nrakta South-western N. America - California. ksacta Fertile lowlands in deep rich soils in the valleys of W. California between the Sierra Nevada and the coast[82, 229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses:Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[11, 200]. A fairly long-lived tree in the wild, with specimens 300 - 400 years old recorded[229]. It is very slow growing in Britain, but there is a specimen at Kew that was 27 metres tall in 1988[11]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Good crops are produced in the wild every 2 - 3 years[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Inconspicuous flowers or blooms.

# 8.2.160 Ouercus leucotrichophora

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 25 m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus leucotrichophora is an evergreen Tree growing to 25 m (82ħ Oin). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[177]. The seed is about 2.5cm long[200], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test

can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Charcoal Fuel Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark contains up to 23% dry weight of tannin[146]. Wood - hard, red-brown in colour, warps and splits badly when seasoning. Used for furniture and agricultural implements[61, 146, 158]. It is also a good fuel[51, 146, 272] and makes a good charcoal[61, 146].

dwatta Astringent Diuretic DysenteryThe seeds are astringent and diuretic[240]. They are used in the treatment of gonorrhoea, indigestion, diarrhoea and asthma[240]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[41].

nrakta E. Asia - Himalayas from Pakistan to C. Nepal. ksacta Forests where it is usually gregarious and common, 1200 - 2400 metres[51]. Prefers rather dry hillsides[146].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Trees can be coppiced if their trunks are up to 25cm in diameter[[146, 158]. The seed ripens in its first year[200]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

# 8.2.161 Torreya grandis

Chinese Nutmeg Tree

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 25 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli nyanhjen hjonli

drutta Torreya grandis is an evergreen Tree growing to 25 m (82ft 0in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in April, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - roasted[46, 61, 63, 105, 183, 266]. An edible oil is obtained from the seed[266].

tcanta Essential Oil WoodAn essential oil is extracted from the aril (fruit)[266]. The wood is used in constructing buildings, bridges, and furniture[266].

dwatta Anthelmintic Antitussive Carminative LaxativeThe flowers are anthelmintic and carminative[218]. The seed is anthelmintic, antitussive, laxative and peptic[218].

nrakta E. Asia - C. and E. China. ksacta Woodlands, 1000 - 1600 metres[109]. Mountains, open valleys, often by streams, on yellow, red, and dark soils at elevations of 200-1400 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Some of the seed should germinate in the following spring though much of it might take another 12 months. Stored seed requires a period of cold stratification and can take 18 months or more to germinate. Prick out the seedlings into individual pots as soon as growth is observed and grow them on in light shade in the greenhouse for at least the next couple of winters, making sure to pot them on into larger pots as and when required. Plant them out into their permanent positions in early summer when the plants are at least 20cm tall. Cuttings of half-ripe shoots in late summer[1]. Cuttings do not grow well[11]. Layering.

nwatta Management: Standard Regional Crop Staple Crop: Protein-oilSucceeds in ordinary garden soil, tolerating some lime[1]. Requires a sheltered position and either high humidity or a moist riverside soil[200]. Dislikes wind exposure[200]. Tolerates woodland shade very well[200]. Requires hot, very humid summers for best growth[200]. This species is not very hardy in Britain, it only succeeds outdoors in the milder areas of the country[1]. It succeeds outdoors at Kew[11], a tree was 8 metres tall in 1970[185]. The seed takes two summers to mature[229]. The edible seed of this very ornamental evergreen tree is often sold in local markets in China. Closely related to T. nucifera[200]. Plants are dioecious so both male and female plants are required if seed is to be produced. Occasional trees are monoecious with dioecious branches.

# 8.2.162 Castanopsis orthacantha

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 20 m hkuc hmim cyutli tcup hwicli jlutnyik hpa7tli flatprik hpa7tmwatli hionli

drutta Castanopsis orthacantha is an evergreen Tree growing to 20 m (65ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind, midges. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil

kcakta Edible Parts: SeedEdible Uses: Seed - raw or cooked[177]. The seed, which is up to 15mm in diameter, takes about 18 months to ripen[266].

nrakta E. Asia - S.W. China. ksacta Mixed and broadleaved evergreen forests; 1500-3200 metres in W Guizhou, SW Sichuan, Yunnan[266].

propta Seed - requires a period of cold stratification and is best sown as soon as it is ripe in a cold frame[138]. The seed has a short viability and should not be allowed to dry out. It can be stored for a few months if kept cool and moist (putting it in a plastic bag that is placed in the salad compartment of a fridge works well). Stored seed should be soaked in warm water for 24 - 48 hours prior to sowing[138]. Germination usually takes place within 1 - 3 months at 15°c[138]. As soon as they are large enough to handle, prick out the seedlings into individual pots and plant them out in mid summer if possible, otherwise grow them on in a cold frame for their first winter and plant them out in late spring. Give the young plants some protection from cold for their first few winters autifors.

nwatta Prefers a good deep medium to stiff loam[1]. Requires a sheltered position in semi-shade and a lime-free soil[138]. Although cold hardy in much of Britain, tolerating temperatures down to about -10°c, this species really requires a warm continental climate if it is to prosper and it does not do well in the maritime climate of this country[200]. The seed takes two growing seasons from fertilization to maturity[266]. The catkins have an unpleasant hawthorn-like smell to attract midges for their pollination[245].

nwatta Requires a sheltered sunny position in a well-drained soil. This species is not very cold hardy, tolerating temperatures down to about -5°c[200]. It can succeed out-doors in the milder areas of Britain, especially if given the protection of a south or west facing wall.

# 8.2.250 Salvia pomifera

Apple Sage

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Salvia pomifera is an evergreen Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves have a strong odour and flavour, resembling lavender and common sage[183]. They are used as an adulterant of sage as a commercial food flavouring[183, 238]. An infusion of the herb is used to make a tea[183]. Very fragrant, it is called 'fascomiglia'[200]. Semi-transparent galls are formed on the plant as a result of gall wasps invading the young branches. These galls are made into a kind of conserve or sweetmeat by crystallizing them in sugar and this is regarded as a great delicacy by the Greeks[183, 200]. They have an agreeable and astringent flavour[4]. We are not sure if the galls are used before or after the insect has departed[K].

dwatta MiscellanyAn infusion of the dried leaves is used medicinally in Greecel41. The report does not give any details as to the uses, but does say that in excess the tea causes profuse perspiration, languor and even faintness[4]. The leaves are said to have the same properties as common sage (S. Officinalis), but to be stronger in their action[238]. These properties are antihydrotic, antiseptic, antispasmodic, astringent, carminative, cholagogue, galactofuge, stimulant, tonic and vasodilator[4, 9, 13, 21, 165, 238].

nrakta S. Europe - Greece, Turkey and Crete. ksacta Rocky slopes, limestone cliffs and macchie from sea level to 800 metres in Turkey[93].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Soils rich in nitrogen encourage excessive leaf growth at the expense of flowering[11]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between 5 and -10°c[200]. Plants can be killed by excessive winter wet[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.251 Phytolacca acinosa

Indian Poke

7 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phytolacca acinosa is a PERENNIAL growing to 1.5 m (5ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves are poisonous. They are said to be safe to eat when young, the toxins developing as they grow older.

According to another report it is only a form with reddish purple flowers and a purple root that is poisonous[178].

kcakta Edible Parts: Leaves RootEdible Uses: Leaves they must be cooked, and are then used as a spinach[1, 2, 46, 51, 105, 183]. Only the young leaves should be used since the leaves become toxic with age. The young shoots are used as an asparagus substitute[2, 105, 183]. They have an excellent flavour[2]. Root - cooked[178]. Must be leeched first[179]. Only the white root of the white flowered form (if it exists![K]) should be eaten. See notes above.

tcanta InkA red ink is obtained from the fruit[57].

dwatta Antiasthmatic Antibacterial Antidote Antifungal Antitussive Antiviral Diuretic Expectorant Laxative Urinary VermifugeThe root is antiasthmatic, antibacterial, antidote, antifungal, antitussive, diuretic, expectorant, laxative and vermifuge[176, 178, 218, 238]. The plant has an interesting chemistry and it is currently (1995) being investigated as a potential anti-AIDS drug[238]. It contains potent antiinflammatory agents, antiviral proteins and substances that affect cell division[238]. These compounds are toxic to many disease-causing organisms, including the water snails that cause schistosomiasis[238]. The root is used internally in the treatment of urinary disorders, nephritis, oedema and abdominal distension[238]. Externally, it is used to treat boils. carbuncles and sores[238]. The roots are harvested in the autumn and dried for later use[238]. All parts of the plant are toxic, this remedy should be used with caution and preferably under the supervision of a qualified practitioner.

nrakta  $\vec{E}$ . Asia - China to India. ksacta Valleys, hillsides, forest understories, forest margins and roadsides at elevations of 500 - 3400 metres[266]. It is also found in cultivated land houses, moist fertile lands and as a weed[266].

propta Seed - sow autumn or spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer after the last expected frosts. If you have sufficient seed, it might be worthwhile trying an outdoor sowing in a seed bed in early spring. Grow the plants on in the seedbed for their first year and plant them out the following spring. Division in March or October. Use a sharp spade or knife to divide the rootstock, making sure that each section has at least one growth bud. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta An easily grown plant, succeeding in most soils[1], though preferring a moisture retentive fertile soil in full sun or partial shade[200]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring can be damaged by late frosts. Often self sows when in a suitable position[200]. Cultivated for its edible leaves in India[1, 51]. It is said that there are two forms of this plant, one with red flowers that has a poisonous root, whilst another with white flowers that has a white edible root. This white form is said to be cultivated for its edible root in parts of China[178] (I wonder if this is a mis-identification for another species? It could also be P. esculenta, which according to one report is a synonym of P. acinosa esculenta and is said to have an edible root[K]). Plants seem to be immune to the predations of rabbits[233].

#### 8.2.252 Adenophora stricta

Sha Shen, Ladybells

7 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Adenophora stricta is a PERENNIAL growing to 1 m (3ft 3in) by  $0.3\ m$  (1ft). See above for USDA hardiness. It is hardy to UK zone 7. It is in flower in September, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

less surface-rooting habit, the very dense root system of Vetiver has a strong tendency to grow downwards for 4 metres or more. This effectively anchors strips of plants and the soil behind them[ 310 ]. Traditionally, the plant is grown in southern India in strips as permanent field boundaries and occasionally in contour strips to control erosion, while in Java it is planted to protect sloping drains[ 310 ]. Its use as an erosion-control plant has spread throughout the tropics, but for a long time remained restricted to small areas. Recent interest started in Fiji, where it was grown in contour strips in sugar-cane plantations on steep slopes. Since the late 1980s, its planting for erosion control has been promoted strongly. not only around fields, but also to protect terraces and road shoulders 310 ]. Strips of densely packed, stiff and tough grass stems break the speed of run-off water and divide it evenly, reducing the risk of formation of run-off streams and gully erosion 310 ]. The plant is highly tolerant of heavy metals in the soil, including silver, cadmium, manganese and aluminium. In addition, it can grow in land where fuel has been spilt. Over a period of time it gradually accumulates these toxins which can then be removed by cutting the grass and the metals can be reclaimed[ 418 ]. Other Uses A highquality essential oil, known as 'vetiver oil' is obtained from the root[ 46, 200, 310 ]. Its scent is heavy and woody[ 310 ]. It has a wide range of applications, being used is used in perfumery, cosmetics, deodorants, soaps and other toilet articles[ 46, 200, 310 ]. In perfumery, the essential oil and vetiveryl acetate, synthesized by acetylation of vetiver oil, are important fixatives for more volatile fragrance materials. The chemical stability of vetiver oil under alkaline conditions makes it a suitable scent compound for soaps[ 310 ]. The essential oil, and the roots, have insecticidal and insectrepellent properties about which little is known[ 310 ]. The roots are used for making baskets, mats, fans or 'pamaypay' in the Philippines and cooling screens named 'tatties' in India. These give a pleasant smell to a room, especially when dampened[46, 200, 310, 454]. The dried roots, or sachets of powdered roots, are stored between clothes to give them a pleasant smell and to repel insects[ 310 ]. The stems and old leaves are an excellent, long lasting thatch and can be processed into a coarse paper-pulp[ 310 ]. Absorbs dissolved heavy metals from polluted water, tolerates As, Cd, Cr, Ni, Pb. Hg. Se and Zn.

dwatta Anthelmintic Antispasmodic Carminative Diaphoretic Diuretic Emmenagogue Refrigerant Stimulant Stomachic TonicThe essential oil obtained from the roots is used medicinally as a carminative, diaphoretic, diuretic, emmenagogue, refrigerant, stomachic, tonic, antispasmodic and sudorific[ 310 ]. A stimulant drink is made from fresh rhizomes[ 310 ] The plants are used as an anthelmintic[ 310

nrakta E. Asia - Pakistan, India, Sri Lanka, Myanmar, Thailand. ksacta Floodplains and the banks of streams and rivers[ 200 ]. Rich moist soils, often along water courses[ 454 ].

propta Seed, Division.

Crop: Biomass Management: Hay Management: Standard Minor Global CropA plant of the tropics, where it is found at elevations up to 2.500 metres. It grows best in areas where annual daytime temperatures are within the range 22 - 35°c, but can tolerate 12 - 45°c[ 418 ]. When dormant, the plant can survive temperatures down to about -15°c, but young growth can be severely damaged at 0°c[ 418 ]. It prefers a mean annual rainfall in the range 500 - 2.500mm, but tolerates 200 - 5.000mm[ 418 ]. Prefers a moisture-retentive soil in full sun[ 200 ]. Succeeds in a very wide range of soils, tolerating occasional waterlogging once established[ 418 ]. Plants are very tolerant of saline soils[ 418]. Prefers a Ph in the range 4.5 - 8, tolerating 3 - 9.9[ 418]. A yield of 1 - 5 tonnes of dried roots per hectare can be harvested annually, at an oil content of 0.7 - 2.5%, this produces 40 - 100 kilos of essential oil[ 418 ]. Tolerant to drought because of its deep roots, flood, and submergence.

#### 8.2.248 Phormium cookianum

Wharariki

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 1.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Phormium cookianum is an evergreen Perennial growing to 1.2 m (4ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil. The plant can tolerate maritime exposure.

pcista The root is highly purgative[173].

kcakta Edible Parts: NectarEdible Uses: Coffee Gum GumThe roasted seed is used as a coffee substitute[173]. An edible nectar is obtained from the flowers[173]. An edible gum is obtained from the base of the leaves[173].

tcanta Adhesive Fibre Gum GumA high quality pliable fibre is obtained from the leaves[153]. A gum found at the base of the leaves is used as a paper glue 1731.

nrakta New Zealand. Naturalized in Britain on the Scilly Isles. ksacta Coastal cliffs to mountain slopes, locally dominant on shady faces in high country, North, South and Stewart Islands[44].

propta The seed is best sown as soon as it is ripe in a cold frame. Sow stored seed in February in a cold frame. Germination is sometimes poor but should take place in 1 -6 months at 15°c. The seedlings are very variable. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed remains viable for about 12 months in normal storage[1]. Division in spring as growth commences. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Prefers a rich loamy soil[1] but is not too fussy, succeeding in peaty soils and in boggy moorland[11]. Tolerates light shade[1] but prefers full sun[200]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. Very tolerant of maritime exposure, this species is recommended for coastal plantings[166, 187]. Hardy to about -10°c[187]. Polymorphic, there are many named varieties[200]. This species often hybridizes with P. tenax and there are many cultivars of uncertain origin. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

#### 8.2.249 Cautleya spicata

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

nwatta Agroforestry Services: Contour hedgerow Industrial (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

> kcakta Edible Parts: StemEdible Uses: The pith of the stem is eaten as a vegetable[272].

> dwatta StomachicThe juice of the rhizome is used in the treatment of stomach disorders[272].

> nrakta E. Asia - Himalayas. ksacta Moist shady places at elevations of 1000 - 2600 metres in Nepal[272].

propta Seed - best sown as soon as it is ripe in a warm greenhouse at 18°c[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on for at least their first winter in the greenhouse. Plant out in late spring after the last expected frosts. Division as growth commences in the spring[200]. Dig up the clump and divide it with a sharp spade or knife, making sure that each division has a growing shoot. Larger clumps can be planted out direct into their permanent positions, but it is best to not up the smaller divisions and grow them on in a greenhouse until they are established. Plant them out in the summer or late in the following spring.

### 8.2.163 Ouercus suber

7 tlin 10 cvuc 2 kcak 4 tcan 2 dwat 20 m hkuc

hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus suber is an evergreen Tree growing to 20 m (65ft) by 15 m (49ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[105]. A famine food[177]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute. One reader noted the Q. suber population of the Mamora forest in Morocco contains only sweet acorns and can be eaten raw, it has a similar taste to raw chestnuts. The skin removes quite easyl Ouercus ilex also exists with tannin-free acorns in the moroccan forests, the locals say around 20 percent are sweet.

tcanta Cork Fodder Repellent Shelterbelt Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. A fairly windtolerant tree, it can be used in shelterbelt plantings[200]. Good on dry banks. Shade tree. Bark is the source of cork, it is much used for heat and sound insulation, flooring, floats etc. Trees are first harvested when they are 25 - 30 years old[74], and then harvested every 6 - 12 years[117]. The bark must be removed carefully so as not to harm the tree. A large tree can yield up to 1 tonne of cork. On a 10% moisture basis, the bark contains 16.9% tannin[223]. Wood.

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta S. Europe to N. Africa. ksacta Siliceous hills on the littoral[89].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Fodder: Mast Industrial Crop: Cork Industrial Crop: Tannin Management: Standard Other Systems: Dehesa Other Systems: Strip intercrop Regional CropPrefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Cultivated for its bark in Europe, it is the main source of cork[50, 89]. Trees are first harvested when they are 25 - 30 years old and are then harvested on a 10 - 12 year rotation. Only hardy in the milder areas of Britain[200], it is not very frost resistant[98]. Trees grow well in Cornwall where there are many large specimens[11, 49, 59]. Trees grow guite well at Kew[K]. Transplants badly unless it is moved regularly, it should only be moved in September or as growth commences in late spring[11]. Does not fruit well in Britain. Most of the trees grown in Britain as Q. suber are in fact Q. suber occidentalis[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200], Heat Zone: 9-7.

### 8.2.164 Pinus pinaster

Maritime Pine

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 20 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprik hpa7tmwatli dvat hionli

drutta Pinus pinaster is an evergreen Tree growing to 20 m (65ft) by 7 m (23ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in May, and the seeds ripen in April. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222]. Avoid if allergies. Avoid internally if suffering from asthma or bronchitis. The astringent taste may cause stomach discomfort [301]

kcakta Edible Parts: OilEdible Uses: Condiment OilSeed - raw or cooked. Rich in oil, it has a resinous flavour. The seed is about 1cm long[200]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Dve Herbicide Miscellany Oil Resin Shelterbelt Soil stabilization WoodOften planted as a shelterbelt along exposed coasts[11, 49, 59, 75, 81] and also to stabilize sandy soils[50, 89]. It is very tolerant of maritime exposure, but may require staking when it is young[75]. A tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. This species is the major source of resin in Europe, it is extensively planted, especially along the Atlantic coast of Europe[50, 64, 200]. Oleo-resins are present in the tissues of all species of pines. but these are often not present in sufficient quantity to make their extraction economically worthwhile [64]. The resins are obtained by tapping the trunk, or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc. for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative etc. Wood - rough carpentry, boxes, pit props etc. A source of pulp wood[11, 100].

dwatta MiscellanyThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns, boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta Europe - W. Mediterranean. Naturalized in Britain in some parts of the New Forest[81], ksacta Coastal sands and dunes, it is also found on mountains inland.

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to grow away[81].

nwatta Industrial Crop: Hydrocarbon Management: Standard Regional CropThrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1] and shady positions. Established plants tolerate drought[200]. Succeeds in poor dry sandy soils[185]. Tolerates maritime exposure[75], though trees are often laid over from the base by heavy winds when they are young. The stem merely bends back to the vertical and continues growing, the bend remaining in the trunk[185]. The best trees are found in the far south of Britain, where this species often self-sows. It is very fast growing, especially when young with new annual shoots of 1 metre common[185]. It is not very long-lived in cultivation[11, 185], though trees have lived longer than 150 years in Britain. Widely cultivated in Europe for the resin obtained from the trunk and for woodpulp, it is the most widely used European species[64, 200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow beneath the trees[18]. Plants in this genus are notably susceptible to honey fungus[200].

### 8.2.165 Juniperus silicicola

Southern Redcedar, Juniper, Southern Red Cedar 7 tlin 10 cyuc 2 kcak 3 tcan 2 dwat 20 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hionli

drutta Juniperus silicicola is an evergreen Tree growing to 20 m (65ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is nleaf all year, in flower from April to May, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

pcista All parts of the plant might be toxic[4, 222]. kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A thin, sweetish resinous flesh, the cones are about 7 - 10mm in diameter and have a thin skin[82, 229].

tcanta Essential Incense Insecticide Repellent Shelterbelt WoodWood - straight-grained, very durable, light, brittle, soft, easily worked, very fragrant, insect-resistant[229]. The wood does not shrink much on drying and weighs 30lb per cubic foot[227]. The reddish wood is highly prized for cabinet making[226], it is also used for fencing, the casing of lead pencils etc[229]. This tree has been over-exploited and large trees suitable for commercial exploitation are now rare[229]. The following reports are for the closely related I, virginiana, they probably also apply to this species. An essential oil is obtained from the wood[1, 46, 57, 61]. Composed of cedar camphor or cedrol[213], it is used in soaps, as an insecticide and moth repellent[61, 213], a deodorant, in polishes, perfumery etc[4, 21]. The leaves are used as an incense[46, 213] and are also either burnt or crushed and then scattered around as an insect repellent[169, 257]. The

crushed bark can be used as a soft base in cradles[257]. The bark has also been used to make mats[257]. Some cultivars of this tree are suitable for ground cover when spaced about 90cm apart each way[208]. 'Tripartita' and 'Chamberlaynii' have been recommended[208]. A fairly wind resistant tree, it can be grown as part of a shelterbelt planting[200].

dwatta Abortifacient Analgesic Anthelmintic Antirheumatic Antiseptic Aromatherapy Cancer Diaphoretic Diuretic Emmenagogue Febrifuge RubefacientThe leaves are analgesic, antirheumatic, diuretic and febrifuge[257]. An infusion has been used in the treatment of fevers, stiff neck, backache, headaches, low fever, coughs, colds and diarrhoea[257]. A decoction of the leaves has been used as a body rub and steam bath in the treatment of rheumatism[257]. The following reports are for the closely related J. virginiana, they probably also apply to this species. The leaves are anthelmintic, diuretic, rubefacient and stimulant[4, 257]. A decoction has been used in the treatment of coughs and colds, general weakness and as a medicine for convalescents[257]. The berries are anthelmintic, diaphoretic, emmenagogue and mildly antiseptic[4, 213, 222, 257]. They have been chewed as a treatment for mouth ulcers[213, 257] or made into a tea to treat colds, rheumatism, worms etc[222, 257]. The fresh young twigs are used as a diuretic[213]. An infusion has been used both internally and as a steam bath in the treatment of rheumatism[257] The essential oil from the wood is an abortifacient, in some cases it has caused vomiting, convulsions, coma and death[4, 2131. The plant is said to contain the anticancer compound podophyllotoxin[222]. The essential oil from the berries is used in aromatherapy. Its keyword is 'Composing' [210].

nrakta South-eastern N. America - South Carolina to Texas. ksacta Low wet areas of swamps, stream and creek margins and flood-plain woodlands. Tolerating varying levels of soil moisture, it also grows in open woods and abandoned fields, usually on limestone[229].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel. September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October, Takes 12 months[78].

nwatta Landscape Uses:Christmas tree, Screen, Seashore, Specimen. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11] and succeeding on chalk[200]. Established plants are drought tolerant, succeeding in hot dry positions[200]. This species is only hardy in the milder areas of the country. requiring a warm sunny sheltered position[81]. A very ornamental tree, it is a slow-growing but long-lived tree in the wild[229]. Seed production is cyclic, a year of high yields being followed by some years of low yields[229]. Closely related to J. virginiana[229]. This species often hybridizes with other members of the genus. The crushed foliage has an aroma like soap or paint[185]. Plants are resistant to honey fungus[88]. In America this tree is a host of a gall-like rust that at certain stages in its life-cycle also attacks the leaves of apple trees[149]. Plants are dioecious, male and female plants must be grown if seed is required. Special Features: Attracts birds, North American native, Fragrant foliage, Inconspicuous flowers or blooms. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is flat with shallow roots spreading near the soil surface [2-1].

giving them some protection from the cold for their next winter. Division of suckers in spring[78]. Whilst they can be placed direct into their permanent positions, better results are achieved if they are potted up and placed in a frame until established[11]. Leaf cuttings in the autumn.

nwatta We have very little information on this species, though we know it should tolerate temperatures down to about -5°c[260], and so should be hardy at least in the milder areas of Britain. The following notes are based on the general needs of the genus. An easily grown shrub, it thrives in any good garden soil[11] including heavy clays. Prefers a semishaded woodland position in a damp, slightly acid to neutral humus-rich soil[200]. Plants are very tolerant of pruning and can be cut right back into old wood if they have outgrown their welcome[182]. Hybridizes freely with other members of this genus.

### 8.2.245 Euphorbia antisyphilitica

Candelilla

7 tlin 10 cyuc 2 kcak 4 tcan 0 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Euphorbia antisyphilitica is an evergreen Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The sap contains a latex which is toxic on ingestion and highly irritant externally, causing photosensitive skin reactions and severe inflammation, especially on contact with eyes or open cuts. The toxicity can remain high even in dried plant material[200]. Prolonged and regular contact with the sap is inadvisable because of its carcinogenic nature[214].

kcakta Edible Parts: Edible Uses: GumA wax from the plant can be used to make chewing gum[46, 61].

tcanta Gum WaxA wax is obtained from the whole plant and is used as a polish, water proofer, for making records, lighting etc[21, 46, 57, 61]. The wax exudes from the plant pores and forms a thin skin on the stems. Most is produced in the winter and it is extracted by boiling up the plant[171]. Carbon Farming - Industrial Crop: wax. Dynamic accumulator

nrakta Southern N. America - Texas to Mexico. ksacta

propta Seed - sow spring in a warm greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings can be taken throughout the growing season. Leave them to dry and callus for 2 weeks before potting them up[1].

nwatta Experimental Crop Industrial Crop: Wax Management: CoppicePrefers a light well-drained moderately rich loam in an open position[200]. Requires ample water in the growing season but very dry conditions in the winter[1]. We are not sure if his plant can be grown outdoors in Britain[K], one report says that this plant is hardy to zone 8 (which experiences temperatures down to -5°c)[200]. Another report says that minimum winter temperatures with other members of this genus[200]. The ripe seed is released explosively from the seed capsules[200]. Members of this genus are rarely if ever troubled by browsing deer and rabbits[233]. This genus has been singled out as a potential source of latex (for making rubber) for the temperate zone although no individual species has been singled out 141.

### 8.2.246 Berberis capillaris

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli drutta Berberis capillaris is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: The following report is for the closely related B. angulosa - it quite possibly can also be applied to this species[K]. The fruit of this species is said to be somewhat larger than that of B. angulosa, with fruits up to the size of a cherry[11]. Fruit - raw or cooked. The relatively large berries are freely borne and are more palatable than most barberries. The fruit is about 15mm long and 8mm wide[200].

tcanta DyeA yellow dye is obtained from the root.

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta E. Asia - China to Burma. ksacta Not known

propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Layering.

nwatta Prefers a warm moist loamy soil but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[200]. This species does not do well in the colder areas of the country, tolerating temperatures down to about -5 to -10°c[11, 200]. Plants can be pruned back quite severely and will resprout well from the base[200]. Hybridizes freely with other members of this genus[1]. This species is closely related to B. angulosa[11, 200].

### 8.2.247 Chrysopogon zizanioides

Vetiver, Vetiver Root, Khus Khus

7 tlin 11 cyuc 2 kcak 4 tcan 2 dwat 1.8 m hkuc hmimhtut cyutli hgattcuphja7n hwicli hrasjlut hpa7tli frusflatpriklwissliphsom hpa7tmwatli hjonli

drutta Chrysopogon zizanioides is an evergreen Perennial growing to 1.8 m (6ft) by 1.8 m (6ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid, very alkaline and saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil RootEdible Uses: OilEdible portion: Root - oil for flavouring. An essential oil obtained from the roots is used as a flavouring in sherbets, syrup sweets, fruit drinks and canned asparagus[46, 301]. It is used in certain canned foods, such as asparagus and peas, to reinforce the natural odour and taste[310].

tcanta Basketry Biomass Cosmetic Essential Hedge Insecticide Oil Paper Soap making Soil reclamation Soil stabilization StrawOther uses rating: High (4/5). Agroforestry Uses: Unlike most grasses, which tend to have a more or

enough to handle. Grow on the young plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give some protection from the cold for at least their first couple of winters outdoors.

nwatta Requires a position in full sun in a well-drained sandy soil[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -5°c[200]. It is probably best grown against a sunny wall. If the plant needs pruning to keep it within bounds, then this is best carried out in spring or early summer. Do not cut back to wood more than 2 years old[238]. This plant is remarkable for the coating of varnish-like resin that covers the upper leaf surface[200]. The foliage is very aromatic[200].

#### 8.2.242 Billardiera longiflora

Appleberry

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 2.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flat hpa7tmwatli xre7t hjonli

drutta Billardiera longiflora is an evergreen Climber growing to 2.4 m (7ft 10in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The leaves contain saponins. Although poisonous, saponins are poorly absorbed by the human body and so most pass through without harm. Saponins are quite bitter and can be found in many common foods such as some beans. They can be removed by carefully leaching in running water. Thorough cooking, and perhaps changing the cooking water once, will also normally remove most of them. However, it is not advisable to eat large quantities of food that contain saponins. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[3, 157, 183]. Aromatic, mealy and pleasant[144]. Remove the seeds before eating the fruit[144]. The fruit does not have a pulp[154] and is dry and boring[K]. The deep blue fruit is up to 25mm long[219].

nrakta Australia - New South Wales, Tasmania, Victoria ksacta Damp forests and along the sides of streams[260].

propta Seed - best sown in a warm greenhouse as soon as it is ripe. Only just cover the seed. Sow stored seed in early spring in a warm greenhouse. The germination of fresh seed is usually prolific, but stored seed can take a year to germinate[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10 - 12cm with a heel, July/August in a frame. Fair percentage. Layering.

nwatta Requires a moist well-drained humus-rich lime-free soil in a sheltered position in sun or semi-shade with a cool root run[3, 11, 31, 200]. Plants are only hardy to about -5°c[260]. They succeed outdoors only in the mildest areas of Britain[1, 3, 49]. They can survive quite cold winters outdoors if given a suitable position[120]. They are hardy to at least -7°c in Australian gardens[157] though this cannot be translated directly to British gardens because of our cooler summers and longer, wetter and colder winters. Mulching the roots in winter will provide extra protection for the plant and even if the top is cut back by the cold it might resprout from the base[200]. A very ornamental plant[1]. The flowers are deliciously scented[245]. Any pruning is best done in spring[202].

### 8.2.243 Coprosma nitida

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli drutta Coprosma nitida is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit raw. Sweetish but not pleasant according to one report[144]. Nice according to another[177]. The orange-red fruit is about 6mm in diameter[200, 225]. The roasted seed is an excellent coffee substitute[153].

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153].

nrakta Australia - Tasmania, Victoria. ksacta Mountains above 750 metres, becoming very dense and low-growing at high altitudes[11].

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[K]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Succeeds in most soils[225]. This species is somewhat intolerant of frost, but some provenances should succeed outdoors at least in the milder areas of Britain. A specimen seen at Hilliers Arboretum in April 1999 was 1.5 metres tall. It had been planted in quite heavy dappled shade right next to the trunk of a fairly upright deciduous tree, though with a fairly open aspect to the south. It looked very healthy, though a bit drawn up, with no signs of any cold damage[K]. Hybridizes freely with other members of this genus[200, 225]. Plants are tolerant of heavy clipping or pruning[225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

#### 8.2.244 Mahonia flavida

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc pcimhmimhtut cyutli tcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mahonia flavida is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: We have no specific information on this species. The fruit of all members of the genus is edible, though we do not know the quality of this species[K].

nrakta E. Asia - South-western China - Kunming. ksacta Rocky, partially shaded crevices on limestone soils[260].

propta Seed - best sown as soon as it is ripe in a greenhouse[78]. It usually germinates in the spring[K]. 'Green' seed (harvested when the embryo has fully developed but before the seed case has dried) should be sown as soon as it is harvested and germinates within 6 weeks[K]. Stored seed should be sown as soon as possible in late winter or spring. 3 weeks cold stratification will improve its germination, which should take place in 3 - 6 months at 10°c. Prick out the seedlings when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer and consider

### 8.2.166 Quercus garryana

Oregon White Oak, Garry Oak
7 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 18 m hkuc
hmimhtut cyutli hgattcup hwicli jlutnyikfrip hpa7tli flatpriklwis hna7tmwatli hionli

drutta Quercus garryana is a deciduous Tree growing to  $18\ m$  (59ft) by  $10\ m$  (32ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower in May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed - raw or cooked[226]. Up to 25mm long[200]. Up to 32mm long and 25mm wide according to other reports[82, 229], which also said that it has a sweet taste[229]. The seed is ground into a powder and used in making bread etc, it is a good thickener for soups and stews[183]. The seed has a high content of bitter tannins, these can be leached out by thoroughly washing the dried and ground up seed in water[183], though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - hard, heavy, strong, tough, close grained, durable, easy to split. Used for furniture, cabinet making, general construction etc and also for fence posts and fuel[46, 61, 82, 171, 226, 229].

dwatta Astringent Dysentery TBAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4]. A decoction of the bark has been used in the treatment of tuberculosis[257]. An infusion of the plant has been drunk by a mother before her first baby comes[257]. The pounded bark has been rubbed on the abdomen and sides of the mother before her first delivery[257].

nrakta Western N. America - British Columbia to California. ksacta Dry prairies and foothills to rocky bluffs[60].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses: Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[11, 200]. A slow-growing and drought tolerant tree[188, 229], it can live for 500 years[229]. Seed production is cyclic, with a year of high production being followed by 2 - 3 years of lower yields[229]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance,

trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Inconspicuous flowers or blooms.

### 8.2.167 Quercus suber occidentalis

Cork Oak

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 18 m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli flatprikl-

hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7 wis hpa7tmwatli hjonli

drutta Quercus suber occidentalis is an evergreen Tree growing to 18 m (59ft) by 13 m (42ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[105]. A famine food[177]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Cork Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Bark is the source of cork, it is much used for heat and sound insulation, flooring, floats etc. Trees are first harvested when they are 25 - 30 years old[74], and then harvested every 6 - 12 years[117]. The bark must be removed carefully so as not to harm the tree. A large tree can yield up to 1 tonne of cork. Wood.

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta S. Europe to N. Africa. ksacta Siliceous hills on the littoral[89]

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[11]. Lime tolerant[188]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. Cultivated for its bark in Europe, it is the main source of cork[50, 89]. This sub-species has slightly thinner bark than the species[11]. Trees are first harvested when they are 25 - 30 years old and are then harvested on a 10 - 12 year rotation. Only hardy in the milder areas of Britain[200], it is not very frost resistant[98]. This sub-species is somewhat hardier than the type[11]. Trees grow well in Cornwall where there are many large specimens[11, 49, 59]. There is at

least one large healthy specimen of this tree at Kew, it produced some seeds in the hot summer of 1989[K]. Transplants badly unless it is moved regularly, it should only be moved in September or as growth commences in late spring[11]. Does not fruit well in Britain. Most of the trees grown in Britain as Q. suber are in fact this sub-species[11]. Hybridizes freely with other members of the genus[200]. This species is notably resistant to honey fungus[88, 200].

### 8.2.168 Lagarostrobus franklinii

Huon Pine

7 tlin 10 cvuc 2 kcak 0 tcan 0 dwat 15 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Lagarostrobus franklimi is an evergreen Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe source of an essential oil, called Huon pinewood oil, that has been recommended for the production of vanillin[61, 183]. This can be used as a flavouring in ice creams, confectionery, beverages etc[183]. It is usually obtained by steam distillation of the wood[156].

tcanta Repellent ResinThe essential oil (see above) is also used in medicinal soaps, toilet water, as a preservative in casein paints etc[46, 61, 156]. Wood -fairly hard, straight grained, light, soft, strong, aromatic. It is very durable, containing a strongly scented resin that repels insects. Used for construction, furniture etc[61, 156, 167].

nrakta Australia - S. and W. Tasmania. ksacta Banks of rivers and swampy flats to 750 metres[11, 167].

propta Seed - sow spring in a freely draining compost. Germination usually takes place within 1- 3 months at  $20^{\circ} (164]$ . Another report says that the seed can be very slow to germinate and that it is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed as early in the year as possible.

nwatta Requires a light, freely draining soil[164] in a sheltered position with protection from cold winds[166]. Requires high rainfall and humidity if it is to succeed[200]. This species tolerates shade and probably requires it in drier areas if the tree is to survive[82, 200]. It requires warm sumers if it is to grow well in this country, and even then it is very slow growing[11, 200]. Plants are only hardy in the milder areas of the country[11, 82]. An 80 year old tree at Bodnant was 6 metres tall in 1970[185]. Plants are hardy to at least -7°c in Australian gardens[157] but this cannot be translated directly to British gardens because of our cooler summers and colder, wetter winters.

#### 8.2.169 Corynocarpus spp.

Karaka

7 tlin 10 cyuc 2 kcak 4 tcan 0 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Corynocarpus spp. is an evergreen Tree growing to 15 m (49ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista None Known

kcakta Edible Parts: Fruit SeedEdible Uses:

tcanta Carbon Farming Solutions - Industrial Crop: starch (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles). Corynocarpus spp. are crops suited to woody agriculture. [1-1].

dwatta None Known

nrakta Native to New Guinea, Australia, New Zealand, New Caledonia, and Vanuatu. ksacta Coastal and lowland forest, south to latitude 44°south[44].

propta Seed - best sown in a greenhouse as soon as it is ripe[188]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, Iuly/August in a frame[188].

nwatta Industrial Crop: Starch Management: Standard Wild CropClimate: warm temperate to subtropical. Humidity: humid. Carbon Farming Solutions - Cultivation: wild. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

### 8.2.170 Castanopsis delavayi

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc hmim cyutli tcup hwicli jlutnyik hpa7tli flatprik hpa7tmwatli bionli

drutta Castanopsis delavayi is an evergreen Tree growing to 15 m (49ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind, midges. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed[105, 177]. Up tp 14mm in diameter[266]. No more details are given, but it is probably cooked.

nrakta E. Asia - S.W. China. ksacta Mixed and broadleaved evergreen forests at elevations of 1500 - 2800 metres[266].

propta Seed - requires a period of cold stratification and is best sown as soon as it is ripe in a cold frame[138]. The seed has a short viability and should not be allowed to dry out. It can be stored for a few months if kept cool and moist (putting it in a plastic bag that is placed in the salad compartment of a fridge works well). Stored seed should be soaked in warm water for 24 - 48 hours prior to sowing[138]. Germination usually takes place within 1 - 3 months at 15°c[138]. As soon as they are large enough to handle, prick out the seedlings into individual pots and plant them out in mid summer if possible, otherwise grow them on in a cold frame for their first winter and plant them out in late spring. Give the young plants some protection from cold for their first few winters outfloors.

nwatta Prefers a good deep medium to stiff loam[1]. Requires a sheltered position in semi-shade and a lime-free soil[138]. Although cold hardy at least in the milder areas of Britain, this species really requires a warm continental climate if it is to prosper and it does not do well in the maritime climate of this country[200]. The seed takes two growing seasons from fertilization to maturity[266]. The catkins have an unpleasant hawthorn-like smell to attract midges for their pollination.

### 8.2.171 Torreya yunnanensis

Yunnan Nutmeg Yew

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 15 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Torreya yunnanensis is an evergreen Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Demulcent Pectoral PurgativeDemulcent, pectoral, purgative[61].

nrakta E. Asia - Himalayas from Pakistan to Uttar Pradesh. ksacta Humus rich soils[145] in meadows and forest clearings, 1800 - 3600 metres[51]. Wet meadows or sunny slopesat elevations of 540 - 2200 metresin Tibet[266].

propta Seed - sow spring in a cold frame and only just cover the seed[200]. Germination is usually quick and good. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer[K]. Basal cuttings in spring. Cuttings of softwood in June/July[188].

nwatta Avery easily grown plant, succeeding in any ordinary garden soil in sun or partial shade[1, 187]. Prefers a light well-drained moderately fertile soil in full sun[200]. A soil that is too rich encourages foliar growth at the expense of flowering[200]. Tolerates maritime exposure[200]. Plants are hardy to about -20°c[187]. This species is considered by some botanists to be no more than a minor variant of L. thuringiaca[187].

#### 8.2.239 Aralia continentalis

Manchurian Spikenard

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 2 m hkuc pcimhmim cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aralia continentalis is a PERENNIAL growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Leaves Root StemEdible Uses: The following uses are for the closely related A. cordata. It is quite possible that they also apply to this species[K]. Shoots-cooked or raw[2, 46, 61, 105, 177]. They can be up to 1.5 metres long and have a mild and agreeable flavour[116]. They are usually blanched and are crisp and tender with a unique lemon-like flavour[183]. They can be sliced and added to salads, soups etc[206]. The shoots contain about 1.1% protein, 0.42% fat, 0.8% soluble carbohydrate, 0.55% ash[179]. Root-cooked[22, 105, 177]. Used like scorzonera[2].

nrakta E. Asia - W. and N. China, Korea, Siberia. ksacta

propta Seed - best sown as soon as ripe in a cold frame. Stored seed requires 3 - 5 months of cold stratification. Germination usually takes place within 1 - 4 months at  $20^{\circ}$ c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in light shade in a greenhouse for at least their first winter. Once the plants are 25cm or more tall, they can be planted out into their permanent positions, late spring or early summer being the best time to do this. Root cuttings 8cm long, December in a cold frame[11, 78]. Store the roots upside down in sand and pot up in March/April. High percentage[78]. Division of suckers in late winter[11]. Very easy, the suckers can be planted out direct into their permanent positions if required.

nwatta Prefers a deep moderately fertile moistureretentive well-drained loam and a semi-shady position[1, 11, 200]. Requires a sheltered position[200]. Plants are hardier when grown in poorer soils[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. This species is closely related to A. cordata[200].

### 8.2.240 Uniola paniculata

Sea Oats, Sea Oats Grass 7 tlin 11 cyuc 2 kcak 0 tcan 0 dwat 2.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli drutta Uniola paniculata is a PERENNIAL growing to 2.5 m (8ft 2in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked and eaten as a cereal[177, 183]. Said to have a very good flavour[183]. Seed production in the wild is generally poor[270].

tcanta Soil stabilizationThe spreading root system of this plant make it useful for stabilizing drifting coastal sand dunes[1, 200, 236].

nrakta Eastern N. America - Virginia to Texas and Mexico. ksacta Sandhills and drifting sands on the coast[43]. Also found on salt flats[200].

propta Seed - sow early spring in situ and only just cover the seed[1]. Division in spring[200].

nwatta Landscape Uses. Erosion control, Ground cover, Seashore.
Prefers a moist sandy soil, tolerating some shade [200]. Tolerates maritime exposure and saline soils [200]. An invasive plant, spreading freely by means of its rhizomes [236], but it is very ornamental [200]. and is well worth a place in the garden. Special Features: North American native, Naturalizing, Attractive flowers or blooms.

### 8.2.241 Eriodictyon californicum

Yerba Santa, California yerba santa 7 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 2.3 m hkuc htut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eriodictyon californicum is an evergreen Shrub growing to  $2.3 \, \mathrm{m}$  (7ft) by  $2 \, \mathrm{m}$  (6ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Not recommended during breast feeding or pregnancy. Iron and other minerals absorption can be effected by Yerba Santa [301].

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaThe fresh leaves are chewed for their refreshing taste and to relieve thirst[183]. An aromatic sweet tea is made from the fresh or dried leaves[183]. An extract of the leaves is used as a flavouring in baked goods, sweets, ice cream and soft drinks[183].

tcanta WeavingThe leaves have been woven into skirts and aprons[257].

dwatta Antiasthmatic Expectorant Pectoral TonicYerba Santa (the name means Holy weed) is a famous domestic remedy from south-western N. America where it is considered to be especially useful as an expectorant[238]. It is an ingredient of many patent cough medicines[238]. The leaves are an aromatic pleasant tasting tonic herb that reduces spasms, expels phlegm and lowers fevers[238, 254]. They are especially recommended for treating diseases of the chest and respiratory system, including asthma, and are also used in the treatment of hay fever[4, 200, 238]. A bitter tea made from the leaves has been much used as a bitter tonic and a stimulating balsamic expectorant[207, 213]. A steam bath made from the branches and leaves has been used in the treatment of rheumatism[257]. A decoction of the leaves has been used as a wash for sore areas and painful fatigued limbs[257]. A natural mouthwash is prepared by rolling the leaves into balls and allowing them to dry in the sun[213]. These are then chewed and at first have a bitter flavour but this is soon replaced by a sweetness if a drink of water is taken[213]. The leaves are harvested in the summer and dried for later use[238]. The plant has been smoked as a remedy for asthma[213]

nrakta South-western N. America - Oregon to California. ksacta Dry mountain slopes at altitudes up to 1,200 metres[254].

propta Seed - sow spring in a greenhouse[200]. Prick out the seedlings into individual pots when they are large

-10°c[200]. Mulberries have brittle roots and so need to be handled with care when planting them out[238]. Any pruning should only be carried out in the winter when the plant is fully dormant because mulberries bleed badly when cut[238]. Ideally prune only badly placed branches and dead wood[238]. Plants in this genus are notably resistant to honey fungus[200].

### 8.2.235 Arthropodium minus

Small Vanilla Lilv

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arthropodium minus is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: RootEdible Uses: Root - cooked. Rather watery with a slightly sweet or bitter flavour[193]. Plants produce about 4 - 5 tubers, each of which are up to 3cm long[193].

nrakta Australia - New South Wales, Tasmania, Victoria. ksacta Found in a variety of habitats from the coast to alpine areas. Eucalyptus forests, woodlands and sub-alpine meadows, favouring drier habitats than A. milleflorum[193].

propta Seed - sow late winter in a cold greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in a greenhouse. Plant out in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Prefers a well-drained sandy peaty loam in a warm, sheltered sunny position[200]. Succeeds in areas where temperatures seldom fall much below freezing so long as it is given a sunny sheltered position and a well-drained soil[200]. Plants are hardy to at least -7°c in Australian gardens[157], though this cannot be translated directly to British gardens due to our cooler summers and colder longer and wetter winters. The plant has a strong scent of vanilla, this is especially noticeable on warm days[157].

#### 8.2.236 Lavatera species

Tree Lavatera

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 2.4 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Lavatera species is an evergreen Shrub growing to  $2.4\,\mathrm{m}$  (7ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: Flowers LeavesEdible Uses: Young leaves - raw or cooked. A mild flavour, but tough and not very worthwhile[K]. When cooked the leaves have a somewhat slimy consistency[K]. Flowers - raw. A pleasant mild flavour, they make a decorative addition to the salad bowl[K].

nrakta S. Europe - Greece. ksacta Not known

propta Seed - sow spring in a cold frame and only just cover the seed[200]. Germination is usually quick and good. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer[K]. Basal cuttings in spring. Cuttings of softwood in June[July[188].

nwatta Easily grown in any ordinary garden soil[1]. Prefers a light well-drained moderately fertile soil in full sun[200]. A soil that is too rich encourages foliar growth at the expense of flowering[200]. Tolerates maritime exposure[200]. An unknown species from Greece given to us by

Bill of Falmouth. It is very fast growing, even in a very exposed position but is short lived, usually only 3 - 4 years before it starts breaking up in the wind. The plant is probably too floriferous for its own good but if self-sows freely. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.237 Ferula narthex

Ferula

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 2.5 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ferula narthex is a PERENNIAL growing to 2.5 m (8ft 2in). See above for USDA hardiness. It is hardy to UK 2one 8. It is in flower in July, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Condiment GumLeaves and young shoots[105, 177]. Used as a potherb[2]. The gum obtained from the roots is used as a condiment[2, 46].

tcanta GumThe root is a source of the gum 'asafoetida'[1, 2, 61], it is used as a condiment and as a medicine. It is obtained by incision of the roots[114].

dwatta Anthelmintic Antispasmodic Carminative Contraceptive Diaphoretic Expectorant NervineThe gum resin obtained from the root is anthelmintic, antispasmodic, expectorant and nervine[240]. It is used in the treatment of asthma, whooping cough, flatulent colic, and in pneumonia and bronchitis in children[240]. The leaves are carminative and diaphoretic[240]. The plant has recently been investigated as a potential contraceptive[254].

nrakta W. Asia - Afghanistan to Pakistan. ksacta Grassy slopes at elevations around 3600 metres in Tibet[266].

propta Seed - best sown as soon as the seed is ripe in a greenhouse in autumn[1]. Otherwise sow in April in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle. Plant them out into their permanent positions whilst still small because the plants dislike root disturbance[1]. Give the plants a protective mulch for at least their first winter outdoors. Division in autumn. This may be inadvisable due to the plants dislike of root disturbance.

nwatta Succeeds in most soils[1]. Requires a deep fertiles soil in a sunny position[200]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. The whole plant is very strong-smelling[200]. Plants have a long taproot and are intolerant of root disturbance[200]. They should be planted into their final positions as soon as possible.

#### 8.2.238 Lavatera cachemiriana

Lavatera

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 2.4 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lavatera cachemiriana is a PERENNIAL growing to 2.4 m (7ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: LeavesEdible Uses: Young leaves - raw or cooked. A mild flavour, but they are tough and not very worthwhile[K]. When cooked they have a somewhat slimy consistency[K]. Flowers - raw. Rather bland, but an attractive garnish to a salad[K].

tcanta FibreA strong fibre is obtained from the stems, it is used for making string, bags, paper etc[74].

kcakta Edible Parts: Oil Oil SeedEdible Uses: Oil OilSeed[81]. No more details are given but it is likely that the seed can be eaten raw or cooked and is rich in oil. An edible oil is obtained from the seed.

tcanta Oil Oil WoodAn oil is extracted from the seed[266]. The high quality timber is used in constructing houses, bridges, and furniture, and for making implements and utensils[266].

nrakta E. Asia - China in Yunnan province. ksacta Coniferous and mixed forests in warm temperate zones, locally a common forest tree, at levations of 1500 - 3400 metres in NW Yunnan[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Some of the seed should germinate in the following spring though much of it might take another 12 months. Stored seed requires a period of cold stratification and can take 18 months or more to germinate. Prick out the seedlings into individual pots as soon as growth is observed and grow them on in light shade in the greenhouse for at least the next couple of winters, making sure to pot them on into larger pots as and when required. Plant them out into their permanent positions in early summer when the plants are at least 20cm tall. Cuttings of half-ripe shoots in late summer[1]. Cuttings do not grow well[11]. Layering.

nwatta Succeeds in ordinary garden soil, tolerating some lime[1]. Requires a sheltered position and either high humidity or a moist riverside soil[200]. Dislikes wind exposure[200]. Tolerates woodland shade very well[200]. Requires hot, very humid summers for best growth[200]. A vulnerable species in the wild, where it is at risk of becoming extinct[266]. This species is not hardy in all parts of Britain, but trees can be grown outdoors in the milder parts of the country[81]. The seed takes two summers to mature[229]. There is some confusion over the correct name of this species, with some authorities seeing it as no more than a sub-species of T. fargesii[266]. Plants are dioecious, but sometimes monoecious with dioecious branches. Male and female plants must usually be grown if seed is required.

### 8.2.172 Corvnocarpus laevigatus

New Zealand Laurel, Karaka nut 7 tlin 10 cyuc 2 kcak 4 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Corynocarpus laevigatus is an evergreen Tree growing to 12 m (39ft) by 8 m (26ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from May to June, and the seeds ripen from December to February. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista The seed is poisonous raw[65, 173].

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw. Sweet and pulpy[1, 2, 46, 59, 61, 103, 173]. One report says that it is poisonous raw[153], though the writer might have been confused with the seed[K]. Seed - cooked[46, 59, 61, 128]. The seed needs to be soaked in salt water or thoroughly boiled or roasted in order to destroy a deleterious principle[1, 2, 63]. A staple food of the Maoris, it contains a tasteless farinaceous substance[2, 103]. The seed contains about 11% protein and 58% carbohydrate[173].

tcanta Insecticide WoodAn insecticide is made from the plant[153]. Wood. The tree trunk is used by the Maoris to make canoes[46, 61]. Carbon Farming Solutions - Industrial Crop: starch (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles). Corynocarpus spp. are crops suited to woody agriculture. [1-1].

nrakta New Zealand. ksacta Coastal and lowland forest, south to latitude 44°south[44].

propta Seed - best sown in a greenhouse as soon as it is ripe[188]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer.

after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[188].

nwatta Succeeds in ordinary garden soil[1]. Best grown in a woodland garden[166]. Plants are not very frost-tolerant and are only hardy outdoors in the mildest areas of Britain[1]. There is a large tree in Falmouth[59]. Plants tolerate pruning if this is necessary[188].

#### 8.2.173 Camellia semiserrata

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Camellia semiserrata is an evergreen Shrub growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from January to March, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: OilEdible Uses: OilAn oil is obtained from the seed[177]. It is used in cooking[266].

nrakta E. Asia - China. ksacta Forests, forests along river valleys at elevations of 200 - 500 metres in W Guangdong and E Guangxi Provinces[266].

propta Seed - can be sown as soon as it is ripe in a greenhouse[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10 - 15cm with a heel, August/September in a shaded frame. High percentage but slow[78]. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leaf-bud cuttings, July/August in a frame.

nwatta Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1, 11, 200]. A calcifuge plant, preferring a pH between 5 and 7[11, 200]. Prefers the partial shade of a light woodland[200]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200]. This species is closely related to C. reticulata[180]. The plant is often cultivated in China for the oil in its seed[177].

### 8.2.174 Podocarpus salignus

Willowleaf Podocarp

1369

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Podocarpus salignus is an evergreen Tree growing to 12 m (39ft) by 5 m (16ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, and the seeds ripen in October. The species is diocious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Superficially similar to Taxus species, but this plant is definitely not poisonous[200].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. About 8mm long[200]. We have seen no reports for this species but it is most likely that the fruit is edible.

tcanta WoodWood - straight grained, reddish, very durable lasting a long time in water, but it can be brittle.

Used for construction work and cabinet making[1, 11, 46, 61, 128].

nrakta Southern S. America - S. Chile. ksacta Temperate rain forests [214].

propta The seed can be sown at any time of the year in a sandy soil in a warm greenhouse, though it is probably best sown as soon as it is ripe[1]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe terminal shoots, 5 - 10cm long, July/August in a frame[78].

nwatta Prefers a rich moist non-alkaline soil[167]. Shade tolerant, at least when young[200]. This species is hardy to about -25°c, but the plants grow best in humid areas with high rainfall and mild winters[200]. Plants often fruit freely in Britain and self-sow freely in Cornwall[200]. A good plant for the rock garden[200]. Very tolerant of pruning[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

### 8.2.175 Ouercus laevis

American Turkey Oak, Turkey oak 7 tlin 9 cyuc 2 kcak 0 tcan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hyisjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus laevis is a deciduous Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked. The seed is up to 27mm long and 18mm wide[82. 229]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is guicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. Wood - heavy, hard, strong, rather closegrained. Too small to be of commercial value, it makes an excellent fuel[82, 171, 229].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-eastern N. America - Virginia to Florida and west to Louisiana. ksacta Dry barren sandy ridges, sandy bluffs and hammocks[82], growing well in almost sterile soil[229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left

in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A moderately fastgrowing but short-lived species in the wild[229], trees are very slow-growing in Britain[11, 200]. They prefer warmer summers than are usually experienced in Britain, often growing poorly in this country and failing to properly ripen their wood, resulting in frost damage overwinter[200]. Seed production is cyclic, with a year of high yields being followed by 1 - 2 years of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: North American native, Attracts butterflies, Inconspicuous flowers or blooms.

#### 8.2.176 Camellia kissi

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 12 m hkuc hmimhtut, cyutli, tcup, hwicli, hrasilut, hpa7tli, flatp

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Camellia kissi is an evergreen Shrub growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Fruit OilEdible Uses: Oil TeaAn oil is obtained from the seed[180]. It is used for cooking[272]. A tea is made from the steamed then dried leaves[51, 177, 183, 272]. It is used as a substitute for China tea (obtained from C. sinensis)[240, 243]. The flowers are boiled then pickled[272]. The fruit is said to be edible[177, 183]. This seems a very strange report, the fruit is a dry wooden capsule[K].

dwatta MiscellanyThe oil is much valued in medicine[180]. No more details given.

nrakta E. Asia - C. Nepal to S.W. China. ksacta Forests and shrubberies in evergreen forests, 1000 - 2100 metres[51]. Moist ground in hill forests at elevations of 900 -2100 metres in Nepal[272].

propta Seed - can be sown as soon as it is ripe in a greenhouse[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10 - 15cm with a heel, August/September in a shaded frame. High percentage but slow[78]. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leaf-bud cuttings, July/August in a frame

nwatta Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1, 11, 200]. A calcifuge plant, preferring a pH between 5 and 7[11, 200]. Prefers the partial shade of a light woodland[200]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200]. This species is sometimes cultivated in China for the edible oil contained in its seed

#### 8.2.177 Prunus caroliniana

1370

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 12 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli propta Seed - sow April/May in situ[134]. Germination is usually rapid.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though it should be possible to grow it as a spring-sown annual. The following notes are based on the general needs of the genus. Succeeds in full sun in any well-drained but not too fertile soil[200]. Most species in this genus tolerate saline and very alkaline soils[200].

### 8.2.232 Hibiscus mutabilis

Cotton Rose, Dixie rosemallow

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Hibiscus mutabilis is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from August to October, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Rutin-Leaves[177]. The leaves contain rutin, but the report does not say what quantity[218]. Root - it is edible but very fibrousy[144]. Mucilaginous, without very much flavour[144].

tcanta FibreA fibre from the bark is used for making cords and rope[178, 272].

dwatta Antiphlogistic Demulcent Depurative Expectorant FebrifugeThe leaves are anodyne, antidotal, demulcent, expectorant and refrigerant[218]. With the flowers, they are applied to burns, swellings and other skin problems[147, 218, 240]. The flowers are antiphlogistic, depurative, febrifuge, pulmonary and stimulant[147, 240]. A decoction is used in the treatment of lung ailments[218, 240].

nrakta E. Asia - China, Japan. ksacta Thickets in S. Japan[58].

propta Seed - sow early spring in a warm greenhouse. Germination is usually fairly rapid. Prick out the seedlings into individual pots when they are large enough to handle. If growing them as annuals, plant them out into their permanent positions in early summer and protect them with a frame or cloche until they are growing away well. If hoping to grow them as perennials, then it is better to grow them on in the greenhouse for their first year and to plant them out in early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Overwinter them in a warm greenhouse and plant out after the last expected frosts.

nwatta Prefers a well-drained humus rich fertile soil in full sun[200]. Prefers a warm but wet winter[260]. This species is not very hardy in Britain, it is frost-tender and top growth will be killed by even a slight frost. However, the roots are somewhat hardier and the plant can resprout from the base after a few degrees of frost[200, 260]. The plant can probably be grown outdoors in the mildest areas of the country especially if given a good mulch in the winter. It is widely cultivated in tropical and occasionally in temperate areas as an ornamental plant, there are many named varieties[200].

#### 8.2.233 Musa basioo

Japanese Banana

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

drutta Musa basjoo is an evergreen Perennial growing to 3 m (9ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: NectarEdible Uses: The nectar of the flowers is sweet and drinkable[183].

tcanta FibreA fibre is obtained from the leaf stems[1, 11, 61]. Used for cloth, sails etc[46, 134]. The fibre can also be used for making paper[189] The leaves are harvested in summer and are soaked in water for 24 hours prior to cooking. The fibres are cooked for 2 hours with lye and then beaten in a ball mill for 4½ hours before being made into paper[189].

dwatta Diuretic Febrifuge SialagogueThe roots are diuretic, febrifuge and sialagogue[147]. A decoction is used in the treatment of beriberi, constipation, jaundice, dropsy, restlessness due to heat, leucorrhoea and croton bean poisoning[147, 218]. The leaves are diuretic[218].

nrakta E. Asia - Japan. ksacta Not known

propta Seed - best sown as soon as it is ripe in a warm greenhouse[134]. The seed usually germinates rapidly. Presoak stored seed for 72 hours in warm water, if it is still floating then it is not viable. Sow in a warm greenhouse in spring, planting one large seed in each pot. Germination usually takes place within 2 - 24 weeks at 22°c[134]. Grow the plants on in the greenhouse for at least 3 years before trying them outdoors. The seed remains viable for 2 years[134]. Removal of suckers as the plant comes into growth in spring.

nwatta Industrial Crop: Fiber Management: Managed Multistem Regional CropRequires a rich soil and a sunny sheltered position[11, 166, 200]. The large leaves are very easily torn by the wind[233]. This species is only hardy in the milder areas of Britain and even there will require protection in colder winters[1]. It thrives and fruits in south-western Britain[11, 59] where it survived the very severe winters of 1985 to 1987[K]. Plants are herbaceous and die down after flowering, forming new shoots from the roots. Cultivated in Japan as a fibre plant[11].

#### 8.2.234 Morus macroura

Himalayan Mulberry

7 tlin 10 cvuc 2 kcak 0 tcan 1 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Morus macroura is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from April to May, and the seeds ripen from July to August. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Dry and insipid[146]. Sweetish [183] when fully ripe[158, 272]. The yellowish-white fruit is 6 - 12cm long[266].

tcanta Dye Fibre WoodThe plant is used for paper making[266]. No further details are given, but it is almost certainly the bark that is used as the source of fibre[K]. A colour is distilled from the wood and leaves[266]. Wood - hard, close grained with a beautiful lustre. Used for furniture, construction etc1146, 2721.

dwatta AstringentThe juice of the bark is applied to cuts and wounds[272].

nrakta E. Asia - S. China to the Himalayas and Burma. ksacta Forests in the mountains of Szechwan [109]. Open hill-sides at elevations of 1000 - 2000 metres in Nepal [272].

propta The seed germinates best if given 2 - 3 months cold stratification[80, 98]. Sow the seed as soon as it is ripe if possible, otherwise in February in a cold frame. The seed usually germinates in the first spring, though it sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the cold frame for their first winter. Plant them out in late spring or early summer after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame. Plant out in spring. A good percentage take, though they sometimes fail to thrive[78, 113]. Cuttings of mature wood of the current season's growth, 25 - 30cm with a heel of 2 year old wood, autumn or early spring in a cold frame or a shady bed outside[78, 113, 200]. Bury the cuttings to threequarters of their depth. Lavering in autumn[200].

nwatta Prefers a warm well-drained loamy soil in a sunny position[1, 11]. Not very hardy in the colder parts of Britain, it tolerates temperatures down to between -5 and

1391

klwis hpa7tmwatli xre7t hjonli the flowers is sweet and drinkable[183].

but fruits are much more likely to be produced when the plants are grown in a sunny position[200, 219]. Not fully hardy in Britain, it is probably hardier than the closely related H. coriacea, tolerating temperatures down to about -15°c[184] but it can be damaged by prolonged periods below -5°c[200]. Plants are hardy at Kew but they do not fruit freely in this country[11]. Hand pollination would probably help[11, 166], fruits are more likely to form in hot summers[166]. There is also some doubt as to whether the plants are monoecious or dioecious, it would be best to grow at least two distinct plants (not cuttings from one plant) and make sure that male and female flowers are present[K]. The flowers are sweetly and heavily scented. The males are produced on the previous years wood whilst females are produced on the current years wood[182]. Plants are fast growing[200] and climb by means of twining[182]. This genus is closely related to Stauntonia spp[200].

#### 8.2.230 Pinus muricata

Bishop's Pine 7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli frusflatprikhsom hpa7tmwatli dyat hjonli

drutta Pinus muricata is an evergreen Tree growing to 20 m (65ft) by 6 m (19ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in June, and the seeds ripen from January to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils and can grow in very acid and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista The wood, sawdust and resins from various species of pine can cause dermatitis in sensitive people[222]. kcakta Edible Parts: SeedEdible Uses: CondimentSeed

- raw or cooked[257]. They can be dried and stored for later use[257]. A vanillin flavouring is obtained as a by-product of other resins that are released from the pulpwood[200].

tcanta Adhesive Dve Herbicide Shelterbelt Waterproofing WoodA very fast growing tree, even in exposed maritime areas, it makes a very good shelterbelt[75, 200]. Trees in a very exposed position at Rosewarne in N. Cornwall reached 10m in 29 years[75]. A tan or green dye is obtained from the needles[168]. The needles contain a substance called terpene, this is released when rain washes over the needles and it has a negative effect on the germination of some plants, including wheat[201]. Oleo-resins are present in the tissues of all species of pines, but these are often not present in sufficient quantity to make their extraction economically worthwhile 641. The resins are obtained by tapping the trunk. or by destructive distillation of the wood[4, 64]. In general, trees from warmer areas of distribution give the higher yields[64]. Turpentine consists of an average of 20% of the oleo-resin[64] and is separated by distillation[4, 64]. Turpentine has a wide range of uses including as a solvent for waxes etc. for making varnish, medicinal etc[4]. Rosin is the substance left after turpentine is removed. This is used by violinists on their bows and also in making sealing wax, varnish etc[4]. Pitch can also be obtained from the resin and is used for waterproofing, as a wood preservative, adhesive etc[257]. The roots have been used in making baskets[257]. Wood heavy, coarse-grained, weak, usually containing a number of knots[229]. Of little value commercially[229], though it is occasionally manufactured into lumber[82].

dwatta Antiseptic Diuretic Pectoral Poultice VermifugeThe turpentine obtained from the resin of all pine trees is antiseptic, diuretic, rubefacient and vermifuge[4]. It is a valuable remedy used internally in the treatment of kidney and bladder complaints and is used both internally and as a rub and steam bath in the treatment of rheumatic affections[4]. It is also very beneficial to the respiratory system and so is useful in treating diseases of the mucous membranes and respiratory complaints such as coughs, colds, influenza and TB[4]. Externally it is a very beneficial treatment for a variety of skin complaints, wounds, sores, burns,

boils etc and is used in the form of liniment plasters, poultices, herbal steam baths and inhalers[4].

nrakta South-western N. America - California. ksacta Found in 7 scattered locations on exposed bluffs and headlands, often drenched by salt spray[11, 200].

propta It is best to sow the seed in individual pots in a cold frame as soon as it is ripe if this is possible otherwise in late winter. A short stratification of 6 weeks at 4°c can improve the germination of stored seed[80]. Plant seedlings out into their permanent positions as soon as possible and protect them for their first winter or two[11]. Plants have a very sparse root system and the sooner they are planted into their permanent positions the better they will grow[K]. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm[200]. We actually plant them out when they are about 5 - 10cm tall. So long as they are given a very good weed-excluding mulch they establish very well[K]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Cuttings. This method only works when taken from very young trees less than 10 years old. Use single leaf fascicles with the base of the short shoot. Disbudding the shoots some weeks before taking the cuttings can help. Cuttings are normally slow to arow away[81]

nwatta Thrives in a light well-drained sandy or gravelly loam[1, 11]. Dislikes poorly drained moorland soils[1]. Established plants tolerate drought[200] and are very resistant to maritime exposure[185]. Mature trees produce a broad heavy crown and are somewhat likely to be blown down in severe gales[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -10°c[200]. It grows quickly on barren acidic sandy soils[81], with annual growths of 1.8 metres being recorded for young trees[185]. Trees from the northern provenances maintain rapid height growth for longer than trees from the southern provenances, but both remain vigorous in girth[185]. Trees grow larger in cultivation than they do in the wild[200]. The cones are about 8cm long, they remain on the tree and retain viable seed for up to 25 years, opening up and scattering the seed after a forest fire[11, 82]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200]. They hybridize freely with other members of this genus[200]. Leaf secretions inhibit the germination of seeds, thereby reducing the amount of plants that can grow beneath the tree[18]. Plants in this genus are notably susceptible to honey fun-

#### 8.2.231 Atriplex serenana

Bractscale, Davidson's bractscale 7 tlin 10 cyuc 2 keak 0 tean 0 dwat 3 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli

drutta Atriplex serenana is a ANNUAL growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August, and the seeds ripen from August to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate droudth. The plant can tolerate maritime exposure.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves.

kcakta Edible Parts: Leaves SeedEdible Uses: CondimentLeaves and young plants - cooked. They are usually boiled with other foods as a salty flavouring[161, 177, 257]. Seed - cooked. Used in piñole or ground into a meal and used as a thickener in making bread or mixed with flour in making

nrakta South-western N. America - California. ksacta Alkaline valleys, marshy areas, valley grasslands, coastal sage scrub, sometimes as a ruderal weed at elevations of 70 - 1300 metres (71, 270). drutta Prunus caroliniana is an evergreen Shrub growing to 12 m (39ft 4in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista The leaves and young branches of this species contain considerable quantities of hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: The fruit might be edible[105]. It has a thick skin and a thin dry flesh[82] and is not edible[227]. It is slightly toxic to humans[229]. The fruit is about 13mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta Dye Hedge Hedge Shelterbelt WoodAmenable to trimming, this plant can be grown as a screen and hedge[82, 227]. It can also be used in shelterbelt plantings[200]. A green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]. Woodhard, heavy, strong, close grained[82]. The trees are seldom large enough for the wood to be exploited commercially[229].

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta South-eastern N. America - North Carolina to Florida, west to Texas. ksacta Deep, well-drained rich moist bottomlands. bluffs or streambanks[82, 229].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Landscape Uses: Pest tolerant, Screen, Standard, Street tree, Woodland garden. Requires a well-drained moisture retentive soil[11, 200]. Succeeds in a hot dry position. Succeeds in light shade but fruits better in a sunny position[11, 200]. Thrives in a loamy soil, doing well on limestone[11, 200]. Prefers some chalk in the soil but apt to become chlorotic if too much is present[11]. Fairly windresistant[200]. One report says that this species is tender in most of Britain[11], whilst another says that it succeeds in climatic zone 7 (tolerating frosts down to about -15°c)[200]. A fast-growing but short-lived tree[229]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features:North American native, Naturalizing, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms.

#### 8.2.178 Arbutus xalapensis

Madrono, Texas madrone 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 12 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flat hpa7tmwatli fyifxre7t hjonli

drutta Arbutus xalapensis is an evergreen Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower

from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[161,

nrakta South-western N. America - Mexico. ksacta Drier oak forests from Sinaloa, Chihuahua and Nuevo Leon southwards. Usually found on limestone soils at elevations up to 3,000 metres[260].

propta Seed - best surface sown in a cold frame as soon as it is ripe. Stored seed should be soaked for 5 - 6 days in warm water and then surface sown in a shady position in a greenhouse[78]. Do not allow the compost to become dry. 6 weeks cold stratification helps[134]. The seed usually germinates well in 2 - 3 months at  $20^{\circ}c[134]$ . Seedlings are prone to damp off[184], they are best transplanted to individual pots as soon as they are large enough to handle and should be kept well ventilated. Grow them on in a greenhouse for their first winter and then plant out in late spring after the last expected frosts[K]. Basal cuttings in late winter[200]. Cuttings of mature wood of the current season's growth, November/December in a frame. Poor percentage[78]. Layering of young wood - can take 2 years[1, 200].

nwatta Requires a lime-free nutrient-rich well-drained moisture-retentive soil in sun or semi-shade and shelter from cold drying winds, especially when young[200]. This species thrives on limestone soils and in dry conditions[260]. Plants are not very hardy in the colder areas of the country, tolerating temperatures down to about -10°c[200].

### 8.2.179 Vitis girdiana

Valley Grape, Desert wild grape
7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 12 m hkuc
hmimhtut cyutli kyuctcup hwicii hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli yre7t hionli

drutta Vitis girdiana is a deciduous Climber growing to 12 m (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw or dried for winter use[161, 177, 257]. The fruit is about 4 - 7mm in diameter[200] and is carried in bunches. Young leaves are wrapped around other foods and then baked, they impart a pleasant flavour. Young tendrils - raw or cooked.

tcanta Dye HairA yellow dye is obtained from the fresh or dried leaves[168]. The sap has been rubbed on falling or thin hair to keep it healthy and make it grow[257].

nrakta South-western N. America - California, Baja California. ksacta Canyon bottoms along the sides of streams etc, below 1200 metres[71].

propta Seed - best sown in a cold frame as soon as it is ripe[K]. Six weeks cold stratification improves the germination rate, and so stored seed is best sown in a cold frame as soon as it is obtained. Germination should take place in the first spring, but sometimes takes another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant out in early summer. Cuttings of mature wood of the current seasons growth, December/January in a frame. These cuttings can be of wood 15 - 30cm long or they can be of short sections of the stem about 5cm long with just one bud at the top of the section. In this case a thin, narrow strip of the bark about 3cm long is removed from the bottom half of the side of the stem. This will encourage callusing and the formation of roots. Due to the size of these cuttings they need to be kept in a more protected environment than the longer cuttings. Layering.

nwatta Prefers a deep rich moist well-drained moderately fertile loam[1, 200]. Grows best in a calcareous soil[200]. Succeeds in sun or partial shade though a warm sunny position is required for the fruit to ripen[200]. Plants

climb by means of tendrils[182]. Any pruning should be carried out in winter when the plants are dormant otherwise they bleed profusely[182, 200]. Plants in this genus are notably susceptible to honey fungus[200].

### 8.2.180 Ipomoea alba

Moonflower, Tropical white morning-glory
7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 10 m hkuc
htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis
hpa7tmwatli xre7t hjonli

drutta Ipomoea alba is an evergreen Perennial Climber growing to 10 m (32ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Leaves SeedEdible Uses: Young leaves and fleshy calyces - cooked. Steamed and eaten as a vegetable or used in curries, soups, stews etc[183]. They can also be dried for later use[183]. Seed - eaten when young[183].

dwatta The whole herb is used in treating snakebite[266].

nrakta Pantropical. ksacta Wet forests, watercourses and disturbed areas in China[266].

propta Pre-soak the seed for 12 hours in warm water, or early the seed, and sow in individual pots in a greenhouse in early spring. The seed usually germinates in 1 - 3 weeks at 22°c. Plants are extremely resentful of root disturbance, even when they are quite small, and should be potted up almost as soon as they germinate[219]. Grow them on in the greenhouse for at least their first winter then plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of side shoots in a peaty soil. Layering. Plants form tubercles on their stems[260]. These can be stored overwinter in a slightly moist medium such as sand or leafmould, keeping them in a cool but frost-free place. Pot them up in early spring.

nwatta Requires a fertile well-drained loam in a warm sunny position[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Another report says that plants need a minimum temperature of 5°c if they are to overwinter successfully[260]. A short-lived perennial or biennial species[187]. A fast-growing climbing plant, it is best grown as a temporary screen in the garden or along the boundary edge[200]. Plants need a long period of growth to reach flowering size and so are not very suitable for growing in pots in a greenhouse[260]. A climbing plant, supporting itself by twining around the branches of other plants[219]. The plant forms tubercles (baby tubers) on the stems and can be propagated by them[260]. The aromatic flowers open of a night time[188].

#### 8.2.181 Torreya jackii

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Torreya jackii is an evergreen Tree growing to 10 m (32ft 10in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed[81]. No more details are given but it is likely that the seed can be eaten raw or cooked and is rich in oil. An edible oil is obtained from the seed[105, 177].

tcanta Incense Oil WoodThe leaves are very aromatic when bruised or burned, giving off a fragrance like sandal-wood oil[266]. The wood is very fragrant, and is used to make agricultural implements, utensils, and handicrafts[266].

nrakta E. Asia - E. China. ksacta Woods at elevations of 400 - 1000 metres in N Fujian, NE Jiangxi S Zhejiang provinces[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Some of the seed should germinate in the following spring though much of it might take another 12 months. Stored seed requires a period of cold stratification and can take 18 months or more to germinate. Prick out the seedlings into individual pots as soon as growth is observed and grow them on in light shade in the greenhouse for at least the next couple of winters, making sure to pot them on into larger pots as and when required. Plant them out into their permanent positions in early summer when the plants are at least 20cm tall. Cuttings of half-ripe shoots in late summer[1]. Cuttings do not grow well[11]. Layering.

nwatta Succeeds in ordinary garden soil, tolerating some lime[1]. Requires a sheltered position and either high humidity or a moist riverside soil[200]. Dislikes wind exposure[200]. Tolerates woodland shade very well[200]. Requires hot, very humid summers for best growth[200]. Quite rare in the wild, this is a vulnerable species at risk of becoming extinct in the wild[266]. Torreya jackii is unlike the other Chinese members of the genus and is remarkably similar to Cephalotaxus fortunei, from which it can be distinguished by its sessile seed-bearing structures and by the peculiar, strongly twisted leaf arrangement[266]. The seed takes two summers to mature[229]. This species is not very hardy in Britain, though trees can be grown outdoors in the milder parts of the country[81]. Plants are dioecious, but sometimes monoecious with dioecious branches. Male and female plants must usually be grown if seed is required.

### 8.2.182 Muehlenbeckia australis

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Muehlenbeckia australis is an evergreen Climber growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Sweet and juicy[173].

nrakta New Zealand. ksacta Scrub and forests, especially marginal, up to montane altitudes on Three Kings, North, South, Stewart and Chatham Islands[44, 173].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8 cm with a heel, July/August in a frame. Pot up in autumn and overwinter in a cold frame. High percentage[78]. Plant out in late spring. Cuttings of mature wood of the current season's growth, 5 - 10cm with a heel, October/November in a cold frame. High percentage[78].

nwatta Requires a well-drained soil in sun or semishade[200]. Not very hardy in Britain[182]. Plants tolerate temperatures down to between -5 and -10°c[200]. A climbing plant that supports itself by twining around other plants etc[219]. Dioecious. Male and female plants must be grown if seed is required.

### 8.2.183 Liquidambar orientalis

Oriental Sweet Gum 7 tlin 10 cyuc 2 koak 0 tcan 3 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli nrakta South-eastern N. America - Florida. ksacta The elevated central lands of Florida in dry sandy soils that have a supply of water at depth, as part of the understorey in sand pine and oak scrub communities[231].

propta Seed - best sown as soon as it is ripe in a warm greenhouse at not less than  $24^{\circ}c[188]$ . Stored seed is very slow to germinate. Pre-soaking the seed for 24 hours in warm water prior to sowing may shorten the germination time. Plants form a long tap-root some time before forming a shoot. Germination of fresh seed usually takes place in 3-4 months at  $25^{\circ}c[138]$ . As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first two winters. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Consider giving them some protection from the cold for at least their first winter outdoors.

nwatta Succeeds in most fertile moist but well-drained soils in a sheltered sunny position[188, 200, 231]. Although it prefers a humid atmosphere, this species is tolerant of arid atmospheres so long as it has plenty of moisture available at the roots[231]. This palm tolerates short-lived freezes down to about -10°c and can be grown outdoors in the very mildest areas of the country[231]. Palms usually have deep penetrating root systems and generally establish best when planted out at a young stage. However, older plants are substantially more cold tolerant than juvenile plants[231]. In areas at the limit of their cold tolerance, therefore, it is prudent to grow the plants in containers for some years, giving them winter protection, and only planting them into their permanent positions when sheer size dictates[231]. This species can also be transplanted even when very large. Although the thick fleshy roots are easily damaged and/or desiccated, new roots are generally freely produced. It is important to stake the plant very firmly to prevent rock, and also to give it plenty of water until re-established - removing many of the leaves can also help[231]. Plants are very slow-growing when young and take a considerable time to establish[231].

### 8.2.227 Decaisnea insignis

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 3.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Decaisnea insignis is a deciduous Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower in June, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[1, 105, 177]. A yellow pod about 8cm long[200], it is filled with a white juicy pulp that is very sweet and pleasant to eat[2]. nrakta E. Asia - Himalayas in Sikkim and Bhutan. ksacta Moist woods and thickets to 3000 metres[109, 146].

propta Seed - best sown as soon as it is ripe in a cold frame[200], it then usually germinates freely in early spring[K]. Sow stored seed in February in a greenhouse. This usually germinates well, within 1 - 3 months at 18°c[175]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on under protection for their first winter. Plant out in late spring after the

last expected frosts. Cuttings.

mwatta Prefers a rich moist loamy soil and a sunny position sheltered from cold winds[1, 175]. Succeeds in partial
shade[200]. This species is not very hardy in Britain[11], it
probably needs greenhouse protection in most parts of the
country[1]. The flowers and young growth in spring are very
frost-tender and can be damaged by late frosts[200]. The
flowers are produced at the tips of the new upright growths
in the spring[11, 2021.

#### 8.2.228 Salvia microphylla

Blackcurrant Sage 7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia microphylla is an evergreen Perennial growing to 1.2 m (4ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves have a pleasant scent of blackcurrant and can be used fresh or dried as a flavouring. A herbal tea, called 'mirot de montes', is made from the leaves[260].

dwatta FebrifugeAn infusion of the flowers and leaves have been used in the treatment of fevers[238].

nrakta Southern N. America - Mexico to Guatemala. ksacta Not known

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a warm sunny position[200]. Prefers a rich soil[1]. Plants can be killed by excessive winter wet[200]. This species is rather variable with a number of sub-species and cultivars of differing hardiness[200, 260]. The hardiest forms tolerate temperatures down to about -10°c[260] and can be grown outdoors in the mildest areas of the country, though they are probably best grown in a cold greenhouse. When grown outdoors, the top growth will be cut back to the ground in cold winters but, if the roots are given a good mulch in the autumn, plants will often survive the winter outdoors and resprout freely from the base in the spring[200]. The flowers are very attractive to bees, providing a good source of nectar[61]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 8.2.229 Holboellia angustifolia

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Holboellia angustifolia is an evergreen Climber. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177]. Often considered to be insipid, it is a startling metallic-blue colour, sausage-shaped with many black seeds in the white pulp. The fruit can be up to 8cm long and 5cm wide[266].

dwatta The roots and stems are used medicinally[266].

nrakta E. Asia - Himalayas to C. China. ksacta Scrub and gorges, 600 - 1800 metres in W. Hubei. Mixed forest on mountain slopes, edge of forests, hillsides, along valleys and by streams at elevations of 1000 - 2700 metres

propta Seed - we have no details on this species but suggest sowing the seed as soon as it is ripe if this is possible, otherwise as soon as you obtain it, in a warm greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of softwood[1]. Cuttings of half-ripe wood in late summer or autumn[188]. Layering.

nwatta Easily grown in any fertile soil in sun or part shade[182, 200]. Plants grow best on a shady wall or when grown into a tree[200]. They succeed in sun or deep shade,

suckers in late spring and plant out in their permanent position 12 months later.

nwatta Requires a rich moist but well-drained soil in a sunny sheltered position[188, 231], especially from the cold drying winds of the north and east[11]. Individual leaves live for about 3 years and, if they are damaged by wind will make the plant look very shabby as well as reducing its potential for photosynthesis[231]. Hardy in the southern part of Britain, tolerating frosts down to between -5 and -10°c if the plant is sheltered from cold winds[200, 260]. Young plants require protection during winter[11]. Palms usually have deep penetrating root systems and generally establish best when planted out at a young stage. However, older plants are substantially more cold tolerant than juvenile plants[231]. In areas at the limit of their cold tolerance, therefore, it is prudent to grow the plants in containers for some years, giving them winter protection, and only planting them into their permanent positions when sheer size dictates[231]. Palms can also be transplanted even when very large. Although the thick fleshy roots are easily damaged and/or desiccated, new roots are generally freely produced. It is important to stake the plant very firmly to prevent rock, and also to give it plenty of water until re-established - removing many of the leaves can also help[231]. Very closely related to T. fortunei, one of the main differences being that, unlike T. fortunei, the fibres from the leaf stalks do not persist on this species[231]. The plant is also slower growing, though it is eventually much taller than T. fortunei[260]. Dioecious. Male and female plants must be grown if seed is required.

### 8.2.224 Liriope minor

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Liriope minor is an evergreen Perennial growing to  $0.3\ m$  (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: RootEdible Uses: The following use is reported for L. graminifolia, but there is a lot of confusion between members of this genus (compare [58] and [200]) and it is quite possible that the root of this species is also used[K]. Root - cooked[105, 177, 179]. Candied and used medicinally[61]. The root has a fleshy, tuberous part near tip[266]. Rich in mucilage, the root also contains about 1.6% protein, 0.5% fat, 80% carbohydrate and 2.3% ash[179].

tcanta A good drought tolerant evergreen ground cover plant[200].

dwatta Aphrodisiac Pectoral StimulantThe root is aphrodisiac, pectoral and stimulant[61].

nrakta E. Asia - China, Japan. ksacta Lowland and foothills all over Japan[58]. Forests, shady hillsides and grassy slopes at elevations of 600 - 2600 metres[266].

propta Seed - we have no information on this species but suggest sowing it in a cold frame or greenhouse as soon as the seed is ripe if possible, if not then sowing the stored seed in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a sandy soil[1]. Succeeds in full sun so long as the soil does not dry out in the summer, otherwise it should be grown in partial shade in any moderately fertile well-drained soil[200]. Not very hardy in Britain, it is best to give the plants some protection in the winter[1]. Closely related to L. muscari[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 8.2.225 Bolax gummifera

Bolax

7 tlin 8 cyuc 2 kcak 0 tcan 1 dwat m hkuc htut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Bolax gummifera is an evergreen Perennial at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to July. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: RootEdible Uses: Root - raw or roasted[69].

tcanta Plants can be used for ground cover, forming a very dense carpet of growth[208].

dwatta Antispasmodic DeobstruentAn oleo-resin obtained from incisions made at the base of the main stem is antispasmodic and deobstruent[4].

nrakta Southern S. America ksacta Cliffs and rocks, open scrub and heath, forest margins and clearings, feldmark, to 900 metres[69].

propta Seed - it may be best to sow the seed as soon as it is ripe in a greenhouse and plant out in late spring. Stored seed should be sown in late winter in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division of rooting rosettes in the summer[188]

nwatta Landscape Uses:Container, Ground cover, Massing, Rock garden. Requires a position in full sun in a well-drained gritty humus-rich soil[188, 200]. A cushion plant up to 1.2m in diameter[69], it is often included in the genus Azorella[188]. Plants rarely flower in cultivation[188]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

#### 8.2.226 Sabal etonia

Scrub Palmetto

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sabal etonia is an evergreen Shrub growing to 3 m (9ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta The fruit is a small dry berry with a thin sweet flesh[229]. The fruit is up to 13mm long and 15mm wide, with a seed up to 6.7mm long and 10mm wide[270]. Although we have seen no records of edibility for this species, the following uses are for the related S. palmetto. They quite probably also apply here[K]. Fruit - raw or cooked[2]. Sweet and pleasant[2]. A nourishing food, though it is said to be an acquired taste[2]. The fruit is up to 12mm long and 3mm wide[200]. Young leaves - raw or cooked. An excellent food[2]. Sap - sweet[2].

tcanta Fibre TanninThe following reports are for S. palmetto. They quite probably also apply to this species[K]. An excellent fibre is obtained from the leaf stalks[171]. The best quality is from young leaf stalks still in the bud, whilst coarser material is obtained from older leaves or the bases of old leaf stalks surrounding the bud[171]. The fibres are up to 50cm long, they are harvested commercially and used to make brushes, especially where these have to remain stiff in hot water or caustics[171]. The roots contain tannin[171].

drutta Liquidambar orientalis is a deciduous Tree growing to 10 m (32ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower in May, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: GumA chewing gum and a stabilizer for cakes etc are obtained from the resin[177]. This resin is also used to flavour baked foods etc[183].

tcanta Gum Incense Parasiticide Resin WoodThe aromatic resin 'Storax' is obtained from the trunk of this tree[57, 64]. It forms in cavities of the bark and also exudes naturally. It is harvested in autumn. Production can be stimulated by beating the trunk in the spring[171, 238]. The resin has a wide range of uses including medicinal, incense, perfumery, soaps etc. It is also used as a parasiticide[46, 61]. Liquid storax gives greater permanence to the odours of flowers extracted by maceration[245]. It is also used in the imitation of other scents as an alternative to vanilla, ambergris and benzoin, or to complement them[245]. The aromatic bark is burnt as an incense[245].

dwatta Antibacterial Antidote Antiinflammatory Parasiticide Pectoral Salve Stimulant VulneraryA resin obtained from the wood and inner bark acts both as an irritant and an expectorant within the respiratory tract. It is one of the ingredients of 'Friar's Balsam', an expectorant mixture that is inhaled to stimulate a productive cough[254]. Externally it is applied to the skin to treat a range of diseases [254]. The resin is also mixed with Hamamelis virginiana and Rose water to make an astringent face lotion[254]. The resin is antibacterial, anti-inflammatory, antiseptic, expectorant, pectoral, salve and stimulant[46, 57, 61, 176, 218, 238]. It is taken internally in the treatment of strokes, infantile convulsions, coma, heart disease and pruritis[238]. It is also used in the treatment of cancer[218]. Externally it is mixed with oil and used to treat scabies, wounds, ulcers etc[238, 254]. The bark is harvested in the autumn and the resin extracted from the bark[254]. The leaves, fruits and roots are used in similar ways to the resin[238] and are also considered to be antidote, parasiticide and vulnerary[218].

nrakta W. Asia. ksacta Flood plains, marshy places and valley sides near streams to elevations of 1800 metres in Turkev[93].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. Harvest the seed capsules at the end of October or November, dry in a warm place and extract the seed by shaking the capsule. Stored seed requires 1 - 3 months stratification and sometimes takes 2 years to germinate. Sow it as early in the year as possible. Germination rates are often poor. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame or greenhouse for their first winter. Since they resent root disturbance, it is best to plant them out into their permanent positions in early summer of their second year and give them some protection from cold for their first winter outdoors[K]. Cuttings of half-ripe wood, July/August in a frame. Suckers in early spring. Layering in October/November. Takes 12 months.

nwatta Prefers a moist but not swampy loam in a sheltered position[1, 200]. Prefers a neutral to acid soil[130]. Grows poorly on shallow soils overlying chalk[188]. Plants can be grown in full sun so long as the soil is not dry hungry and shallow[130]. Young plants are susceptible to damage from late frosts[11, 130, 200]. Mature plants are fully hardy but prefer a hotter climate if they are to do well[11]. Plants rarely, if ever, flower in Britain[11]. They rarely flower in climatic zones colder than zone 7[200]. An aromatic gum exudes from the trunk. The fragrance is also present to some extent in the leaves, especially if they are bruised[245]. This species resents root disturbance, young plants should be potgrown and be placed in their permanent positions as soon as possible[200]. A slow growing plant[1].

### 8.2.184 Docynia delavayi

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Docynia delavayi is an evergreen Tree growing to 10 m (32ft) by 10 m (32ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw, cooked or used in preserves[177]. When ripe it is like an apple[183]. The fruit is about 4cm in diameter[200].

tcanta Fruit ripeningThe fruits of this plant are used to promote the ripening of persimmons, Diospyros kaki. The fruits of each species are placed in alternate layers in a large container, they are then covered with rice husks and in 10 hours the persimmons are ready for eating[61, 105, 183].

nrakta E. Asia - China. ksacta Riversides in valleys, mixed forests and mountainous areas at elevations of 1000 - 3000 metres in W Guizhou, W Sichuan and NW Yunnan Provinces[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Requires a well-drained soil in a sunny position[200]. This species is only hardy in the milder areas of Britain[1], it succeeds outdoors at Wisley just west of London[11]. The genus is closely related to the quince, Cydonia oblonga[200].

### 8.2.185 Arbutus canariensis

Canary Madrona

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Arbutus canariensis is an evergreen Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta Edible Parts: FruitEdible Uses: The fruit is made into a sweetmeat[2, 183].

nrakta Canary Isles. ksacta Not known

propta Seed - best surface sown in a cold frame as soon as it is ripe. Stored seed should be soaked for 5 - 6 days in warm water and then surface sown in a shady position in a greenhouse[78]. Do not allow the compost to become dry. 6 weeks cold stratification helps[134]. The seed usually germinates well in 2 - 3 months at 20°c[134]. Seedlings are prone to damp off[184], they are best transplanted to individual pots as soon as they are large enough to handle and should be kept well ventilated. Grow them on in a greenhouse for their first winter and then plant out in late spring after the last expected frosts[K]. Basal cuttings in late winter[200]. Cuttings of mature wood of the current season's growth, November/December in a frame. Poor percentage[78]. Layering of young wood - can take 2 years[1, 200].

nwatta Requires a lime-free nutrient-rich well-drained moisture-retentive soil in sun or semi-shade and shelter from cold drying winds, especially when young[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200].

### 8.2.186 Cornus chinensis

7 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Cornus chinensis is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from February to March, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: The following notes refer to the closely related species C. officinalis, they probably also apply to this species[K]:- Fruit - raw or cooked[105, 177]. The fully ripe fruit is quite pleasant but slightly astringent[K]. It is about 1.5cm long[200]. The fruit contains about 8.6% sugars, 2.9% malic acid, 0.74% ash[179].

dwatta Antibacterial Antifungal Antiperiodic Antiseptic Antitumor Astringent Diuretic Hepatic Hypotensive Malaria Tonic UrinaryThe fruit is used medicinally for similar treatments as Cornus officinalis[266]. These are:- Shan Zhu Yu has been used for at least 2,000 years in Chinese herbal medicine. It is a herb that "stabilizes and binds" and is used principally to reduce heavy menstrual bleeding and unusually active secretions including copious sweating, excessive urine, spermatorrhoea and premature ejaculation[147, 238, 254]. Like all herbs that suppress bodily fluids (even excessive ones), it will simply prolong or lead to a worsening of symptoms if it is used without tonic or detoxifying herbs[254]. It is, therefore, normally used in combination with herbs such as Rehmannia glutinosa and is an ingredient of the "Pill of eight ingredients" which is used in China to "warm up and invigorate the yang of the loins" [254]. The fruit is antibacterial, antifungal, hypotensive, antitumor, astringent, diuretic, hepatic and tonic[116, 147, 176, 178, 238]. The fruit, without the seed, is decocted for the treatment of arthritis, fever and a wide range of other ailments[218]. It is used in the treatment of senile lumbago, diabetes, cystitis, tinnitus etc[174, 254]. The fruit has an antibacterial action, inhibiting the growth of Bacillus dysenteriae and Staphylococcus[176]. The fruit is harvested when fully ripe and is dried for later use[238]. The stem bark is astringent, antimalarial and tonic[218]. The plant is antibacterial, diuretic, hypotensive and a urinary antiseptic[218].

nrakta E. Asia - C. and S. China. ksacta Slopes, margins of mixed forests and dense forests at elevations of 700 - 2500, occasionally to 3500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame or in an outdoors seedbed if there is sufficient seed[80, 1131. The seed must be separated from the fruit flesh since this contains germination inhibitors[80, 164]. Stored seed should be cold stratified for 3 - 4 months and sown as early as possible in the year[164]. Scarification may also help as may a period of warm stratification before the cold stratification[80, 164]. Germination, especially of stored seed, can be very slow, taking 18 months or more[164]. Prick out the seedlings of cold-frame sown seeds into individual pots as soon as they are large enough to handle and grow the plants on for their first winter in a greenhouse, planting out in the spring after the last expected frosts. Cuttings of half-ripe side shoots, July/August in a frame. Cuttings of mature wood of the current year's growth, taken with a heel if possible, autumn in a cold frame. High percentage [78]. Layering of new growth in June/July. Takes 9 months[78].

nwatta An easily grown plant, it succeeds in any soil of good or moderate fertility[1], ranging from acid to shallow chalk[200]. Grows well in heavy clay soils. Succeeds in full sun or light shade[[188]. Prefers semi-shade[219]. Plants are not very cold-tolerant, they succeed outdoors only in the milder areas of the country where winter temperatures do not fall below about -5°c[11, 200]. A specimen growing in a fairly open sunny position at Kew Gardens in April 1999 was about 10 years old and 2 metres tall. It had no sign of flowers, though it is obviously more cold hardy than believed since it has already tolerated temperatures rather lower than 5°c[K]. This species is very closely related to C. mas and C. officinalis, differing mainly in having black instead of red fruit[11, 200]. Plants in this genus are notably resistant to honey fungus[200].

### 8.2.187 Corvlus ferox

Himalayan Hazel, Tibetan hazelnut

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Corylus ferox is a deciduous Tree growing to 10 m (32ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw or cooked[146, 177, 272]. Small with a thick shell, the seed atsets like the common filbert, C. maxima[2, 183]. The seed ripens in mid to late autumn and will probably need to be protected from squirrels[K]. When kept in a cool place, and not shelled, the seed should store for at least 12 months[K]. An edible oil is obtained from the seed.

tcanta Oil WoodWood - soft, even grained[146].

nrakta E. Asia - Himalayas from C. Nepal to S.W. China. ksacta Forests, 2400 - 3000 metres in the Himalayas[51]. Forests on mountain slopes at elevations of 1500 - 3800 metres in western China[266].

propta Seed - best sown as soon as it is harvested in autumn in a cold frame[164]. Germinates in late winter or spring. Stored seed should be pre-soaked in warm water for 48 hours and then given 2 weeks warm followed by 3- 4 months cold stratification[164]. Germinates in 1- 6 months at  $20^{\circ}c[164]$ . When large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame or sheltered place outdoors for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Layering in autumn. Easy, it takes about 6 months[78, 200]. Division of suckers in early spring. Very easy, they can be planted out straight into their permanent positions.

nwatta An easily grown plant, it succeeds in most soils, but is in general more productive of seeds when grown on soils of moderate fertility[11, 200]. It does less well in rich heavy soils or poor ones[11, 63]. Does well in a loamy soil[11]. Very suitable for an alkaline soil[11], but it dislikes very acid soils[17]. Plants are fairly wind tolerant[1, 11]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Members of this genus bear transplanting well and can be easily moved even when relatively large[11].

### 8.2.188 Himalayacalamus hookerianus

Padano

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 9 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Himalayacalamus hookerianus is an evergreen Bamboo growing to 9 m (29ft 6in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed - cooked whole or ground into a powder and used as a cereal[214]. Plants flower at intervals of about 50 years, they flower and produce fertile seed abundantly in British gardens[214].

tcanta Basketry Soil stabilization WeavingThe older stems are harvested for weaving into baskets and mats[214]. The canes can be up to 3cm in diameter and, with the long gaps between nodes, produce a high-quality weaving material[220, 272]. A very effective plant for stabilising soil on steep slopes[267].

nrakta E. Asia - Himalayas from E. Nepal to Sikkim and Bhutan. ksacta Cool broad-leaved forests, 2000 - 2500 metres[220]. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 - 6 months. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings.

nwatta Prefers an open loam of reasonable quality and plenty of moisture in the growing season[1]. Requires a sheltered position[25]. A very ornamental plant[1], it is only reliably hardy in the milder areas of Britain[1, 11, 25, 162], tolerating temperatures down to about -6°c. In most parts of the country it is best grown in a conservatory. This species is notably resistant to honey fungus[200]. Plants flower quite frequently in Britain and often produce viable seed[11]. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rootstock is caespitose, new shoots are produced from late Mav[25].

### 8.2.221 Neillia thyrsiflora

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Neillia thyrsiflora is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - eaten when fully ripe[272].

nrakta E. Asia - Himalayas to western China, Burma and south to Indonesia. ksacta Exposed slopes along streams at elevations of 1600 - 2100 metres in Nepal[272]. In bushes at elevations of 1000 - 3000 metres in NW Yunnan, China[266].

propta Seed - sow late winter or early spring in a warm grenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a semi-shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings in early summer[200]. Semi-ripe cuttings in the summer in a closed frame with botom heat[200]. Division of suckers in the autumn[200].

nwatta Prefers a moist, well aerated soil in a sunny or partly shaded position[200]. This species is nt very winter hardy, tolerating temperatures down to about -5 c. It succeeds outdoors in the milder areas of Britain[200]. Unlike other members of this genus, this species flowers on the current season's growth and so any pruning is best carried out in late winter or early spring[200].

### 8.2.222 Billardiera scandens

Common Appleberry 7 tlin 10 cyuc 2 kocak 0 tcan 0 dwat 3 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flat hpa7tmwatli xre7t hionli

drutta Billardiera scandens is an evergreen Climber growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105, 154]. Unripe fruits can be roasted[193]. A pleasant sub-acid flavour akin to dried apples[2, 144]. Tastes like kiwi fruits (Actinidia deliciosa)[193]. The fruits are up to 2.5cm long[193].

nrakta Australia - New South Wales, Queensland, South Australia, Tasmania, Victoria. ksacta By mountain streams or scrub country in forests, by coasts and on tablelands[154].

propta Seed - best sown in a warm greenhouse as soon as it is ripe. Only just cover the seed. Sow stored seed in early spring in a warm greenhouse. The germination of fresh seed is usually prolific, but stored seed can take a year to germinate[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10 - 12cm with a heel, July/August in a frame. Fair percentage. Layering.

nwatta Requires a moist, well-drained, humus-rich, lime-free soil in sun or semi-shade with a cool root run[200]. This species usually requires greenhouse protection in Britain[1], but plants can succeed outdoors on a wall in mild areas of the country[166]. They tolerate temperatures down to at least -7°c[157] in Australian gardens but this cannot be translated directly to British gardens because of our cooler summers and longer, colder and wetter winters.

### 8.2.223 Trachycarpus martianus

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nvanhien hionli

drutta Trachycarpus martianus is an evergreen Tree growing to 12 m (39ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Fruit- raw or cooked The flesh is scanty and almost tasteless[2]. The following notes are for the closely related T. fortunei. They almost certainly also apply to this species[K]. Young flower buds - cooked[2, 105, 178]. Used like bamboo shoots[183]. The fresh flowers and terminal bud are also apparently consumed[183].

tcanta Fibre WeavingThe following notes are for the closely related T. fortunei. They almost certainly also apply to this species[K]. The fibres from within the leafstalk are used for making brushes, ropes, coarse cloth etc[231]. A matting is made from the bark admixed with some of the stem fibres[178]. The leaves are woven into hats, rough coats and fans[46, 61, 178].

dwatta Astringent Contraceptive HaemostaticThe following notes are for the closely related T. fortunei. They almost certainly also apply to this species[K]. The flowers and the seed are astringent and haemostatic[147, 218]. The root or the fruit is decocted as a contraceptive[147, 218]. The ashes from the silky hairs of the plant are haemostatic[147, 218]. Mixed with boiling water they are used in the treatment of haemopytsis, nose bleeds, haematemesis, blood in stools, metrorrhagia, gonorrhoea and other venereal diseases[147].

nrakta E. Asia - Himalayas from Nepal to S.W. China. ksacta Found at elevations to 2,400 metres, often on limestone soils[2,31].

propta Scarify or pre-soak the seed for 24 hours in warm water then sow in a cold frame in mid to late winter. Bring into the greenhouse about 4 - 6 weeks later and the seed should germinate in about 4 - 8 weeks at 25°c[133]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Consider giving the plants some protection from the cold for at least their first winter outdoors. Pot up

pots in a greenhouse. Good percentage[78]. Suckers, removed in late winter and planted into their permanent positions[113].

nwatta Landscape Uses:Border, Massing. Prefers a good deep well-drained moisture retentive soil in full sun or semi-shade[1, 11, 200]. Plants are hardy to at least -15°c[200]. The leaves are often persistent until the following spring when the new leaves are produced[82]. Diocious. Male and female plants must be grown if seed is required. Flowers are formed on the old wood[206]. Special Features:North American native, Attracts butterflies, Inconspicuous flowers or blooms.

### **8.2.219** Vitex agnus

Agnus Castus, Lilac chastetree, Vitex, Chastetree 7 tlin 9 cyuc 2 kcak 3 tcan 5 dwat 3 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vitex agnus-castus is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf from June to October, in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista Headache, abdominal cramps and diarrhoea, increased menstrual flow, rashes, pruritus[301].

kcakta Edible Parts: Edible Uses: CondimentThe fruit is used as a condiment, it is a pepper substitute[46, 61, 100, 183]. The aromatic leaves are also used as a spice[183, 227]. This plant forms one of the ingredients of the legendary Moroccan spice mixture 'ras el hanout'[183]. Unfortunately, the seed is very unlikely to be produced in Britain[K].

tcanta Basketry Dye Essential WoodA perfume is made from the flowers[227]. Young stems are used in basket making[46, 61, 100]. A yellow dye is obtained from the leaves, the seed and the roots[100, 148]. Wood - hard, close grained[146].

dwatta Anaphrodisiac Aphrodisiac Diaphoretic Diuretic Febrifuge Galactogogue Infertility Ophthalmic Sedative Stomachic Women's complaintsAgnus castus has been used for thousands of years for its beneficial affect on the female hormonal system. Modern research has confirmed this use, the seeds being used to restore balanced functioning to the female reproductive system[254]. The seeds and fruits are anaphrodisiac, aphrodisiac, galactogogue, ophthalmic, sedative, stomachic, women's complaints[89, 148, 165]. Prolonged usage restores corpus luteum function[165]. Unfortunately, the berries are unlikely to be produced in the British climate[K]. The berries of this plant have a range of medicinal actions but possibly the most important is its ability to rectify hormonal imbalances caused by an excess of oestrogen and an insufficiency of progesterone[224]. It acts upon the pituitary gland, reducing the production of certain hormones and increasing the production of others, shifting the balance in favour of the gestagens. Thus it has a wide application of uses in malfunctions of the feminine reproductive system and has been used with great effect in restoring absent menstruation, regulating heavy periods, restoring fertility when this is caused by hormonal imbalance, relieving pre-menstrual tension and easing the change of the menopause[224]. Some caution is advised since excessive doses can cause a nervous disorder known as formication, which manifests as a sensation of insects crawling over the skin[238]. The berries are considered to be an aphrodisiac[89], though other reports say that they are anaphrodisiac[11, 46]. The reason for this apparent disagreement is that the berries have a regulating effect on the body and so are likely to increase sexual activity in those who are not very active in this area whilst reducing it in those who are very active[K]. The fresh berries are pounded to a pulp and used in the form of a tincture for the relief of paralysis, pains in the limbs, weakness etc[4]. Other uses include: reduced flatulence, suppress appetite and induce sleep. Unproven uses include: treatment of impotence, prostatitis, swelling of the testes, sterility, swelling of the ovaries[301]. Not recommended during pregnancy and

could inhibit milk production[301]. The German Commission E Monographs, a therapeutic guide to herbal medicine approve Vitex agnus-castus for premenstrual syndrome, and menopausal complaints (see [302] for critics of commission F)

nrakta S. Europe. ksacta Damp places by streams and on the littoral[45].

propta Seed - sow March in a warm greenhouse. The seed does not need pre-treatment[113]. Germination is usually free and quick[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in early summer of the following year. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Good percentage[78]. Cuttings of mature wood of the current seasons growth, November in a cold frame[113].

nwatta Landscape Uses:Border, Container, Espalier, Pollard, Standard, Specimen. Prefers a light well-drained loamy soil in a warm sunny position sheltered from cold drying winds[49, 200]. Succeeds in dry soils. Intolerant of water-logging[202]. Hardy to about -10°c, this species only succeeds outdoors in the milder parts of Britain[1, 11]. though it grows well on a wall at Kew[11]. Plants only flower freely in a warm summer, so they are best grown against a sunny wall even in areas of the country where they are hardy[219]. The plants failed to open their flowers on our Cornish trial ground even after a very hot summer[K]. The flowers are produced so late in the season that they are unlikely to produce viable seed in this country even if they flower properly[K]. A very ornamental plant[1], there are some named varieties[219]. The whole plant is aromatic. the leaves and stems are strongly aromatic[182], the flowers are deliciously scented[245] and the dried seeds have a pungent lemony perfume[245]. This species has long been regarded as a symbol of chastity[46]. Flowers are produced at the ends of the current year's growth[202]. Any pruning is best carried out in the spring and should consist of cutting out dead wood and shortening last year's flowering branches[219]. Special Features: Fragrant foliage, Not North American native, Naturalizing, Attracts butterflies, Fragrant flowers, Attractive flowers or blooms. For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]

### 8.2.220 Drepanostachyum falcatum

lennis

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 3.5 m hkuc

hmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Drepanostachyum falcatum is an evergreen Bamboo growing to 3.5 m (11ft 6in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots - cooked[25]. Used as a vegetable[272]. They are also fermented and preserved in Nepal to form a dish called tama[272]. Tama is sour and has a very strong flavour, it is sometimes mixed in vegetable curries[272].

tcanta Basketry Soil stabilization WeavingThe canes are used for making hats, baskets, rods etc[46, 51, 61, 272]. The culms are not very straight, and they have rather swollen nodes, which make them not very suitable as a weaving material[220]. Nevertheless, they are still widely used for this purpose in the Himalayas[220]. They are also used in construction[195]. They are about 2cm in diameter[220]. The plant is used as a very effective soil stabilizer in Nepal[220].

nrakta E. Asia - Himalayas. ksacta Forms dense thickets in evergreen oak forests that are usually damp, to 3600 metres[11, 51].

propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. propta Seed - surface sow as soon as it is ripe in a greenhouse at about 20°c. Do not allow the compost to dry out. There is a degree of dormancy in the seed and it can take 1 - 8 months to germinate at 20 - 25°c, a cold pre-treatment might shorten this time[214]. Grow on in a lightly shaded place in the greenhouse until large enough to plant out. Seed is rarely available. Division in spring as new growth commences. Take divisions with at least three canes in the clump, trying to cause as little root disturbance to the main plant as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Basal cane cuttings.

nwatta Prefers a good loamy soil[214]. Succeeds in most soils so long as they do not dry out[200]. Dislikes drought[1]. Prefers a position sheltered from cold north and east winds[1]. The stems colour more brightly when grown in a sunny position[200], though the leaves curl up in bright sunlight[214]. Succeeds outdoors in a woodland garden in the milder parts of Britain[214]. Plants are intolerant of winter wet and of temperatures below about -6°c[200]. Plants are flowering freely (1993) in Kew and Edinburgh where they are producing abundant fertile seed[214]. This species is notably resistant to honey fungus[200]. There has been much confusion over this species and many plants cultivated under this name have proved to be different species[214]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering, but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122].

### 8.2.189 Arbutus texana

Texas Madrone

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flat hpa7tmwatli fyifxre7t hjonli

drutta Arbutus texana is an evergreen Tree growing to 8 m (26ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in March, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is polinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitÉdible Uses: Fruit - raw or cooked. A sweetish taste[149], the fruit has a dry mealy flesh[181]. It has narcotic properties[181]. The fruit is up to 1cm in diameter[229].

tcanta Charcoal Fuel WoodWood - heavy, hard, close grained. Used for small tools, mathematical instruments, rollers etc[82, 149]. It is a good fuel and also produces a fine grade of charcoal[149, 229].

dwatta AstringentThe bitter principles in the bark and leaves can be used as an astringent[229].

nrakta South-western N. America - Texas to New Mexico and south to Mexico. ksacta Dry limestone hills[82]. Chaparral and somewhat humid oak forests[181].

propta Seed - best surface sown in a cold frame as soon as it is ripe. Stored seed should be soaked for 5 - 6 days in warm water and then surface sown in a shady position in a greenhouse[78]. Do not allow the compost to become dry. 6 weeks cold stratification helps[134]. The seed usually germinates well in 2 - 3 months at 20°c[134]. Seedlings are prone to damp off[184], they are best transplanted to individual pots as soon as they are large enough to handle and should be kept well ventilated. Grow them on in a greenhouse for their first winter and then plant out in late spring after the last expected frosts[K]. Basal cuttings in late winter[200]. Cuttings of mature wood of the current season's growth, November/December in a frame. Poor percentage[78]. Layering of young wood - can take 2 years[1, 200].

nwatta Requires a lime-free nutrient-rich well-drained moisture-retentive soil in sun or semi-shade and shelter from cold drying winds, especially when young[200]. Succeeds on dry soils[82]. This species is unlikely to be hardy in the

colder areas of the country, it probably tolerates temperatures down to between -5 and -10°c[200]. There is some confusion over the name of this plant, some books suggest that A texana is a synonym of A xalapensis. HBK. whilst others say that A texana exists in its own right and has a synonym of A xalapensis. non HBK[11, 149, 200]. A. texana is very closely related to A. xalapense and is considered by many botanists to be indistinguishable from that species[274].

### 8.2.190 Gynostemma pentaphyllum

Sweet Tea Vine

7 tlin 10 cyuc 2 kcak 0 tcan 5 dwat 8 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Gynostemma pentaphyllum is a AN-NUAL/PERENNIAL growing to 8 m (26ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf from May to October, in flower from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaLeaves and young stems - cooked[105, 177, 183]. The leaves have a sweet taste and are used as a tea[105, 177, 183].

tcanta CosmeticThe plant is used in proprietary preparations for cosmetics and anti-ageing tonics[238].

dwatta Alterative Anticholesterolemic Antispasmodic Hepatic Hypoglycaemic Sedative TonicThe whole plant is a tonic herb that improves the circulation, stimulates liver function, strengthens the immune and nervous systems, and reduces blood sugar and cholesterol levels[238]. It also has sedative effects, relieving spasms and lowering the blood pressure[238]. It is used internally in the treatment of nervous tension and exhaustion, peptic ulcer, asthma, bronchitis, diabetes, cardiovascular disease and cancer[238]. It was rated among the ten most important tonic herbs at a conference on traditional medicines in Beijing in 1991[238].

nrakta E. Asia - China, Japan, Korea. ksacta Thickets in open forests in lowland all over Japan[58, 275]. Forest, thickets or road sides on mountain slopes at elevations of 300 - 3200 metres in China[266].

propta Pre-soak the seed for 24 hours in warm water and then sow it in spring in a rich compost in a greenhouse, placing 2 - 3 seeds per pot. Thin the seedlings to the strongest in each pot and grow the plants on fast. Plant them out after the last expected frosts and protect them with a frame or cloche until they are growing away well.

nwatta Requires a rich well-drained but moisture-retentive soil in a warm sheltered position in partial shade[238]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. A problematic crop outdoors in Britain, it can be grown successfully as an annual in a greenhouse but requires a long hot summer if it is to do well outdoors. Plants tend to be annuals or short-lived perennials[238]. A climbing plant, attaching itself to supports by means of tendrils[238]. Dioecious, male and female plants must be grown if seed is required. Some plants might be monoecious[200].

#### 8.2.191 Prunus campanulata

Taiwan Cherry

7 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Prunus campanulata is a deciduous Tree growing to 7 m (23ft) by 7 m (23ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from April to May, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers

well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Fruit SeedEdible Uses: Fruit - raw or cooked. A cherry[11], it is edible if the astringency is removed[177]. The fruit is about 11mm in diameter and contains one large seed[200]. Seed - raw or cooked. Do not eat the seed if it is too bitter - see the notes above on toxicity.

tcanta DyeA green dye can be obtained from the leaves[168]. A dark grey to green dye can be obtained from the fruit[168]

dwatta Although no specific mention has been seen for this species, all members of the genus contain amygdalin and prunasin, substances which break down in water to form hydrocyanic acid (cyanide or prussic acid). In small amounts this exceedingly poisonous compound stimulates respiration, improves digestion and gives a sense of well-being[238].

nrakta E. Asia - S. China, S. Japan. ksacta Hill forests below 600 metres[260]. Forests in ravines, forest margins at elevations of 100 - 1300 metres[266].

propta Seed - requires 2 - 3 months cold stratification and is best sown in a cold frame as soon as it is ripe[200]. Sow stored seed in a cold frame as early in the year as possible[200]. Protect the seed from mice etc. The seed can be rather slow, sometimes taking 18 months to germinate[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a greenhouse or cold frame for their first winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood with a heel, July/August in a frame[11, 200]. Softwood cuttings from strongly growing plants in spring to early summer in a frame[200]. Layering in spring.

nwatta Landscape Uses:Specimen. Thrives in a welldrained moisture-retentive loamy soil[11, 200]. Prefers some lime in the soil but is likely to become chlorotic if too much lime is present[1]. Succeeds in sun or partial shade though it fruits better in a sunny position[11, 200]. This species is not very hardy in Britain, though it succeeds outdoors in the milder areas of the country[11]. When fully dormant, it probably tolerates temperatures down to about -10 to -15°c[200]. This species grows well in areas that are too warm for other species of flowering cherries[260]. Most members of this genus are shallow-rooted and will produce suckers if the roots are damaged[238]. A very ornamental plant[1], there are several named varieties[200]. Closely related to P. cerasoides[109]. Plants in this genus are notably susceptible to honey fungus[200]. Special Features: Not North American native. All or parts of this plant are poisonous. Blooms are very showy.

### 8.2.192 Camellia pitardii

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli fyifxre7t hjonli

drutta Camellia pitardii is an evergreen Shrub growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta Edible Parts: OilEdible Uses: OilAn oil obtained from the seed is used in cooking[177].

nrakta E. Asia - China. ksacta Forests and thickets, on slopes and by rivers, 1000 - 2800 metres in Yunnan [180, 266].

propta Seed - can be sown as soon as it is ripe in a greenhouse[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1-3 months at  $23^{\circ} \text{c}[138]$ . Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10-15cm with a heel, August/September in a shaded frame. High percentage but slow[78]. Cuttings of firm wood, 7-10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leaf-bud cuttings, July/August in a frame.

nwatta Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1, 11, 200]. A calcifuge pant, preferring a pH between 5 and 7[11, 200]. Prefers the partial shade of a light woodland[200]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200]. This species is closely related to C. reticulata[11]. This plant is sometimes cultivated in Asia for the edible oil in its seed.

### 8.2.193 Pittosporum tenuifolium

Tawhiwhi

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 7 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Pittosporum tenuifolium is an evergreen Tree growing to 7 m (23ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista This plant contains saponins[152, 154]. Saponins are found in many foods, such as some beans, and although they are fairly toxic to people they are poorly absorbed by the body and most pass straight through without any problem. They are also broken down if the food is thoroughly cooked for a long time. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: Edible Uses: GumGum - fragrant. It is obtained by bruising the bark or by incision[128, 173].

tcanta Gum Hedge HedgeVery tolerant of trimming, plants can be grown as a formal or informal hedge in exposed maritime areas, though they do not stand extreme exposure[11, 75, 200]. When grown as a formal hedge it is best trimmed in spring, though this will mean that the plant will not produce many flowers[245]. A compromise is to only trim the hedge every other year[245].

nrakta New Zealand. ksacta Coastal to lower montane forests, North and South Islands, especially from North Cape and southwards[44].

propta Seed - sow when ripe in the autumn or in late winter in a warm greenhouse[78, 200]. The seed usually germinates freely. Prick out the seedlings into individual pots when they are large enough to handle, move the plants to a cold frame as soon as they are established and plant out late in the following spring[78]. Consider giving them some protection from the cold during their first winter outdoors. Cuttings of half-ripe wood, 5 - 7cm with a heel, July/August in a frame. Poor to fair percentage[78]. Basal ripewood cuttings late autumn in a cold frame[200].

nwatta Succeeds in most well-drained soils of reasonably good quality in full sun or light shade[1, 200]. Succeeds in dry soils. Fairly tolerant of maritime exposure[75, 182], but it can be killed by cold winds[184]. Hardy to about -10°c[184], it is tender outside the milder areas of Britain, but often self-sows when happy. Plants have reached a height of 9 metres in a sheltered position in eastern England[11]. A very ornamental plant[1], there are many named

they are growing away well. Plant them out in the summer or the following spring.

nwatta Prefers a cool moist well-drained humus-rich soil in partial or dappled shade and protection from scorching winds. Tolerates sandstone and limestone soils but becomes chlorotic if the pH is too high. Prefers a pH between 6 and 6.5[200]. Plants are not very hardy in Britain, though they should succeed outdoors in the milder areas of the country[1]. Plants grow and flower during the winter and early spring in California, dying down in the summer[1]. All members of this genus have more or less edible leaves and flower buds, though those species, such as this one, that have yellow flowers can cause diarrhoea if eaten in large quantities[62, 85, 159].

## 8.2.217 Chimonanthus praecox

Winter Sweet

7 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Chimonanthus praecox is a deciduous Shrub growing to 3 m (9ft) by 3 m (9ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from November to March, and the seeds ripen from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers - thoroughly boiled and then washed[179]. Eaten with oil and salt[177, 183]. The flower petals are used to flavour and scent tea[183].

tcanta Essential WoodThe flowers are very fragrant, they are used in pot-pourri and to make perfumes[1, 46, 61]. The wood, after soaking in water, polishes to a brilliant black finish[178].

dwatta Antiphlogistic Antirheumatic SialagogueThe flowers and flower buds contain 0.5 - 0.6% essential oils comprising benzylalcohol, benzyl acetate, linalcol, terpineol and indole[266]. They are sialagogue[178, 218]. The flowers are used in the treatment of thirst and depression whilst the essential oil is used to treat colds[266]. The leaves and roots can be used in the treatment of contusions, cuts, haemorrhages, strains, lumbago, rheumatism, numbness and colds[266].

nrakta E. Asia - China. ksacta Cliffs in glens and gorges of Ichang province, 30 - 3000 metres[109]. Mountain forests at elevations of 500 - 1,100 metres[266]. Also found in Sichuan, Hubei and Chekiang.

propta Seed - best sown as soon as it is ripe in a cold frame[78, 200]. Pre-soak stored seed in tepid water for two hours, keep warm and moist for 3 days then chill for 5 - 8 weeks and sow in a cold frame[164]. Germination is usually good, though it is often slow and erratic, and takes place in 2 months or more at 13°c[78, 164]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Extremely difficult to root[11]. Layering in spring[200] or in July/August[78]. Takes 9 months[78]. Fair to good percentage[78].

nvatta Landscape Uses: Border, Espalier, Foundation, Massing. Requires a good soil in a sunny sheltered position[164, 200]. Badly drained or compacted soils may cause blotching or yellowing of the leaves[200]. Succeeds in most soils but it seems most at home on chalky ones[219]. A very ornamental plant[1], it is hardy to about -25°c[184]. It is best grown on a sunny wall, however, in order to protect the flowers and induce heavier flowering[11]. The flowers are very fragrant[182], but the plant can be very sparse flowering after cool summers[184]. Plants have a moderate rate of growth[202]. Plants take 5 - 12 years to flower from seed[182, 200]. The var. 'Grandiflorus' comes true from seed and has larger flowers than the type[78]. Plants flower profusely when established and left unpruned[219], if any prung ing is necessary then it is best done immediately after flow-

ering[184, 219]. The flowers are produced on the leaf axils of wood 3 - 4 years old[202]. The flowers emit a powerful sweet fragrance which can be smelt 50 yards away. The smell is like jonquil and violets[245]. When the fragrance is inhaled close to for any length of time the smell seems to disappear[245]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Not North American native, Fragrant flowers, Attractive flowers or blooms.

### 8.2.218 Zanthoxylum clava

Hercules Club. Prickly Ash - Southern, Hercules' club, Southern Prickly Ash

7 tlin 11 cyuc 2 kcak 0 tcan 3 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Zanthoxylum clava-herculis is a deciduous Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf from March to January, in flower from May to June, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Absorption of gut iron reduced. sun sensitivity, bruising and bleeding. May interfere with cardiac glycoside therapy. May interfere with blood clotting drugs [301].

kcakta The following report is for Z. americanum, it is probably also applicable to this species[K]. Seed - used as a condiment. A pepper substitute[106]. The fruit is rather small, about 4 - 5m in diameter[229], but is produced in dense clusters which makes harvesting easy[K]. Each fruit contains a single seed[229].

tcanta Wood - light, soft, weak and close-grained[82, 229]. It weighs 31lb per cubic foot[227]. Too small for commercial use[229].

dwatta Antirheumatic Antispasmodic Diuretic Dysentery Irritant Odontalgic StimulantThis species is guite widely used in herbal medicine, it has the same properties as Z. americanum, but is said to be more active[4]. All parts of the plant, but especially the bark and roots, contain the aromatic bitter oil xanthoxylin[4]. This has a number of applications in medicine[4]. The fruit has a similar medicinal action to the bark[4]. The bark and roots are irritant, odontalgic and antirheumatic[213]. Along with the fruit they are diaphoretic, stimulant and a useful tonic in debilitated conditions of the stomach and digestive organs[4]. They produce arterial excitement and are of use in the treatment of fevers, ague, poor circulation etc[4]. The fruits are considered more active than the bark, they are also antispasmodic, carminative, diuretic and antirheumatic[4, 213, 222]. The pulverized root and bark are used to ease the pain of toothache[213, 222]. One report says that it is very efficacious, but the sensation of the acrid bark is fully as unpleasant as the toothache[213]. Chewing the bark induces copious salivation[222]. Rubbing the fruit against the skin, especially on the lips or in the mouth, produces a temporary loss of sensation[K]. A tea or tincture of the bark has been used in the treatment of rheumatism, dyspepsia, dysentery, heart and kidney troubles etc[222]. A tea made from the inner bark has been used to treat itchy skin[213].

nrakta South-eastern N. America - Virginia to Florida, west to Texas and Arkansas. ksacta Usually found as scattered trees near the coast in light sandy soils, often on bluffs of islands, river banks or dunes[229]. Best growth is from plants in most rich soils with good drainage[229].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Stored seed may requires up to 3 months cold stratification, though scarification may also help[113]. Sow stored seed in a cold frame as early in the year as possible. Germination should take place in late spring, though it might take another 12 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a cold frame for their first winter. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, 3cm long, planted horizontally in

their first few winters outdoors. Cuttings of half-ripe wood, July/August in a frame. Layering in October.

nwatta Prefers a moderately heavy loam with a generous amount of compost and sand added and a very sunny position[1, 200]. When growing plants in pots, a compost comprising equal quantities of loam and leafmould plus a little charcoal should produce good results[260]. Do not use manure since Citrus species dislike it[260]. When watering pot plants it is important to neither overwater or underwater since the plant will soon complain by turning yellow and dying. Water only when the compost is almost dry, but do not allow it to become completely dry[260]. Reasonably cold resistant, dormant plants can tolerate temperatures down to about -10°c, especially if they are grafted onto a Poncirus trifoliata rootstock[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. A group of hybrids of garden origin. Poncirus trifoliata x Citrus paradisi[183]. Generally, these hybrids combine the qualities of cold hardiness and bitterness from Poncirus trifoliata with the larger fruits of the grapefruit. Citrus paradisi[183]. They are occasionally cultivated for their edible fruit, but more usually for their use as a rootstock, there are some named varieties[183, 200].

### 8.2.214 Gaultheria macrostigma

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat m hkuc hmim cyutli tcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli nyanhjen hjonli

drutta Gaultheria macrostigma is an evergreen Shrub growing to 0.5 m (1ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semishade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[173]. Fairly large[182]. The fruit is about 6mm in diameter[200].

tcanta A good ground cover for sun or light shade.

nrakta New Zealand. ksacta Montane to lower subalpine open grassland and rocky places in North South and Stewart Islands from 39° and southwards[44].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and surface sow in a lime-free compost in a shady part of the greenhouse and keep moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. Watering them with care and making sure you give them plenty of ventilation will reduce this risk. Watering them with a garlic infusion can also help to prevent this[K]. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring just before new growth begins. 'Drop' the plants 12 months earlier by digging them up and replanting them deeper in the soil so that the branches are buried and can form roots. This works best in a sandy soil[78]. It is best to pot up the divisions and grow them on in light shade in a greenhouse until they are established. Plant them out in the summer. Layering in September/October. Takes 12 months[78].

nwatta Requires a light well-drained lime-free soil[1]. The plant can make a good nesting place for mice, these mice he eat the bark of the stems in winter causing die-back. Dioecious. Male and female plants must usually be grown if seed is required. This species, however, does not need a male pollinator in order to fruit well. It also hybridizes freely in the wild with other members of this genus[11]. Plants in this genus are notably resistant to honey fungus[2001.

### 8.2.215 Iuniperus tetragona

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus tetragona is an evergreen Tree. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. A sweet resinous flesh[181]. The fruits are about 12mm in diameter[2].

tcanta WoodWood - brown, hard. Used for construction etc[61]

nrakta South-western N. America - Texas to Mexico. ksacta Pine-oak forests in mountains, to 4500 metres in Mexico[181]

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1] and succeeding on chalk[200]. A drought tolerant plant once established, succeeding in hot dry positions[200]. This species is not very hardy in Britain[1]. Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.216 Viola pedunculata

Grass Pansy, Johnny-jump-up 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Viola pedunculata is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: TeaYoung leaves and flower buds - raw or cooked[105, 161, 177]. When added to soup they thicken it in much the same way as okra[85, 159]. The leaves are best harvested before the flowers open in the spring[257]. Some caution is advised, the yellow flowers of this species can cause diarrhoea if eaten in large quantities[62]. A tea can be made from the leaves[85].

nrakta South-western N. America - California. ksacta Grassy slopes below 450 metres[71].

propta Seed - best sown in the autumn in a cold frame. Sow stored seed in early spring in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in the summer. Division in the autumn or just after flowering. Larger divisions can be planted out direct into their permanent positions, though we have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until

varieties[200]. Very amenable to pruning, plants can be cut right back into old wood if required[200]. The species in this genus are very likely to hybridize with other members of the genus[200]. When growing a species from seed it is important to ensure that the seed either comes from a known wild source, or from isolated specimens in cultivation. Plants are widely cultivated for their foliage which lasts a long time in water and is used in flower arranging[11, 75]. The flowers are honey-scented[188]. Plants in this genus are notably resistant to honey fungus[200].

### 8.2.194 Juglans californica

California Walnut, Southern California walnut 7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 6 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Juglans californica is a deciduous Tree growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardness. It is hardy to UK zone 8. It is in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Oil SeedEdible Uses: OilSeed - raw, cooked or used in pies, cakes, biscuits, confections etc[183]. A sweet flavour[229]. The seed is small with a thick shell but it makes good eating and is said to have a better flavour than Juglans nigra[183]. The seed is up to 15mm in diametr[229]. The seed ripens in late autumn and, when stored in its shell in a cool place, will keep for at least 6 months[K]. An edible oil is obtained from the seed, it tends to go rancid quickly.

tcanta Herbicide Oil Rootstock WoodThis species is sometimes used as a rootstock for the common walnut, Juglans regia[183]. Plants produce chemicals which can inhibit the growth of other plants. These chemicals are dissolved out of the leaves when it rains and are washed down to the ground below, reducing the growth of plants under the tree[18, 20, 159]. The roots of many members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. Wood - moderately coarse-grained. An attractive wood, but the frequent branching pattern of the trunk limits the use of this wood commercially[229]

dwatta Blood tonicAn infusion of the leaves is used to treat thin blood[257].

nrakta South-western N. America - California. ksacta Moist or dry gravelly soils along river courses and bottomlands[229]. Locally common in oak woods below 750 metres[71].

propta The seed is best sown as soon as it is ripe in individual deep pots in a cold frame[80]. You need to protect it from mice, birds, squirrels etc. The seed usually germinates in late winter or the spring. Plant out the seedlings into their permanent positions in early summer and give some protection from the cold for their first winter or two. The seed can also be stored in cool moist conditions (such s the salad compartment of a fridge) over the winter and sown in early spring but it may then require a period of cold stratification before it will germinate[78, 80].

nwatta Requires a deep well-drained loam and a sunny position sheltered from strong winds[1, 11]. Prefers a slightly alkaline soil[200]. Plants are not very hardy in Britain, tolerating temperatures down to between -5 and -10°c[200]. A fairly fast-growing tree in its native habitat, but guite short-lived, dying after about 125 - 150 years[229]. Plants produce a deep taproot and they are intolerant of root disturbance[1, 11]. Seedlings should be planted out into their permanent positions as soon as possible and given some protection since they are somewhat tender when young[1. 11]. Flower initiation depends upon suitable conditions in the previous summer[200]. The flowers and young growths can be destroyed by even short periods down to -2°c, but fortunately plants are usually late coming into leaf[200]. Any pruning should only be carried out in late summer to early autumn or when the plant is fully dormant otherwise

wounds will bleed profusely and this will severely weaken the tree[200]. Trees have a dense canopy which tends to reduce plant growth below them. We have no specific information for this species, but the roots of several members of this genus produce substances that are toxic to many plant species, especially apples (Malus species), members of the Ericaceae, Potentilla spp and the white pines (certain Pinus spp.)[200]. The leaves of many species also secrete substances that have an inhibitory affect on plants growing underneath them. All in all this is not a very good companion plant[K]. Closely related to J. hindsii[183, 200]

### 8.2.195 Rhus chinensis

Chinese Gall, Chinese sumac

7 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Rhus chinensis is a deciduous Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower in August, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista There are some suggestions that the sap of this species can cause a skin rash in susceptible people, but this has not been substantiated. See also notes in 'Cultivation Details'

kcakta Edible Parts: Fruit OilEdible Uses: Curdling agent Oil SaltFruit - cooked[2, 146, 158, 183]. An acid flavour[2]. It is also used medicinally[2, 158]. The fruit can be used as a salt or a rennet substitute[105, 183].

tcanta Dye Ink Mordant Oil Tannin WaxThe leaves are rich in tannin. They can be collected as they fall in the autumn and used as a brown dye or as a mordant[169]. A blue dye is obtained from insect galls on the plant[61], it can also be used as an ink[171]. The galls are formed as a result of damage by the greenfly, Aphis chinensis[223]. The galls contain up to 77% tannin[223]. The reports do not say if the galls are harvested before or after the insect has left the gall. An oil is extracted from the seeds[4, 146]. It attains a tallow-like consistency on standing and is used to make candles. These burn brilliantly, though they emit a pungent smoke[4]. The wood is soft and is not used[158].

dwatta Anthelmintic Antiphlogistic Antiseptic Astringent Cholagogue Depurative Dysentery Haemostatic MalariaThe leaves and the roots are depurative[147]. They stimulate blood circulation[147]. A decoction is used in the treatment of haemoptysis, inflammations, larvngitis, snakebite, stomach-ache and traumatic fractures[147, 218]. The stem bark is astringent and anthelmintic[218]. The fruit is used in the treatment of colic[240]. The seed is used in the treatment of coughs, dysentery, fever, jaundice, malaria and rheumatism[218]. The root bark is cholagogue[218]. Galls on the plant are rich in tannin[279]. They are used internally for their astringent and styptic properties to treat conditions such as diarrhoea and haemorrhage[218, 279]. They are a frequent ingredient in polyherbal prescriptions for diabetes mellitus[218]. An excrescence produced on the leaf by an insect Melaphis chinensis or M. paitan (this report probably refers to the galls produced by the plant in response to the insect[K]) is antiseptic, astringent and haemostatic[176]. It s used in the treatment of persistent cough with blood, chronic diarrhoea, spontaneous sweating, night sweats, bloody stool, urorrhoea and bloody sputum. It is used applied externally to burns, bleeding due to traumatic injuries, haemorrhoids and ulcers in the mouth[176]. Some caution is advised in the use of the leaves and stems of this plant, see the notes above on toxicity.

nrakta E. Asia - China, Japan. ksacta Lowland, hills and mountains in Japan[58]. Also found in the Himalayas (as R. semialata) where it grows in secondary forests to 2100 metres[146].

propta Seed - best sown in a cold frame as soon as it is ripe. Pre-soak the seed for 24 hours in hot water (starting at a temperature of 80 - 90c and allowing it to cool) prior to

sowing in order to leach out any germination inhibitors[200]. This soak water can be drunk and has a delicious lemonflavour. The stored seed also needs hot water treatment and can be sown in early spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into in dividual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 10cm with a heel, July/August in a frame[200]. Root cuttings 4cm long taken in December and potted up vertically in a greenhouse. Good percentage[78, 200]. Suckers in late autumn to winter[200].

nwatta Succeeds in a well-drained fertile soil in full sun[11, 200]. A very ornamental plant[11], it is not fully hardy in all parts of Britain and needs a hot summer in order to fully ripen its wood, suffering winter damage to late growth if the temperature falls below about -7°c[200]. The young growth in spring can be damaged by late frosts. The plants are also susceptible to coral spot fungus and any winter damage will exacerbate the situation[11]. Plants have brittle branches and these can be broken off in strong winds[200]. Many of the species in this genus are highly toxic and can also cause severe irritation to the skin of some people, whilst other species such as this one are not poisonous. It is relatively simple to distinguish which is which, the poisonous species have axillary panicles and smooth fruits whilst non-poisonous species have compound terminal panicles and fruits covered with acid crimson hairs[1, 4]. The toxic species are sometimes separated into their own genus. Toxicodendron, by some botanists[200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required.

### 8.2.196 Camellia chekiangoleosa

Camellia

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Camellia chekiangoleosa is an evergreen Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: OilEdible Uses: OilAn oil is obtained from the seed[177].

nrakta E. Asia - China. ksacta High mountains, 500 - 1300 metres[180]. Forests and thickets at elevations of 600 - 1300 metres in N Fujian, E Hunan, E and W Jiangxi and S Zheijang Provinces[266].

propta Seed - can be sown as soon as it is ripe in a greenhouse[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10 - 15cm with a heel. August/September in a shaded frame. High percentage but slow[78]. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leaf-bud cuttings, July/August in a frame.

nwatta Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1, 11, 200]. A calcifuge plant, preferring a pH between 5 and 7[11, 200]. Prefers the partial shade of a light woodland[200]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200]. This species is a valuable oil crop and is cultivated for its oil in Chekiang, China[266]. It is closely related to C. japonica[200].

### 8.2.197 Coprosma lucida

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Coprosma lucida is an evergreen Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit raw. Sweet and juicy[173], but with little flavour[225]. Dry weight is 3.3% protein, 8.1% sugar and 24.6% lipids[173]. The orange fruit is about 12mm in diameter[200, 225]. The roasted seed is an excellent coffee substitute[173].

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153].

nrakta New Zealand. ksacta Forest and shrubby areas, especially marginal, to the montane zone. Found throughout New Zealand[44, 173].

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[K]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Succeeds in most soils[225]. Somewhat intolerant of frost, this species is only likely to succeed outdoors in the milder areas of Britain[200]. Plants have proved to be nearly hardy in an Essex garden[225]. Hybridizes freely with other members of this genus[200, 225]. Plants are tolerant of heavy clipping or pruning[225]. Sometimes found as an epiphyte in the wild[44]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

#### 8.2.198 Vaccinium ashei

Rabbiteye Blueberry

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc

hmimhtut cyutli hgattcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli dyatxre7t hjonli

drutta Vaccinium ashei is a deciduous Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[3, 105, 142]. It is often insipid but some forms are well-flavoured[1, 200]. The fruit is often used for preserves etc and can also be dried for later use[183]. The fruit is up to 16mm in diameter[200].

nrakta South-eastern N. America. ksacta Swamps and barren pine land[3,72].

propta Seed - sow late winter in a greenhouse in a limefree potting mix and only just cover the seed[78]. Stored seed might require a period of up to 3 months cold stratification[113]. Another report says that it is best to sow the seed in a greenhouse as soon as it is ripe[200]. Once they are about 5cm tall, prick the seedlings out into individual pots and grow them on in a lightly shaded position in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Requires a well-drained soil in a sunny position[200]. This species is only hardy in the milder areas of Britain, tolerating temperatures down to about -5 to -10°c[11, 200]. There is some doubt as to whether this species is distinct from D. delavayi[11]. This genus is closely related to the quince, Cydonia oblonga[200].

### 8.2.210 Leptospermum liversidgei

Lemon-Scented Tea Tree

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 4 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Leptospermum liversidgei is an evergreen Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Edible Uses: TeaThe dried leaves are a tea substitute[183]. Lemon-scented[144, 177].

tcanta EssentialAn essential oil obtained from the leaves[11] is used as a bactericide[156].

dwatta Antibacterial Antibacterial [156].

nrakta Australia. ksacta Swamps by the coast in New South Wales[156, 265].

propta Seed - sow spring in a greenhouse and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts, and give some protection from the cold for their first winter or two outdoors. The seed remains viable for many years. Cuttings of half-ripe wood, 5 - 8 cm with a heel, early August in a frame. Over-winter in the greenhouse for its first year. Good percentage[78]. Cuttings of almost mature wood, 4 - 5 cm with a heel, October/November in a frame. Good percentage[78].

watta Succeed in almost any neutral or acid soil of good or reasonable quality, preferring a light sandy loam and full sun[200]. Prefers a position sheltered from hot or cold drying winds[200]. Only succeeds outdoors in the mild areas of Britain, tolerating temperatures down to about -10°c[200]. If plants are killed back in cold winters they sometimes sprout afresh from the old wood[219]. This species does not regenerate from old wood[200]. Resents root disturbance[200]. The leaves have a delightful lemon scent[182, 219]. The forms grown in Britain have a very weak scent, is this due to a lack of sun?[11]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.211 Camellia vunnanensis

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 3.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hionli

drutta Camellia yunnanensis is an evergreen Shrub growing to 3.6 m (11ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: OilEdible Uses: OilAn oil is obtained from the seed[180].

nrakta E. Asia - South-western China. ksacta Mixed forest and open scrub, open thickets, pine forests and lauraceous woods, 2000 - 2600 metres in Yunnan[180].

propta Seed - can be sown as soon as it is ripe in a greenhouse[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10 - 15cm with a heel, August/September in a shaded frame. High percentage but slow[78]. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leaf-bud cuttings, July/August in a frame.

nwatta Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1, 11, 200]. A calcifuge plant, preferring a pH between 5 and 7[11, 200]. Prefers the partial shade of a light woodland[200]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Plants are hardy to about -10°c and succeed outdoors in the milder areas of Britain[260]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200].

### 8.2.212 Dudleva pulverulenta

Chalk Lettuce, Chalk dudleya

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Dudleya pulverulenta is a PERENNIAL. See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Leaves - raw[46, 61, 161].

nrakta South-western N. America - California to Arizona. ksacta Found in coastal sage scrub and chaparral plant communites from sea level to elevations of 1500 metres[276].

propta Seed -

nwatta 257204 This species is not very hardy in Britain and requires protection from frosts[200]. This contradicts slightly with the plants hardiness rating in the same book of 8, which suggests it should tolerate temperatures down to about -5°c[200, K].

### 8.2.213 Citroncirus

Citrumelo, Citroncirus, Citrange

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Citroncirus is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. Very acid but it can be used in the ways that lemons are used.

nrakta A hybrid of garden origin, Poncirus trifoliata  $\boldsymbol{x}$  Citrus paradisi. ksacta Not known in the wild.

propta The following notes are based on Citrus species. They are probably applicable here as well, even though this is a bi-generic hybrid, since any seed might be produced polyembrionically. The seed is best sown in a greenhouse as soon as it ripe after thoroughly rinsing it[164, 200]. Sow stored seed in March in a greenhouse[3]. Germination usually takes place within 2 - 3 weeks at 13°c. Seedlings are liable to damp off so they must be watered with care and kept well ventilated. The seed is usually polyembrionic, two or more seedlings arise from each seed and they are genetically identical to the parent but they do not usually carry any virus that might be present in the parent plant[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least three growing seasons before trying them outdoors. Plant them out in the summer and give them some protection from the cold for

of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. The tree flowers on new growth produced in spring, the seed ripening in its first year[200, 229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.207 Rhamnus croceus

7 tlin 10 cvuc 2 kcak 0 tcan 0 dwat 4 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Rhamnus croceus is an evergreen Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in April, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

pcista Although no specific mention of toxicity has been found for this species, there is the suggestion that some members of this genus could be mildly poisonous[65].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[46. 61, 105, 257]. If eaten in large quantities they can temporarily tinge the skin red[2, 183]. The fruit is about 5 - 6mm in diameter[200] and has a thin dry flesh[82]. Some caution is advised, see the notes above on toxicity.

nrakta South-western N. America - California to Arizona, south to Mexico, ksacta Scrub and open forests below 1500 metres[184]. Dry washes and canyons[71].

propta Seed - best sown in the autumn in a cold frame. Stored seed will require 1 - 2 months cold stratification at about 5° and should be sown as early in the year as possible in a cold frame or outdoor seedbed[200]. Germination is usually good, at least 80% by late spring. Prick out the seedlings into individual pots when they are large enough to handle, and grow them on in the greenhouse or cold frame for their first winter. Plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame[113]. Cuttings of mature wood of the current year's growth, autumn in a frame. Layering in early spring[4].

nwatta Succeeds in any reasonably good soil[11]. Requires a well-drained sunny site[200]. Plants are possibly hardy to -15°c according to one report[184], whilst another says that this species is rather tender in Britain[1]. The subspecies R. croceus ilicifolia. Greene. often forms a tree up to 7 metres tall[82]. The species in this genus are notably resistant to honey fungus[200]. The flowers are produced in small clusters in the leaf axils or from small persistent bracts on shoots of the year[82]. Plants of this species can be hermaphrodite or dioecious[82]. If fruit and seed is required it is necessary to grow a hermaphrodite form, or male and female forms.

#### 8.2.208 Larrea tridentata

Creosote Bush - Chaparral 7 tlin 10 cyuc 2 kcak 3 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Larrea tridentata is an evergreen Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista Acute hepatitis associated with oral use. Contact dermatitis also reported. Not considered safe as a herbal

kcakta Edible Parts: Edible Uses: Condiment TeaThe flower buds are pickled in vinegar and used as a caper substitute[183]. The stems and leaves are a tea substitute[183]. The twigs are chewed to alleviate thirst[2, 183]. A resin is obtained from the leaves and twigs, it delays or prevents oils and fats from becoming rancid[183].

tcanta Carbon Farming - Industrial Crop: hydrocarbon. dwatta Expectorant Odontalgic UrinaryCreosote bush was widely used by various North American Indian tribes. A decoction of the leaves was used to treat diarrhoea and stomach troubles whilst the young twigs were used to treat toothache and a poultice of the leaves was used to treat chest complaints and as a wash for skin problems[254]. It continued to be widely used as a treatment for rheumatic disease, venereal infections, urinary infections and certain types of cancer especially leukaemia until its sale was hanned in North America due to concern over its potential toxic effect upon the liver[254]. There have been a number of cases of acute or sub-acute hepatitis attributed to the use of this herb and so its internal use is not recommended until further research has been carried out[254]. A tea made from the leaves is used as an expectorant and pulmonary antiseptic[213]. Some N. American Indian tribes heated the shoot tips of this plant and dripped the sap (probably the resin[K]) into tooth cavities to treat toothache[213].

nrakta South-western N. America. ksacta Desert ar-

propta Seed - we have no information for this species but suggest sowing the seed in a greenhouse in spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of new growth in spring in a frame[200].

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: CoppiceRequires a moderately fertile moisture-retentive soil in full sun or light shade[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The plant is resinous and aromatic[200]. Carbon Farming - Cultivation: experimental. Management: coppice.

#### 8.2.209 Docynia indica

7 tlin 10 cvuc 2 kcak 0 tcan 0 dwat 4 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Docynia indica is an evergreen Tree growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[1, 146, 272]. The fully ripe fruit is edible[272]. It is eaten when half ripe[177]. The fruit is about 5cm in diameter[200].

tcanta WoodWood - hard, close and even grained[146]. nrakta E. Asia - China to the Himalayas. ksacta Open places to elevations of 2000 metres in Nepal, Sikkim and Bhutan[146, 272]. Slopes, streamsides and thickets at elevations of 2000-3000 metres in western China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant

last expected frosts. Cuttings of soft wood, May/June in par- in a frame. Over-winter in the greenhouse for its first year. tial shade in media containing pine bark[113]. Cuttings of half-ripe wood, 5 - 8cm with a heel, August in a frame[78]. Slow and difficult. Layering in late summer or early autumn[78]. Another report says that spring is the best time to layer[200]. Takes 18 months[78]. Division of suckers in spring or early autumn[113].

nwatta Requires a moist but freely-draining lime free soil, preferring one that is rich in peat or a light loamy soil with added leaf-mould[11, 200]. Prefers a very acid soil with a pH in the range of 4.5 to 6, plants soon become chlorotic when lime is present. Succeeds in full sun or light shade though it fruits better in a sunny position[200]. Requires shelter from strong winds[200]. Plants are not hardy in all parts of Britain, they should succeed outdoors in the milder areas, tolerating temperatures down to between -5 and -10°c[200]. Often cultivated for its edible fruit, there are many named varieties[142]. Plants have a low chillfactor and so succeed in areas nearer the equator such as Florida[183]. There is some confusion over this name with some authorities seeing it as no more than a synonym for V. virgatum. For the time being it will be kept here as a distinct species. Dislikes root disturbance, plants are best grown in pots until being planted out in their permanent positions[200]. Established plants are drought resistant[183]. Plants in this genus are notably resistant to honey fungus[200]. The plant is heat tolerant in zones 9 through 2. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the aboveground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is multistemmed with multiple stems from the crown [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 8.2.199 Leptospermum lanigerum

woolly tea-tree

7 tlin 10 cyuc 2 kcak 2 tcan 0 dwat 5 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Leptospermum lanigerum is an evergreen Shrub growing to 5 m (16ft 5in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[183].

tcanta Hedge Hedge WoodThis species can be grown as a hedge in positions that are not too exposed. When trimming, however, the plants should not be cut back into old wood because they will not grow back. Other Uses The wood is tough, hard, heavy and close grained. Durable when used internally[601]. It is used for poles, stakes, tool handles etc[154, 601]. The wood makes a good fuel[154].

nrakta Australia - New South Wales, Queensland, South Australia, Tasmania, Victoria. ksacta Mountainous areas and down to the coast[184]. Wet heathland, open eucalyptus forest and by streams[260].

propta Seed - sow spring in a greenhouse and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. and give some protection from the cold for their first winter or two outdoors. The seed remains viable for many years. Cuttings of half-ripe wood, 5 - 8 cm with a heel, early August Good percentage[78]. Cuttings of almost mature wood, 4 -5 cm with a heel, October/November in a frame. Good percentage[78].

nwatta Succeed in almost any neutral or acid soil of good or reasonable quality, preferring a light sandy loam and full sun[200]. Grows best in an acid sandy soil[260]. Prefers a position sheltered from hot or cold drying winds[200]. Another report says that it tolerates fairly exposed positions and that has been our experience with it[K]. Hardy to at least -7°c in Australian gardens, where it succeeds in sun or shade, it only succeeds outdoors in mild areas of Britain, requiring the protection of a wall in colder parts. Plants are hardy to about -15°c in Britain[184]. Polymorphic[157]. There are two distinct forms grown in Britain, one with smallish grevish leaves is sometimes known as L. cunninghamii, the second form has larger narrow glossy green leaves[219]. Plants seldom grow taller than about 2 metres in Britain. Resents root disturbance[200]. Does not regenerate from old wood[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.200 Ehretia anacua

Anagua, Knockaway

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Ehretia anacua is an evergreen Tree growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from October to March, and the seeds ripen from October to March. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 149, 161, 183]. Sweet and rather juicy but it has a thin flesh[82]. The fruit is about 8mm in diameter[200].

tcanta WoodWood - heavy, hard, not strong, close grained, difficult to split. Used for tool handles, yokes, axles, wheel spokes etc[46, 61, 82, 149].

nrakta South-western N. America - S.E. Texas to Mexico. ksacta Develops into a tree when growing in river vallevs in fertile soils, it is also found as a shrub on dry barren ridges[82].

propta Seed - we have no information on this species but suggest sowing it as soon as it is ripe in a greenhouse. Sow stored seed in late winter or early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Division of suckers in the growing season.

nwatta Prefers a moderately fertile well-drained sandy loam in a sunny position[200]. Tolerates exposed positions[200]. Plants are shade tolerant in continental climates but they require more sun in maritime areas in order to ripen the wood[200]. Rich fertile soils encourage soft sappy growth which is then more susceptible to winter damage[200]. This species is not very hardy in Britain, but dormant plants have survived temperatures down to -13°c when growing in a suitable position. The young growth in spring. even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Spreads by means of suckers[149].

### 8.2.201 Debregeasia hypoleuca

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nvanhien hionli

drutta Debregeasia hypoleuca is an evergreen Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and

female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[272]. Sweet but insipid and mucilaginous[158]. About the size of a pea[51, 146]. Used as a flavouring[177].

tcanta Fibre WoodA fibre is obtained from the bark[272]. It is used for making twine and rope[46, 51, 61, 123, 140, 158]. Wood - soft and light. It is not much use[158] and is mployed mainly as a fuel[272].

nrakta W. Asia to the W. Himalayas. ksacta Forests and shrubberies[51], chiefly along watercourses, 1500 - 2400 metres[146, 158].

propta Seed - sow late winter to mid-summer in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 2 months at  $20^{\circ}$ c(175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings in early summer[1].

nwatta Prefers a fertile well-drained loam with some shelter at the hottest part of the day[200]. Plants tolerate occasional lows to about  $15^{\circ}\text{c}[260]$ . This species is probably not very hardy in Britain and will probably require greenhouse protection, though it might be possible to grow it outdoors in the mildest areas of the country, especially if it is given the protection of a warm wall. Dioecious, male and female plants must be grown if seed and fruit is required.

### 8.2.202 Citrus ichangensis

Ichang Papeda

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 4.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Citrus ichangensis is an evergreen Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. Juicy but too acid for most people to eat raw, the fruit can be used as a lemon substitute[200]. The fruit is quite large, up to 10cm x 5cm but with large seeds about 15mm long and 8mm thick[200].

dwatta Miscellany Vitamin CCitrus species contain a wide range of active ingredients and research is still underway in finding uses for them. They are rich in vitamin C, flavonoids, acids and volatile oils. They also contain coumarins such as bergapten which sensitizes the skin to sunlight. Bergapten is sometimes added to tanning preparations since it promotes pigmentation in the skin, though it can cause dermatitis or allergic responses in some people[238]. Some of the plants more recent applications are as sources of anti-oxidants and chemical exfoliants in specialized cosmetics[238].

nrakta E. Asia - W. and S.W. China. ksacta Highland ar-

propta The seed is best sown in a greenhouse as soon as it ripe after thoroughly rinsing it[164, 200]. Sow stored seed in March in a greenhouse[3]. Germination usually takes place within 2 - 3 weeks at 13°c. Seedlings are liable to damp off so they must be watered with care and kept well ventilated. The seed is usually polyembrionic, two or more seedlings arise from each seed and they are genetically identical to the parent but they do not usually carry any virus that might be present in the parent plant[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least three growing seasons before trying them outdoors. Plant them out in the summer and give them some protection from the cold for their first few winters outdoors. Cuttings of half-ripe wood, July/August in a frame. Layering in October.

nwatta Prefers a moderately heavy loam with a generous amount of compost and sand added and a very sunny posi-

tion[200]. Prefers a pH of 5 to 6[200]. Plants are intolerant of water logging[200]. When growing plants in pots, a compost comprising equal quantities of loam and leafmould plus a little charcoal should produce good results[260]. Do not use manure since Citrus species dislike it[260]. When watering pot plants it is important to neither overwater or underwater since the plant will soon complain by turning yellow and dying. Water only when the compost is almost dry, but do not allow it to become completely dry[260]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -5°c when dormant[200]. The young growth in spring, even on mature plants, is frost-tender and so it is best to grow the plants in a position sheltered from the early morning sun[K]. Occasionally cultivated for its edible fruit, there are some named varieties[183]. This is the hardiest member of the Citrus genus and is of interest for use in breeding for greater cold tolerance in other members of this genus[200]. Plants dislike root disturbance and so should be placed into their permanent positions when young. If growing them in pots, great care must be exercised when potting them on into larger containers[238]. The flowers are sweetly scented[245].

### 8.2.203 Berchemia lineata

7tlin 10 cyuc 2 kcak 0 tcan 1 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Berchemia lineata is a deciduous Climber growing to 4 m (13ft lin). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August, and the seeds ripen in November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers meils soil

kcakta Edible Parts: FruitEdible Uses: Fruit. - raw or cooked[177, 272]. Only eat the fruit when it is black ripe[105]. The fruit is not very freely produced in Britain[1]. The fruit is about 8mm in diameter[2001.

dwatta Antitussive FebrifugeThe plant has been used as a febrifuge[240]. The roots and leaves have been used as a medicine to relieve coughs and reduce sputum, to treat injuries, trauma and snakebite[266]

nrakta E. Asia - C. and N. China to the Himalayas. ksacta On rocks and in forests, 2000 - 2700 metres in the Himalayas[146]. Scrub thickets in dry places at elevations of 2400 - 4000 metres in Nepal[272].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Cuttings of mature wood of the current season's growth, November to January in a frame. Root cuttings in winter[200]. Layering of young stems in winter[200].

nwatta Requires a good moist well-drained loam, succeeding in full sun if the soil does not dry out otherwise it is best in light shade[11, 200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Suitable for growing along fences, against walls with wire supports or for growing through other shrubs[200]. Plants climb by means of twining around supports[182]. Closely related to B. edge-worth[1921]

### 8.2.204 Arctostaphylos glauca

Bigberry Manzanita

7 tiin 10 cyuc 2 kcak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli fyifxre7t hionli

drutta Arctostaphylos glauca is an evergreen Shrub growing to 4 m (13ft lin). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy) and medium (loamy)

soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: FruitEdible Uses: DrinkFruit - raw or cooked[3]. The fruit is used fresh or it can be dried and ground into a powder then used to make mush or added to soups etc[105, 161, 183, 257]. It can also be used to make preserves or a beverage that resembles cider in flavour[183]. A drink is made from the berries by sprinkling them with water, kneading them with the hands, mashing them and then soaking them in the sun for about 12 hours. The liquid is then sieved to remove the pulp before being drunk on its own or with Chia (see Salvia columbiana). Water could be drained through the pulp a second time. The liquid was said to be sweet and fattening[257]. The fruit is dry and with little flavour[2]. The seeds can be dried, ground into a powder and used to make a mush or cakes[257]. The seed is rather small, it would most probably have been used together with the fruit and not have been separated from it[K].

tcanta Broom Dye Fuel WoodA yellowish-brown dye is obtained from the leaves, it does not require a mordant[168]. The branches have been used to make a broom[257]. The wood makes a good fuel, producing a lot of heat and burning for a long time[257]. The wood is hard and tough. It is used for making small tools, awl handles etc[257].

dwatta Antiseptic Astringent Diuretic Skin UrinaryThe dried leaves are used in the treatment of a variety of complaints[4]. These leaves should be harvested in early autumn, only green leaves being selected, and then dried in gentle heat[4]. A tea made from the dried leaves is strongly astringent, diuretic and an antiseptic for the urinary tract[4, 222]. It is much used for kidney and bladder complaints and inflammation of the urinary tract, but it should be used with caution[4, 21, 46, 172] because it contains arbutin which hydrolyzes into the toxic urinary antiseptic hydroquinone[222]. Externally, an infusion is used to treat poison oak rash[257].

nrakta South-western N. America - S. California. ksacta Dry slopes below 1500 metres[71].

propta Seed - best sown in a greenhouse as soon as it is ripe. Pre-soak dried seed in boiling water for 10 - 20 seconds or burn some straw on top of them and then stratify at 2 - 5°c for 2 months[11, 200]. The seed usually germinates in 2 - 3 months at 15°c[134]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse or cold frame for at least their first winter, Plant out in late spring or early summer. Cuttings of side shoots of the current season's growth, 5 - 8cm with a heel, August to December in a frame. Takes one year[1, 78]. Division in early spring. Take care because the plant resents root disturbance. Pot the divisions up and keep them in a lightly shaded position in a cold frame or greenhouse until they are growing away actively. Layering in spring[200].

nwatta Requires a deep moist well-drained light or medium lime-free loam in sun or semi-shade[3, 11, 200] but plants produces less fruit when they are grown in the shade[200]. Prefers a warm sunny position[3, 166]. Found on dry soils in the wild, one report says that it succeeds in a hot dry position. Hardy to between -5 and -10°c, succeeding outdoors in the milder parts of Britain[200]. Plants resent root disturbance and should be placed in their final positions as soon as possible[134].

### 8.2.205 Camellia polyodonta

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 4.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Camellia polyodonta is an evergreen Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to June, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: OilEdible Uses: OilAn oil obtained from the seed is used in cooking[180].

nrakta E. Asia - China. ksacta Forests at elevations of 500 - 1000 metres in W Guangdong, E and NE Guangxi and S Hunan Provinces[266].

propta Seed - can be sown as soon as it is ripe in a greenhouse[113]. Stored seed should be pre-soaked for 24 hours in warm water and the hard covering around the micropyle should be filed down to leave a thin covering[78, 113, 138]. It usually germinates in 1 - 3 months at 23°c[138]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in the greenhouse for at least their first winter. Plant them out into their permanent positions when they are more than 15cm tall and give them some protection from winter cold for their first year or three outdoors[K]. Cuttings of almost ripe wood, 10 - 15cm with a heel. August/September in a shaded frame. High percentage but slow[78]. Cuttings of firm wood, 7 - 10cm with a heel, end of June in a frame[11, 78]. Keep in a cool greenhouse for the first year[11]. Leaf-bud cuttings, July/August in a frame

nwatta Prefers a woodland soil but thrives in a warm open well-drained loam if leafmould is added[1, 11, 200]. A calcifuge plant, preferring a pH between 5 and 7[11, 200]. Prefers the partial shade of a light woodland[200]. Prefers a wet summer and a cool but not very frosty dry winter[200]. Plants are not very self-compatible, self-fertilized flowers produce few seeds and these are of low viability[200].

### 8.2.206 Quercus durata

California Scrub Oak, Leather oak

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 4 m hkuc

hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus durata is an evergreen Shrub growing to 4 m (13ft lin). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked[161]. It can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed, which is up to 35mm long and 15mm wide[82], contains bitter tannins. These can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent TanninA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4].

dwatta Astringent DysenteryAny galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta South-western N. America - California. ksacta Coastal ranges[11]. The type species is found on serpentine soils at 150-1500 m, whilst var gabrielensis is found in chaparral on dry, exposed, loose slopes in nonserpentine soils at 450 - 1000 m[270]

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities

This species is so prolific that large clumps can be dug up in late summer for re-establishment[233].

nwatta Landscape Uses:Border, Container, Foundation, Massing. Requires a fertile, moisture retentive well-drained soil and a warm situation in sun or semi-shade[200]. Another report says that it is easily grown in any soil in sun or part shade[190]. Established plants are drought tolerant[190]. Plants succeed in maritime gardens[233]. Plants have proved very tolerant of neglect on our trial grounds in Cornwall, one clump grew and thrived in rank grass for a number of years until increasing shade from trees began to reduce its vigour[K]. This is the hardiest member of the genus, tolerating temperatures down to between -10 and -15°c, especially if the roots are mulched in the winter[187]. Young plants are best given a protective mulch for their first winter or two[233]. Somewhat intolerant of root disturbance[1], the roots are fleshy and brittle[200]. The plant can be rather invasive, spreading by means of thin fleshy roots[187]. Special Features: Attractive foliage, Suitable for cut flowers

### 8.2.371 Daphne oleoides

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 1 m hkuc htut cyutli kyuctcup hwicli ilutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Daphne oleoides is an evergreen Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers dry or moist soil

pcista All parts of the plant are poisonous[200]. Skin contact with the sap can cause dermatitis in some people[65, 200].

kcakta There is a report that the fruit is eaten, but this report then goes on to say that they cause nausea and vomiting[2]. There is also a report that they can be distilled to make an alcoholic drink[2].

dwatta Purgative Skin VDThe roots are purgative[46, 61, 240]. An infusion of the bark and leaves are used in the treatment of cutaneous affections[240]. The leaves are also used in the treatment of gonorrhoea and are applied to abscesses[240]

nrakta S. Europe, N. Africa and W. Asia to the Himalayas. ksacta Dry open slopes in Kashmir, 1700 - 2300

propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at 20°c followed by 12 - 14 weeks at 3°c. Germination may still take another 12 months or more at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood. July/August in a frame.

nwatta Prefers a cool lime-free well-drained friable soil[1]. Plants are usually calcicole and require an acid soil[50]. Survives in any well-fed and well-drained soil in sun or part shade according to one report which also says that it is a reliable plant in most parts of the country[182]. This species is not very hardy outside the mildest areas of Britain tolerating temperatures down to about -5°c[200]. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible[188]. The flowers have a clove-like perfume[245].

### 8.2.372 Artemisia japonica

7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flat-

priklwis hpa7tmwatli xre7t hjonli

drutta Artemisia japonica is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Although no reports of toxicity have been seen for this species, skin contact with some members of this genus can cause dermatitis or other allergic reactions in some peo-

kcakta Edible Parts: LeavesEdible Uses: Young leaves cooked. Used as a vegetable[218].

tcanta IncenseThe powder of the dried plant is used as an incense[272].

dwatta Depurative Digestive Febrifuge Skin Women's complaintsThe leaves are digestive[178]. A decoction of the leaves is said to promote a plump figure, but too much is said to be deleterious and can cause hypertension[218]. The expressed juice of the plant is used in the treatment of vaginitis[178, 218]. It is also used to treat skin diseases[272]. Theplant is used for making antitoxifying and antifebrile drugs[266].

nrakta E. Asia - China, Japan, Korea. ksacta Sunny hills and low elevations in mountains all over Japan[58]. Forest margins, waste areas, shrublands, hills, slopes and roadsides from low elevations to 3300 metres[266].

propta Seed - surface sow from late winter to early summer in a greenhouse, making sure that the compost does not dry out[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. Division in spring or autumn[200]. Basal cuttings in late spring. Harvest the young shoots when about 10 15cm long, pot up in a lightly shaded position in a greenhouse or cold frame and plant them out when well rooted.

nwatta Easily grown in a well-drained circumneutral or slightly alkaline loamy soil, preferring a warm sunny dry position[1, 200]. Established plants are drought tolerant[200]. This species is not very hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. Plants are longer lived, more hardy and more aromatic when they are grown in a poor dry soil[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.373 Platycrater arguta

7 tlin 10 cvuc 1 kcak 0 tcan 0 dwat 1 m hkuc hmim cvutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Platycrater arguta is a deciduous Shrub growing to 1 m (3ft 3in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers

kcakta Edible Parts: Edible Uses: TeaA tea is made from the leaves[2, 177].

tcanta MiscellanyA useful and beautiful ground cover plant[182]. An infusion of the leaves is used by Buddhists to wash or baptise statues of the Buddha[11].

nrakta E. Asia - China, Japan. ksacta Humid rocks[11]. Sparse forests or thickets in valleys, stream banks and mountain slopes at elevations of 400 - 1800 metres in Anhui, Fujian, Jiangxi and Zhejiang provinces, China[266].

propta Seed - we have no information for this species but suggest surface-sowing the seed in a greenhouse in early spring. Do not allow the compost to dry out. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out into their permanent positions in late spring. Cuttings of half-ripe wood, 5 - 8cm taken at a node

slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. Special Features:North American native, Naturalizing, All or parts of this plant are poisonous, Attracts butterflies, Suitable for dried flowers, Attractive flowers or blooms.

### 8.2.259 Tropaeolum leptophyllum

7 tlin 10 cvuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcup hwicli hyishrasilut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Tropaeolum leptophyllum is a PERENNIAL CLIMBER growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked[1. 2, 46, 61, 105]. Large[200]. The tubers are only used in times of scarcity, when better flavoured food is not available[2].

nrakta S. America - Chile, Bolivia. ksacta Not known

propta Seed - sow early spring in a greenhouse. Prick the seedlings out into individual pots once they are large enough to handle and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer. after the last expected frosts. Division of the tubers in the autumn or spring. In cold winter areas the tubers can be harvested in the autumn after top-growth has died down and they can then be stored in a cool frost-free position until planting them out in the spring. Cuttings of basal stems in the spring[200]. Pot them up into individual pots and place them in light shade in a frame until they are established. Plant out in early summer

nwatta Requires a lime-free soil[1] and a sunny position[200]. Prefers a soil of turfy loam and peat or sandy peat and leafmould[1]. Succeeds in soils of low and medium fertility[200]. The dormant plant is hardy to about -15°c[200]. A climbing plant, it supports itself by twisting its leaf stalks around other plants etc[219]. Closely related to T. polyphyllum, differing in its tubers and climbing habit[200]. The caterpillars of the cabbage white butterfly can be a nuisance and often cause considerable damage to the leaves[219].

#### 8.2.260 Cistus creticus

Rock Rose. Cretan rockrose 7 tlin 10 cvuc 2 kcak 0 tcan 2 dwat 1 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Cistus creticus is an evergreen Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. It is noted for attracting wildlife. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves are used as a tea substitute[2, 89]. The oleo-resin obtained from the leaves and stems is used as a commercial food flavouring in baked goods, ice cream, chewing gum etc[183, 238].

tcanta ResinThe glandular hairs on the leaves yield the oleo-resin 'ladanum', used medicinally and in soaps, perfumery, fumigation etc[4, 11, 46, 61, 64, 89, 100]. This resin is an acceptable substitute for ambergris (which is obtained from the sperm whale) and so is important in perfume manufacture[238]. The resin is collected by dragging a type of rake through the plant, the resin adhering to the teeth of the rake, or by boiling the twigs and skimming off the

resin[64, 89]. Most resin is produced at the hottest time of the year[46]. There is a mauve-flowered variety of this species that is the most prolific producer of the resin[245].

dwatta Emmenagogue Expectorant StimulantThis plant is an aromatic, expectorant, stimulant herb that controls bleeding and has antibiotic effects[4, 238]. It is used internally in the treatment of catarrh and diarrhoea[4, 238] and as an emmenagogue[4]. The leaves are harvested in late spring and early summer and can be dried for later use, or the resin extracted from them[238]

nrakta Europe - Mediterranean. ksacta Amongst scrub and in bushy places on rocks, dry hills etc to 1000 metres[89]. propta Seed - gather when ripe and store dry[78]. Sur-

face sow in late winter in a greenhouse[164]. The seed usually germinates in 1 - 4 weeks at 20°c[164]. Prick out the seedlings as soon as they are large enough to handle into individual pots. Grow them on in the greenhouse for their first winter and plant them out the in the following spring or early summer, after the last expected frosts[164]. The seed stores for at least 3 years[K]. Cuttings of softish to half-ripe wood. 8cm long with a heel or at a node, June/August in a frame. Roots are formed within 3 weeks[78]. High percentage[78]. Cuttings of almost mature wood, 8 - 12cm with a heel or at a node, September/October in a frame. High percentage[78]. Lift and pot up in the spring, plant out when a good root system has formed[78]. Layering in spring.

nwatta Requires a sunny position in a dry or moist welldrained light sandy soil[11, 182]. Withstands drought once it is established[11, 184]. Tolerates maritime exposure[188, Kl. Plants are hardy to about -15°c[184], but they require protection in severe winters[11]. Plants are somewhat hardier when grown in poor soils[182]. This is usually a short-lived plant in cultivation, it probably exhausts itself by its very free-flowering habit[K]. Plants often self-sow when growing in a suitable position[166]. Dislikes pruning or root disturbance[11, 200]. Plants should be pot grown and then planted out in their final positions whilst still small. Individual flowers only last one day but there is a long succession of them[11, 200]. A polymorphic species, some forms do not yield much gum[11]. Hybridizes freely with other members of this genus. This species is notably resistant to honey fungus[88, 200]. The flowers are very attractive to bees[108]. The leaves, which exude a balsamic resin, are especially fragrant on warm sunny days[245].

#### 8.2.261 Chenopodium ambrosioides

Mexican Tea

1401

7 tlin 10 cyuc 2 kcak 3 tcan 3 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Chenopodium ambrosioides is a AN-NUAL/PERENNIAL growing to 1 m (3ft 3in) by 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil.

pcista The essential oil in the seed and flowering plant is highly toxic. In excess it can cause dizziness, vomiting, convulsions and even death[222, 238]. The plant can also cause dermatitis or other allergic reactions[222]. The leaves and seeds of all members of this genus are more or less edible. However, many of the species in this genus contain saponins, though usually in quantities too small to do any harm. Although toxic, saponing are poorly absorbed by the body and most pass straight through without any problem. They are also broken down to a large extent in the cooking process. Saponins are found in many foods, such as some beans. Saponins are much more toxic to some creatures. such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K]. The plants also contain some oxalic acid, which in large quantities can lock up some of the nutrients in the food. However, even considering this, they are very nutritious vegetables in reasonable quantities. Cooking the plant will reduce its content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Leaves SeedEdible Uses: TeaLeaves - cooked[2]. The tender leaves are sometimes used as a potherb[183]. Used as a condiment in soups etc[46, 61, 105], they are said to reduce flatulence if eaten with beans[183]. The leaves have a rank taste due to the presence of resinous dots and sticky hairs[85]. The raw leaves should only be eaten in small quantities, see the notes above on toxicity. Seed - cooked[105, 161]. The seed is small and fiddly, it should be soaked in water overnight and thoroughly rinsed before it is used in order to remove any saponins. An infusion of the leaves is a tea substitute[183].

tcanta Dye InsecticideThe plant is used as a fumigant against mosquitoes and is also added to fertilizers to inhibit insect larvae[238]. Gold/green dyes can be obtained from the whole plant[168].

dwatta Analgesic Antiasthmatic Antifungal Carminative Dysentery Stomachic VermifugeMexican tea is a Central American herb that has been used for centuries to expel parasitic worms from the body[254]. The whole plant is analgesic, antiasthmatic, carminative, stomachic and vermifuge[1, 4, 21, 57, 145, 147, 171]. An infusion can be used as a digestive remedy, being taken to settle a wide range of problems such colic and stomach pains[254]. Externally, it has been used as a wash for haemorrhoids, as a poultice to detoxify snake bites and other poisons and is thought to have woundhealing properties[254]. Use with caution and preferably under the supervision of a qualified practitioner[21, 238]. This remedy should not be prescribed for pregnant women[238]. See also the notes above on toxicity. Until fairly recently, this was one of the most commonly used vermifuges, though it has now been largely replaced by synthetic drugs[222]. The seed, or an essential oil expressed from the seed, was used[213]. It is very effective against most parasites, including the amoeba that causes dysentery, but is less effective against tapeworm[213, 238]. Fasting should not precede its use and there have occasionally been cases of poisoning caused by this treatment[213]. The oil is used externally to treat athlete's foot and insect bites[238]. One report says that it is an essential oil that is utilised[240]. This is obtained from the seed or the flowering stems, it is at its highest concentration in the flowering stems before seed is set, these contain around 0.7% essential oil of which almost 50% is the active vermifuge ascaridol[240]. The essential oil is of similar quality from plants cultivated in warm climates and those in cool climates [240]. The leaves are added in small quantities as a flavouring for various cooked bean dishes because their carminative activity can reduce flatulence[222].

nrakta Tropical America. Naturalized in S. Europe[50]. ksacta Mainly found on dry wasteland and cultivated ground[204, 268].

propta Seed - whilst it can be sown in situ in mid to late spring, we have had better results by sowing the seed in a cold frame in early spring. Put a few seeds in each pot and thin to the best plant if necessary. Germination rates are usually very good and the seedlings should appear within a few days of sowing the seed. Plant out in late spring, after the last expected frosts.

nwatta An easily grown plant, succeeding in most soils but disliking shade[1, 200]. It prefers a moderately fertile soil[200]. Tolerates a pH in the range 5.2 to 8.3. Plants are annuals or short-lived perennials[238]. They are not very hardy when grown outdoors in Britain and so are best grown as an annual [238]. Plants have often self-sown freely in our Cornish trial grounds, but the seed often germinates in the autumn and then does not manage to survive the winter[238]. This species is sometimes grown as a medicinal and culinary plant, especially in its native Mexico. The sub-species C. ambrosioides anthelminticum is more active medicinally and is the form most often cultivated for its vermicidal activity[238]. The bruised leaves emit an unpleasant foetid odour[245]. In garden design, as well as the above-ground architecture of a plant, root structure considerations help in choosing plants that work together for their optimal soil requirements including nutrients and water. The root pattern is fleshy. Thick or swollen - fibrous or tap root [2-1].

### 8.2.262 Cyperus aristatus

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc htut cyutli tcuphja7n hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cyperus aristatus is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. The seeds ripen from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil.

kcakta Edible Parts: RootEdible Uses: Tuber - raw or cooked[46, 161, 177]. A starchy flavour[61].

tcanta WeavingThe leaves are used for weaving hats, matting etc[178].

nrakta N. America to S. America. Naturalized in N. Italy[50]. ksacta Wet places in valleys and lowland all over N. America[60]. A cosmopolitan plant, it is not found at high latitudes[60].

propta Seed - surface sow in the spring and keep the compost moist[164]. The seed usually germinates in 2-6 weeks at  $18^{\circ}$ c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow on for their first winter in a greenhouse and plant them out in late spring after the last expected frosts. Division in spring or autumn. This is more a matter of harvesting the tubers and replanting them. If this is done in the autumn, then it is best to store the tubers in a cool frost-free place overwinter and plant them out in the spring.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though judging by its native range it could succeed outdoors in many parts of this country. There is some confusion over the correct name of this species, we have shown C. squarrosus as a synonym but it could be the correct name, whilst some botanists say that C. inflexus is the correct name[235]. The dried plant is fragrant[235]. The following notes are based on the general needs of the genus. Prefers a moist sandy loam[95, 117].

### 8.2.263 Fritillaria imperialis

Crown Imperial, Imperial fritillary, Crown Imperial Fritillary 7 tlin 9 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli jlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fritillaria imperialis is a BULB growing to 1 m (3ft 3in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in flower in April, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista The bulb is poisonous raw[4, 114], it contains low concentrations of a toxic alkaloid[163, 240].

kcakta Edible Parts: RootEdible Uses: Bulb -cooked[114]. A minor source of starch[4, 105, 177]. Some caution is advised since there are reports of toxicity.

dwatta Diuretic Emollient Galactogogue ResolventThe bulb is diuretic, emollient and resolvent[240]. It is also a cardiac poison[240]. It has been used as an expectorant and also to encourage increased breast milk production[254]. The fresh plant contains the toxic alkaloid 'imperialine' [240].

nrakta W. Asia - W. Himalayas, Turkey and Iran. ksacta Cliffs, rocky slopes and amongst scrub, 1000 - 3000 metres in Turkey[90]. On humus rich soils, usually in gullies and shaded sides of large rocks, 1800 - 2600 metres in Kashmir[145].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them

dwatta Antibacterial Cancer DysenteryBerberine, universally present in rhizomes of Berberis species, has marked antibacterial effects. Since it is not appreciably absorbed by the body, it is used orally in the treatment of various enteric infections, especially bacterial dysentery[218]. It should not be used with Glycyrrhiza species (Liquorice) because this nullifies the effects of the berberine[218]. Berberine has also shown antitumour activity[218].

nrakta Southern S. America - S. Chile. ksacta Not known propta Seed - best sown as soon as it is ripe in a cold frame, when it should germinate in late winter or early spring[78]. Seed from over-ripe fruit will take longer to germinate[78], whilst stored seed may require cold stratification and should be sown in a cold frame as early in the year as possible[80]. The seedlings are subject to damping off, so should be kept well ventilated[113]. When the seedlings are large enough to handle, prick them out into individual pots and grow them on in a cold frame. If growth is sufficient, it can be possible to plant them out into their permanent positions in the autumn, but generally it is best to leave them in the cold frame for the winter and plant them out in late spring or early summer of the following year. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current season's growth, preferably with a heel, October/November in a frame[78]. Suckers, removed in late autumn/early winter and planted out in situ or potted up and planted out in late spring[200].

nwatta Prefers a warm moist loamy soil and light shade but it is by no means fastidious, succeeding in thin, dry and shallow soils[11, 200]. Grows well in heavy clay soils. Plants are possibly hardy to about -15°c[184]. Plants can be pruned back quite severely, they resprout well from the base[200]. Hybridizes freely with other members of this genus[1]. Plants produce suckers[11].

#### 8.2.368 Bromus tectorum

Cheat Grass, Downy Brome 7 tlin 10 cyuc 1 kcak 1 tcan 1 dwat 1 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli priklwishsom hpa7tmwatli xre7t hjonli

drutta Bromus tectorum is a ANNUAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista The awns of the plant can cause mechanical injury to grazing animals[274].

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed -cooked[257]. A famine food, the small seed can be cooked into a gruel in times of food shortage[257]. A coffee is made from the roasted seed[177].

tcanta Bedding MiscellanyThe leaves have been used as a bedding[257]. B. tectorum is the most abundant forage species on many intermountain area rangelands of the USA [1d].

dwatta MiscellanyA paste made from the seeds is applied as a poultice to the chest to relieve chest pains[272].

nrakta S. Europe - Mediterranean. Naturalized in N. America. ksacta Roadsides and waste places, also in thatched roofs in Eastern N. America[43].

propta Seed - sow spring or autumn in situ and only just cover. Germination should take place within 2 weeks.

nwatta Succeeds in ordinary well-drained garden soil in a sunny position[138, 200].

### 8.2.369 Nicandra physaloides

Shoo Fl

7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Nicandra physaloides is a ANNUAL growing to 1.2 m (4ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September.

The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although no mention of toxicity has been seen for this species, it belongs to a family that contains many species of poisonous plants so some caution is advised. It is normally the leaves and the unripe fruits that are most likely to be suspect, this family also includes many food plants such as potatoes, tomatoes, peppers etc.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit[177]. No more details are given. The fruit is a berry about 15mm in diameter[200]. Young leaves - boiled[177]. Some caution is advised, see the notes above on toxicity.

tcanta RepellentThe plant is thought to repel flies[188]

dwatta Analgesic Anthelmintic Antibacterial Antiin-flammatory Diuretic Febrifuge MydriaticThe plant is directic[240]. There is no evidence to suggest that the plant is purgative, though an alkaloid with mydriatic action is present[240]. The seeds are used in Tibetan medicine, they are said to have an acrid taste and a cooling, very poisonous potency[241]. Analgesic, anthelmintic, antibacterial, anti-inflammatory and febrifuge, regular use increases bodily vigour[241]. They are used in the treatment of contagious disorders, toothache, intestinal pain from worms and impotence[241]. A decoction of the seeds is used in the treatment of fevers[272].

nrakta S. America - Peru. Introduced and casual in Britain. ksacta Naturalized in waste places and near dwellings in much of N. America[204].

propta Seed - sow in situ in late spring, preferably after the last expected frosts[200]. Young seedlings can be transplanted. The seed can remain dormant for several decades[200].

nwatta Succeeds in ordinary garden soil[1], but prefers a rich well-drained soil in a sunny position[200]. Plants withstand poor weather conditions well and do not usually require staking[200]. Plants are fast-growing[188] and often self-sow freely[200]. Individual flowers only live for one day, but the plant produces a succession of flowers from summer to early autumn[188].

#### 8.2.370 Alstroemeria aurea

Peruvian Lily

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Alstroemeria aurea is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf from February to August, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil and can tolerate drought. The plant can tolerate maritime exposure.

pcista Some people are sensitive to this plant and skin contact with the sap can cause them to get dermatitis[65].

kcakta Edible Parts: RootEdible Uses: Although no reports have been seen for this species, the root of many members of this genus are edible and a source of starch that is very nutritious. It is most likely that this species can be used in the same way.

nrakta S. America - S. Chile ksacta Moist wood-

propta Seed - best sown in individual pots in a cold frame as soon as it is ripe although seedlings can be transplanted successfully if they are moved with care whilst small. Presoak stored seed for 12 hrs in warm water, warm stratify for 4 weeks at 25°c and then reduce the temperature to 10°c. Excising a small bit of the seed near the embryo after the seed has been warm stratified helps to speed up the germination process[164]. Plant out about 20cm deep into their permanent positions in late summer or autumn[200]. Division in April or October with care since the plant resents root disturbance[133]. Ensure each portion has a growth bud[111].

htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Zygophyllum fabago is a PERENNIAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not selffertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: Edible Uses: CondimentThe flower buds are pickled and used as a caper substitute[2, 103, 105,

nrakta S.E. Europe. N. Africa to W. Asia - Svria to Afghanistan. ksacta Dry places[50].

propta Seed - sow spring in a greenhouse. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a sunny position in a dry very welldrained soil[1]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.365 Polygonum equisetiforme

7 tlin 10 cvuc 1 kcak 0 tcan 0 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Polygonum equisetiforme is an evergreen Perennial growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

pcista Although no specific mention has been made for this species, there have been reports that some members of this genus can cause photosensitivity in susceptible people. Many species also contain oxalic acid (the distinctive lemony flavour of sorrel) - whilst not toxic this substance can bind up other minerals making them unavailable to the body and leading to mineral deficiency. Having said that, a number of common foods such as sorrel and rhubarb contain oxalic acid and the leaves of most members of this genus are nutritious and beneficial to eat in moderate quantities. Cooking the leaves will reduce their content of oxalic acid. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Edible Uses: TeaThe plant is used as a flavouring for tea[183]

tcanta Plants can be grown as a ground cover when spaced about 60cm apart each way[208].

nrakta Europe - Mediterranean. ksacta Chiefly ruderale[50]. Gardens, bluffs, ditches, weed-infested and slightly saline places, pastures and wormwood steppes in irrigated areas[74]

propta Seed - sow spring in a cold frame. Germination is usually free and easy. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer if they have reached sufficient size. If not, overwinter them in a cold frame and plant them out the following spring after the last expected frosts. Division in spring or autumn. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Succeeds in an ordinary garden soil[1] but prefers a moisture retentive not too fertile soil in sun or part shade[200]. Repays generous treatment[1]. Somewhat tender in Britain, it is apt to be cut back in severe winters and should be given a position in a warm sunny corner[1]. It probably tolerates temperatures down to between -5 and -10°c[200]. Plants seem to be immune to the predations of

#### 8.2.366 Datura guercifolia

Oak Leaf Datura, Chinese thorn-apple

7 tlin 10 cyuc 1 kcak 0 tcan 3 dwat 1.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hionli

drutta Datura quercifolia is a ANNUAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista All members of this genus contain narcotics and are very poisonous, even in small doses[200].

kcakta Edible Parts: FruitEdible Uses: DrinkFruit ground up and mixed with clay[161] ( the clay probably has a neutralizing effect on the toxins). A very toxic plant, its use cannot be recommended. The fruit is about 7cm long and 6cm wide[200]. A stupefying beverage is made from the leaves and roots[161].

tcanta Unlike Datura inoxia Datura quercifolia does not have much ornamental value.

dwatta NarcoticThe whole plant is narcotic[200]. It has been used in the past to deaden pain, treat insomnia etc, but any use of this plant should only be carried out under the supervision of a qualified practitioner since the difference between the medicinal dose and a toxic dose is very small.

nrakta South-western N. America - Arizona to Mexico. ksacta Roadsides, 1200 - 1800 metres in Arizona.

propta Sow the seed in individual pots in early spring in a greenhouse[200]. Put 3 or 4 seeds in each pot and thin if necessary to the best plant. The seed usually germinates in 3 - 6 weeks at 15°c. Plant out in late spring or early summer, after the last expected frosts. Especially in areas with hot summers, it is worthwhile trying a sowing outdoors in situ in mid to late spring.

nwatta Prefers a rich light sandy soil[1] and an open sunny position[200]. Grows best in a fertile calcareous soil[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. This species is extremely susceptible to the various viruses that afflict the potato family (Solanaceae), it can act as a centre of infection so should not be grown near potatoes or tomatoes[200]. Closely related to D. stramonium[200].

#### 8.2.367 Berberis heterophylla

7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Berberis heterophylla is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[177]. The fruits are about 6mm long[200].

tcanta DyeA yellow dye is obtained from the root.

on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta Landscape Uses:Border, Container, Massing, Seashore, Specimen, Woodland garden. Easily grown in a moderately fertile soil[90]. Prefers a heavy soil without any disturbance, not even hoeing[1, 42]. Requires a well-drained soil and a sunny position[42, 90, 200] or the shade of deciduous trees or shrubs[90]. Succeeds in drier soils and is drought tolerant once established[190]. Plants succeed in most fertile soils, avoiding pure chalk, heavy clay and boggy sites[233]. The dormant bulbs are very hardy and will withstand soil temperatures down to at least -10°c[214]. A very ornamental plant, there are some named varieties[233]. The flowers smell of wet fur and garlic[245]. Bulbs should be planted 10 - 12 cm deep in July[1] on their side with sharp sand beneath them to ensure that they do not rot[42, 200]. Special Features: Attractive foliage.

### 8.2.264 Mahonia gracilis

Mexican Barberry

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Mahonia gracilis is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from February to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: The fruit of all members of the genus is edible either raw or cooked, though we do not know the quality of this species[K]. The ovoid fruit is produced in racemes and is up to 12mm long[200].

nrakta South-western N. America - Mexico, ksacta Dry ravines in open pine forests in limestone soils[260].

propta Seed -

nwatta Unlike most members of this genus, this species requires a dry, well-drained soil in a shady position[260]. It requires a position sheltered from strong or cold winds[202]. Plants are only hardy in the milder areas of the country, tolerating temperatures down to about -5°c when fully dormant[260]. The young growth in spring can be damaged by late frosts. Hybridizes freely with other members of this genus. Plants in this genus are resistant to honey fungus[88].

#### 8.2.265 Ephedra fragilis

7 tlin 10 cyuc 2 kcak 0 tcan 4 dwat 1.8 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Ephedra fragilis is an evergreen Shrub growing to 1.8 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH; mildly acid. neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. Sweet. The fruit is about 10mm in diameter[200].

dwatta AntiasthmaticMembers of this genus contain various medicinally active alkaloids (but notably ephedrine) and they are widely used in preparations for the treatment of asthma and catarrh[148, 238]. The whole plant can be used at much lower concentrations than the isolated constituents - unlike using the isolated ephedrine, using the whole plant rarely gives rise to side-effects[254]. The plant also has antiviral effects, particularly against influenza[238]. The stems are a pungent, bitter, warm herb that dilates the bronchial

vessels whilst stimulating the heart and central nervous system[148, 238]. The stems are also diaphoretic, diuretic, febrifuge, hypertensive, nervine, pectoral, tonic, vasoconstrictor and vasodilator[165, 176, 238]. They are used internally in the treatment of asthma, hay fever and allergic complaints[238]. They are also combined with a number of other herbs and used in treating a wide range of complaints[238]. This herb should be used with great caution, preferably under the supervision of a qualified practitioner[238]. It should not be prescribed to patients who are taking monoamine oxidase inhibitors, or suffering from high blood pressure, hyperthyroidism or glaucoma[238]. Ephedrine is seen as a performance-boosting herb and, as such, is a forbidden substance in many sporting events such as athletics[K]. The stems can be harvested at any time of the year and are dried for later use[238].

nrakta Europe - E. Mediterranean. ksacta Rocky hills and stone walls[148].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[200]. It can also be sown in spring in a greenhouse in a sandy compost[K]. Prick out the seedlings into individual pots as soon as they are large enough to handle and grow them on for at least their first winter in a greenhouse. Plant out in the spring or early summer after the last expected frosts and give some protection in their first winter[K]. Division in spring or autumn[238]. Layering.

nwatta Requires a well-drained loamy soil and a sunny position[11]. Established plants are drought resistant and are also lime tolerant[200]. Plants are not very hardy in Britain, tolerating a few degrees of frost[200]. The report on medicinal uses refers specifically to E. fragilis campylopoda. (C.A.Meyer.) Ascherson. and Graebner. This plant is growing outdoors at Kew, probably planted in 1968, and seems to be perfectly hardy[K]. It is said to come from N. Asia which is rather confusing since the report on medicinal uses is dealing with native plants of Greece[K]. Dioecious. Male and female plants must be grown if seed is required.

### 8.2.266 Disporum cantoniense

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 1 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Disporum cantoniense is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Tender leaves and young shoots - cooked. Used as a vegetable[272].

dwatta FebrifugeThe juice of the roots is used in the treatment of fevers[272]

nrakta E. Asia - Himalayas to China. ksacta Cool shady places at elevations of 1100 - 2900 metres in Nepal[272]. Forests and thickets at elevations of 700 - 3000 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe[175]. Use a lime-free compost and keep it moist[175]. Stored seed requires 6 weeks cold stratification and should be sown as early in the year as possible[175]. Germination usually takes place within 3 - 6 months or more at 15°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[200].

nwatta Best grown in partial shade in a moist peaty or woodland soil[1, 175]. Plants spread rapidly[188] by means of creeping rhizomes when they are grown in a leafy

#### 8.2.267 Nicotiana tabacum

Tobacco, Cultivated tobacco 7 tlin 10 cyuc 2 kcak 3 tcan 2 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Nicotiana tabacum is a ANNUAL growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are poisonous[4, 19, 65, 76]. They contain a volatile oil called nicotine, this is a virulent poison that produces nausea, vomiting, sweating, palpitations and nausea[232].

kcakta Edible Parts: Leaves OilEdible Uses: Egg OilA protein can be extracted from the leaves. It is an odour less, tasteless white powder and can be added to cereal grains, vegetables, soft drinks and other foods[183]. It can be whipped like egg whites, liquefied or gelled and can take on the flavour and texture of a variety of foods[183]. It is 99.5% protein, contains no salt, fat or cholesterol[183]. It is currently (1991) being tested as a low calorie substitute for mayonnaise and whipped cream[183].

tcanta Insecticide Oil RepellentAll parts of the plant contain nicotine, this has been extracted and used as an insecticide[20, 37, 46]. The dried leaves can also be used, they remain effective for 6 months after drying[169]. The juice of the leaves can be rubbed on the body as an insect repellent[213]. The leaves have been dried and chewed as an intoxicant. The dried leaves are also used as snuff or smoked. This is the main species that is used to make cigarettes and cigars. A drying oil is obtained from the seed[57, 171]. Dynamic accumulator.

dwatta Antispasmodic Diuretic Emetic Expectorant Homeopathy Irritant Narcotic Sedative SialagogueTobacco has a long history of use by medical herbalists as a relaxant, though since it is a highly additive drug it is seldom employed internally or externally at present[4, 254]. The leaves are antispasmodic, discutient, diuretic, emetic, expectorant, irritant, narcotic, sedative and sialagogue[4, 192, 213]. They are used externally in the treatment of rheumatic swelling, skin diseases and scorpion stings[240]. The plant should be used with great caution[4], when taken internally it is an addictive narcotic[222]. The active ingredients can also be absorbed through the skin[4]. Wet tobacco leaves can be applied to stings in order to relieve the pain[213]. They are also a certain cure for painful piles[4]. A homeopathic remedy is made from the dried leaves[232]. It is used in the treatment of nausea and travel sickness[232].

nrakta S. America. Naturalized in C. and S. Europe. ks-acta Not known in a truly wild situation.

propta Seed - surface sow in a warm greenhouse about 10 weeks before the last expected spring frosts. The seed usually germinates in 10-20 days at  $20^{\circ}c$ . Keep the soil moist and pot up as soon as the plants are big enough to handle, planting them out after the last expected frosts.

nwatta Prefers a well-drained deep rich moist soil in a sunny position[1, 200]. Plants are not very hardy in Britain, but they can be grown as biennials in areas where winter temperatures do not fall below about -5°c[200]. A polymorphic species[50]. Tobacco is very widely cultivated for its leaves, there are many named varieties[183]. As well as being used as an insecticide, the leaves are used to make cigarettes, cigars, snuff and for chewing. There are many long-term health problems associated with these uses, especially from cancer, lung, circulatory and heart diseases. The plant accumulates potassium[18]. The plant has sweetly scented flowers that release most of their scent in the evening and attract moths[30]. Plant requires more than 14 hours daylight per day in order to induce flowering[169].

#### 8.2.268 Dasylirion wheeleri

Sotol, Common sotol, Bear Grass, Common Sotol, Desert Spoon

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 1.5 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli nyanhien hionli

drutta Dasylirion wheeleri is an evergreen Tree growing to 1.5 m (5ft) at a slow rate. See above for USDA hardi-

ness. It is hardy to UK zone 9. It is in leaf all year, in flower from August to September. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Insects. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: StemEdible Uses: DrinkThe central part of the plant can be cooked and eaten[183]. The crown of the plant was baked by the native North American Indians then dried, pounded into a powder and made into cakes[257]. They would also peel the baked crown, crush it, mix it with water then ferment it and use it as a beverage[257]. The flowering stems can be roasted, boiled or eaten raw[257]. The trunk is rich in sugar, the pith can be used to make the alcoholic beverage 'sotol'[183].

tcanta Basketry Thatching WeavingThe leaves are used in thatching, basket making, weaving into hats, mats etc[257].

nrakta South-western N. America - Arizona to Texas and Mexico. ksacta Open, rocky slopes at elevations of 1200 - 1900 metres in Arizona, New Mexico, Texas and Mexico [270]

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Landscape Uses:Specimen. Requires a very well-drained soil in a sheltered sunny position[200]. This species is not very cold hardy, and is said to require a minimum winter temperature of 10°c[200], However, plants can survive outdoors in the very mildest areas of Britain if given some protection such as a south facing wall and a suitable soil[K]. Plants are sometimes used in sub-tropical bedding schemes in Britain. Special Features:Attractive foliage, North American native. Attractive flowers or blooms.

### 8.2.269 Callicarpa americana

American Beautyberry, Beautyberry, French Mulberry, American Beautyberry

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 1.8 m hkuc

hmimhtut cyutli tcup hwicli jlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Callicarpa americana is a deciduous Shrub growing to 1.8 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from June to July. The species is hermaphrodite (has both male and female organs). Suitable for: medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[105, 177]. Juicy, sweet, fleshy, slightly aromatic[123]. The fruit is about 6mm in diameter[200].

dwatta Diuretic Dysentery MalariaA decoction of the root bark has been used as a diuretic[257]. The leaves are a cure for dropsy[61]. A tea made from the roots is used in the treatment of dysentery and stomach aches[222, 257]. A tea made from the roots and berries is used in the treatment of colic[222, 257]. Some native North American Indian tribes used the leaves and roots in sweat baths for the treatment of malaria, rheumatism and fevers[222, 257].

nrakta South-eastern N. America - Florida to Texas and north to Oklahoma and Arkansas. ksacta Rich woods and thickets[43].

propta Seed - sow February in a greenhouse[78]. Only just cover the seed[138]. Germination usually takes place within 1 - 3 months at 18°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10cm long, July/August in a frame. High percentage[78]. Cuttings of mature wood of the current season's growth with a heel[78] taken in early spring[200].

for the treatment of hysteria, convulsions, colic, uterine diseases and obstructions of the bile duct[61, 272]. They are given to children as a blood purifier[240]. The seeds are cathartic and emetic[240, 272]. An infusion of the dried flowers is useful in the treatment of diarrhoea[240]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - Himalayas from Pakistan to W. Nepal. ksacta Forest and scrub, often gregarious, 1800 - 2500 metres[51, 187]

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250]. nwatta Requires a deep rich soil, preferably neutral or

slightly alkaline[1], doing guite well in sun or light shade[1]. 200]. It is best grown amongst shrubs[200], doing better when given some shade[233]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Many gardeners have difficulties growing this plant in their gardens, though it thrives in the outdoor beds at the Royal Botanical Gardens, Edinburgh[250]. Probably giving it the protection of shrubs or a woodland edge is likely to be most successful[250]. Plants are hardy to about -20°c[187]. A very ornamental[1] and long-lived plant, specimens can survive in the garden for at least 50 years[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from

### 8.2.362 Hedychium spicatum

7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hedychium spicatum is a PERENNIAL growing to 1.5 m (5ft) by 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit cooked[177]. Eaten in savoury dishes with lentils[183].

tcanta Essential IncenseThe rootstock yields 4% essential oil[240]. This oil, which has a scent somewhat like hyacinths, is so powerful that a single drop will render clothes highly perfumed for a considerable period[245]. The dried root is burnt as an incense[245].

dwatta Carminative Digestive Emmenagogue Expectorant Stimulant Stomachic Tonic VasodilatorThe rootstock is

carminative, emmenagogue, expectorant, stimulant, stomachic and tonic[240, 243]. It is useful in the treatment of liver complaints, and is also used in treating fevers, vomiting, diarrhoea, inflammation, pains and snake bite[240, 243, 272]. The root is used in Tibetan medicine, it is said to have an acrid taste and heating potency[241]. It is digestive, stomachic and vasodilator[241]. It is used in the treatment of indigestion and poor circulation due to thickening of the blood[241].

nrakta E. Asia - Himalayas. ksacta Forest clearings, shrubberies, 1800 - 2800 metres[90] from Himachal Pradesh to Arunachal Pradesh.

propta Seed - best sown as soon as it is ripe in a warm greenhouse at  $18^{\circ}$ (2001. Prick out the seedlings into individual pots when they are large enough to handle and grow them on for at least their first winter in the greenhouse. Plant out in late spring after the last expected frosts. Division as growth commences in the spring[2001. Dig up the clump and divide it with a sharp spade or knife, making sure that each division has a growing shoot. Larger clumps can be planted out direct into their permanent positions, but it is best to pot up the smaller divisions and grow them on in a greenhouse until they are established. Plant them out in the summer or late in the following spring.

nwatta Requires a rich moist soil and a sunny position[233]. They can be grown in a sunny border as a summer sub-tropical bedding plant[[1]. Plants are not very coldhardy, tolerating temperatures down to about -2°c. They can be grown at the foot of a south-facing wall if given a good mulch in the winter[1, 200]. Plants succeed outdoors in Tresco Gardens, Isles of Scilly, This species succeeds outdoors in most parts of S. England, especially if the rhizomes are mulched with dry leaves in the autumn[90]. Plants have been known to withstand temperatures down to -16°c in Germany[214]. Plants seem to be immune to the predations of rabbits[233]. The tubers should only just be covered with soil[233]. The flowers are sweetly scented, the scent being most pronounced towards evening[245]. Both the bruised and the dried root are very aromatic with a fragrant, somewhat pungent smell that is similar to orris root but more powerful[245].

### 8.2.363 Arthropodium cirrhatum

Dools lile

7 tlin 10 cvuc 1 kcak 0 tcan 0 dwat 1 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Arthropodium cirrhatum is an evergreen Perennial growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Rhizome - cooked[173, 177].

nrakta New Zealand ksacta Rocky cliffs near the sea, often in colonies, on North and South Islands north of latitude  $42^{\circ} \ 30' \ s[44]$ 

propta Seed - sow late winter in a cold greenhouse. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in a greenhouse. Plant out in late spring or early summer, after the last expected frosts. Division in spring.

nwatta Prefers a well-drained sandy peaty loam in a warm, sheltered sunny position[200]. Grows best in a rich leafy soil[260]. Plants are not very cold-hardy, tolerating temperatures down to about -3°c[260]. They can succeed outdoors in the milder areas of Britain, but they are best grown in a cold greenhouse in this country[200]. A polymorphic species[200]. This plant was possibly formerly cultivated for its edible root by the Maoris, the root grows larger under cultivation[173].

### 8.2.364 Zygophyllum fabago

Syrian Bean Caper

1437

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1.2 m hkuc

drutta Coprosma virescens is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw or cooked. Sweet, but with little flavour[225]. The white fruit is about 5mm in diameter[225]. The roasted seed is an excellent coffee substitute[153].

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153].

nrakta New Zealand. ksacta Lowland to lower montane forest and shrubland, North and South Islands[44].

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[X]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Succeeds in most soils[225]. Somewhat intolerant of frost, this species is only likely to succeed outdoors in the mildest areas of Britain[200]. Another report says that it is proving to be hardy in an Essex garden[225]. Hybridizes freely with other members of this genus[200, 225]. Plants are tolerant of heavy clipping or pruning[225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

### 8.2.359 Oenanthe pimpinelloides

Meadow Parsley, Corkyfruit waterdropwort 7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

htut cyuli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Oenanthe pimpinelloides is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist or wet

pcista Many species in this genus are very poisonous, one report has been found so far saying that this species is also poisonous[76]. It is said to contain the alleged 'psychotroph' myristicine[218].

kcakta Edible Parts: RootEdible Uses: Root[2, 105]. Starchy with a flavour somewhat like filberts, is much esteemed in some areas[4, 183]. Some caution is advised since many members of this genus are very poisonous, see the notes above on toxicity.

nrakta Europe, including Britain, from Belgium south and east to Spain and W. Asia ksacta Meadows and damp grassy places[17].

propta Seed - sow spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in spring or autumn. Very easy, large divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer.

nwatta Requires a moist or wet fertile soil in a sunny position. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and  $-10^{\circ}$ c[200].

### 8.2.360 Paris polyphylla

Herb Paris

7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc pcimhmim cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli dyatxre7t hjonli

drutta Paris polyphylla is a PERENNIAL growing to 1 m (3ft 3in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

pcista Poisonous[4].

kcakta Edible Parts: SeedEdible Uses: Seed[105]. A sweet flavour, but mawkish[2].

dwatta Analgesic Anthelmintic Antiphlogistic Antispasmodic Antitussive Depurative Febrifuge NarcoticThe roots
are analgesic, antiphlogistic, antipyretic, antispasmodic, antitussive, depurative, febrifuge and narcotic[4, 147, 176,
218]. They posses anthelmintic properties[243]. A decoction of the roots is used in the treatment of poisonous snake
bites, boils and ulcers, diphtheria and epidemic Japanese B
encephalitis[147]. A paste of the roots is used as a poultice to
treat cuts and wounds[272]. The juice of the roots has been
used as an anthelmintic[272]. The roots have shown antibacterial action against Bacillus dysenteriae, B. typhi, B. paratyphi, E. coli, Staphylococcus aureus, haemolytic streptococci,
Meningococci etc[176]. The whole plant is febrifuge[218].

nrakta E. Asia - China to the Himalayas. ksacta Broad-leaved and mixed woodlands to 3000 metres in the Himalayas[51, 200]. Forests, bamboo forests, thickets, grassy or rocky slopes and streamsides, 100 - 3500 metres in western China[266].

propta Seed - best sown as soon as it is ripe in late summer in light shade in a greenhouse. Sow stored seed in a greenhouse as soon as it is received. The seed is very slow to germinate. It produces a primary root about 7 months after sowing, this pulls the seed deeper into the soil. Leaves are produced about 4 months later [137]. Sow the seed thinly in fairly deep pots so that the seedlings can be grown on for their first two years without disturbance. Once they have germinated, give them a regular weak liquid feed to ensure that they do not suffer from nutrient deficiency. Once the plants are dormant at the end of their second year of growth, divide them up and put one plant in each pot. Grow them on for at least another year in a shady part of the greenhouse before planting them out into their permanent positions. Division

nwatta Easily grown in a moist humus-rich soil in wood-land conditions, succeeding in full or partial shade[90, 200, 233]. Prefers a light sandy loam[42]. This species is hardy to about -15°c according to one report[200], though another says that plants only succeed outdoors in southern and western Britain[42]. Overcollection of this plant from the wild for medicinal purposes is a cause of conservation concern[272]. A very variable species, with a large number of subspecies recognised[266]. Plants are very slow to flower from seed[137]. The individual flowers are very long-lived, lasting for up to 3 months[200, 233].

#### 8.2.361 Paeonia emodi

7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Paeonia emodi is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in March. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked[105, 146].

dwatta Antispasmodic Blood purifier Cathartic Cholagogue Emetic Uterine tonicThe tubers are a useful medicine nwatta Landscape Uses:Border, Cascades, Erosion control, Foundation, Pest tolerant, Massing, Standard. Requires a sunny position or light dappled shade[1, 200]. Prefers a highly fertile well-drained loamy soil[200]. This species is hardy to about -18°c according to one report[200] whilst another says that it is only really hardy in the milder parts of Britain, though some forms should prove to be hardier[1]. Requires cross-pollination for good fruit production[182]. Plants in this genus are notably resistant to honey fungus[200]. Special Features: Attracts birds, North American native, Fragrant foliage, Naturalizing, Attracts butterflies, Inconspicuous flowers or blooms.

### 8.2.270 Ophrys tenthredinifera

Sawfly Orchid

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Ophrys tenthredinifera is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe - Mediterranean. ksacta Calcareous soils in open places in scrub to 1200 metres[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, how ever[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Plants pre-

fer a shady position[188]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials [230]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

#### 8.2.271 Coprosma brunnea

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Coprosma brunnea is an evergreen Shrub growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable PH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw[128]. Sweet, but with little flavour[225]. The fruit is white or blue and up to 8mm long x 6mm wide[200, 225]. The roasted seed is an excellent coffee substitute[153].

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153]. An excellent medium-height ground cover[200].

nrakta New Zealand. ksacta Lowland to higher montane river beds, open grassland and rubbley places on North, South and Stewart Islands[44].

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[K]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Succeeds in most soils, so long as they are well-drained[225]. Very tolerant of maritime exposure[200]. Somewhat intolerant of frost[200], this species is hardy at Kew but it prefers milder winters[11]. It does not succeed in the colder areas of the country[11]. Fruits are freely produced in Ireland[11]. Does well on a sunny ledge in the rock garden[11, 182]. Hybridizes freely with other members of this genus[200, 225], especially C. petriei[225]. There are several named forms, selected for their ornamental value[225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

### 8.2.272 Commelina elliptica

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Commelina elliptica is a PERENNIAL growing to 0.1 m (0ft 4in). See above for USDA hardiness. It is

hardy to UK zone 8. It is in flower from July to September, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: The following use is for the closely related C. tuberosa, but is also probably appropriate for this species[K]. Tubers - cooked. Rich in starch[105, 177], but with a fairly bland flavour.

nrakta South-western N. America - mountains of Mexico and south to Peru and Bolivia. ksacta Not known

propta Seed - sow March in a greenhouse. The seed usually germinates in 4 - 5 weeks at 20°c[164]. When they are large enough to handle, prick the seedlings out into individual pots plant them out in late spring or early summer, after the last expected frosts. Division in early spring. Make sure that each portion has at least one growing bud[111, K]. Cuttings during the growing season. Very easy[200].

nwatta Prefers a light well-drained loam with added leafmold[42]. Succeeds in an ordinary, reasonably moist soil in a sunny position with some shelter[164]. Plants are hardy to about -10°c if the roots are protected from freezing[187]. The roots are best dug up in the autumn and stored like dahlias in a cool frost free place[200]. When grown in a light well-drained soil and mulched well, the roots usually survive the winter outdoors[1]. This species is closely related to C. tuberosa[200].

### 8.2.273 Oxalis corymbosa

Lilac Oxalis, Pink woodsorrel 7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Oxalis corymbosa is a PERENNIAL growing to 0.2 m (Oft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

pcista The leaves contain oxalic acid, which gives them their sharp flavour. Perfectly all right in small quantities, the leaves should not be eaten in large amounts since oxalic acid can bind up the body's supply of calcium leading to nutritional deficiency. The quantity of oxalic acid will be reduced if the leaves are cooked. People with a tendency to rheumatism, arthritis, gout, kidney stones or hyperacidity should take especial caution if including this plant in their diet since it can aggravate their condition[238].

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Leaves and leafstalks - raw or cooked[144]. Use in moderation, see notes at top of sheet. Flowers - raw. A pleasant acid flavour, they make an ornamental addition to a mixed salad[K]. Root - raw. Sweet, crisp and succulent[144, 177].

nrakta S. America. Naturalized in Britain. ksacta A weed of disturbed ground and gardens in Britain, especially near London[17].

propta Seed - best sown as soon as ripe in a cold frame. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in late spring or early summer. Division in spring. Larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early

nwatta Easily grown in a sandy soil in a warm dry position[1]. Plants are not very hardy in Britain according to one report which lists this plant as succeeding in climatic zone 9 and thus only tolerating occasional light frosts[200]. However, it is naturalized in parts of Britain, especially near London[17]. It is growing well in our Cornwall site, where it has proved to be hardy since 1994[K].

#### 8.2.274 Achyranthes bidentata

7 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Achyranthes bidentata is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to September, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

pcista One report suggests that the root is poisonous[179].

kcakta Edible Parts: Leaves SeedEdible Uses: Seed cooked. A good substitute for cereal grains in bread-making, they have often been used for this purpose in famine years 2, 177, 238]. The light brown oblong seed is about 1mm long[266]. Leaves - cooked[177, 178]. Used as a vegetable in the same manner as spinach[179].

tcanta Insecticide TeethTwo insect-moulting hormones are found in the roots[174]. Can this have a practical application as an insecticide? The stem of the plant is used as a toothbrush that is said to be good for the teeth and is also a treatment for pyorrhoea[272].

dwatta Anodyne Antiasthmatic Antiinflammatory Antirheumatic Bitter Digestive Digretic Emmenagogue Odontalgic VasodilatorThe roots, leaves and stems are widely used in Chinese herbal medicine[238]. The roots contain triterpenoid saponins, sitosterol and sigmasterol[283]. They are anodyne, antiinflammatory, antirheumatic, bitter, digestive, diuretic, emmenagogue and vasodilator[238, 283]. They act predominantly on the lower half of the body and are used in the treatment of aching back and knees and asthenia of the lower limbs[176, 238, 254]. Research suggests that they can cause dilation of the cervix and so this herb should not be used when pregnant[238]. The herb is taken internally to treat hypertension, back pains, urine in the blood, menstrual pain, bleeding etc[238, 283]. It lowers blood cholesterol levrels and so is used in the treatment of atherosclerosis[283]. The root juice is used in Nepal in the treatment of toothache[272]. This juice is also used in the treatment of indigestion and is considered to be a good treatment for asthma[272]. The stem of the plant is used as a toothbrush that is said to be good for the teeth and is also a treatment for pyorrhoea[272]. The plant can be used fresh or dried. The leaves and stems are harvested in the summer and are usually crushed for their juice or used in tinctures[238]. The roots are harvested from 1 or 2 year old plants in the autumn or winter and usually dried and ground into a powder or used in decoctions[238].

nrakta E. Asia - China, Japan, India. ksacta Forest edges, the sides of streams and shrubberies[254]. Moist shady places at elevations of 1200 - 3000 metres in Nepal[272].

propta Seed - sow late spring in a greenhouse. Germination should be fairly rapid, prick out the seedlings into individual pots of fairly rich soil when they are large enough to handle. It is probably wise to grow this plant on in the greenhouse for its first winter, planting it out into its permanent position in late spring after the last expected frosts.

nwatta Prefers a rich, sandy, slightly acid soil in partial shade[238]. This species is probably not hardy in the colder areas of the country, it tolerates temperatures down to at least -5°c[238]. When grown in a rich soil the roots can be up to 1.2 metres long[238]. Widely cultivated in China, especially in Henan Province, as a medicinal plant[238] and as a food plant[179].

#### 8.2.275 Commelina tuberosa

Commelina

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Commelina tuberosa is a PERENNIAL growing to 0.1 m (Oft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September, and the seeds ripen from August to October. The species neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: SeedEdible Uses: Seed - used as a flour[105]. A famine food, they are only used when all else fails[177]

tcanta Dye Hedge HedgePlants can be used for informal hedging in areas that are frost free or almost so[200]. A brown dye is obtained from the bark[46, 61].

nrakta E. Asia - Japan. ksacta Thickets near the seashore, C. and S. Japan[58].

propta Seed - best sown as soon as it is ripe in a shady position in a warm greenhouse [78]. Stored seed should be sown in February/March in a warm greenhouse[78]. Germination is variable [78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5cm with a heel, September/October in a frame. Fair percentage[78, 113]. Layering[200].

nwatta Requires a well-drained moisture retentive fertile loam or peaty soil in a warm sheltered sunny position[11, 200]. Prefers a position in light shade[202]. An easily grown plant but it is intolerant of dry cold[184]. Judging by its habitat, it should be fairly tolerant of maritime exposure[58]. Plants are tolerant of sea spray[245]. Tolerating temperatures down to about -15°c[200], it is normally hardy at Kew[1]. A polymorphic species[58], there are some named varieties selected for their ornamental value [200]. The plant bears honey-scented hawthorn-like blossoms[245]. Plants do not require pruning[182]. They are of slow to moderate growth rate[202]. Plants resent root disturbance and so are best grown in pots and then planted out into their permanent positions as soon as possible[200].

#### 8.2.356 Ferula communis

Giant Fennel

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 2.5 m hkuc htut cyutli hgatkyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Ferula communis is a PERENNIAL growing to 2.5 m (8ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. The plant is selffertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought

kcakta Edible Parts: LeavesEdible Uses: Gum-Leaves[183]. No further details are given.

tcanta Furniture Gum Miscellany TinderA gum 'Gum Ammoniac' is obtained by notching the root [46, 61, 64, 100]. It is used as an incense[4], it also has medicinal value[1]. The stems are used in furniture making[89]. The dried pith is used as a tinder, it burns very slowly inside the stem and can thus be carried from one place to another[89, 100, 148].

dwatta MiscellanyOne report says that the root yields a gum with medicinal properties but no details are given[1].

nrakta Europe - Mediterranean, ksacta Dry hills, walls, waste ground and limestone[89], often in soils that are damp in the spring[187]

propta Seed - best sown as soon as the seed is ripe in a greenhouse in autumn[1]. Otherwise sow in April in a greenhouse. Prick out the seedlings into individual pots as soon as they are large enough to handle. Plant them out into their permanent positions whilst still small because the plants dislike root disturbance[1]. Give the plants a protective mulch for at least their first winter outdoors. Division in autumn. This may be inadvisable due to the plants dislike of root dis-

nwatta Succeeds in most soils[1] including dry ones according to one report[190] whilst others say that it requires a deep moist fertile soil in a sunny position[111, 200]. Established plants are drought resistant[190]. This species is hardy to about -10°c, possibly lower if the rootstock is mulched in the winter[187]. A very ornamental plant[1], though the flowers have a most unpleasant rancid smell[245].

Plants are often monoecious[187]. Plants are intolerant of root disturbance due to their long taproot[200]. They should be planted into their final positions as soon as possible. The sub-species brevifolia is the form used for its gum[1, 46, 61,

### 8.2.357 Edgeworthia papyrifera

Paperbush, Oriental Paperbush

7 tlin 10 cyuc 1 kcak 4 tcan 0 dwat 2.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Edgeworthia papyrifera is a deciduous Shrub growing to 2.5 m (8ft) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from February to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

kcakta It is used to make edible rice paper.

tcanta Paper StringA high-class paper is made from the bark[1, 11, 58, 61, 200]. The bark fibres are used[61]. The stems are harvested in spring or early summer, the leaves are removed and the stems steamed until the fibres can be stripped. The outer bark is removed from the inner by peeling or scraping. The fibres are cooked for 2 hours with soda ash and then beaten with mallets or put through a blender. The paper is off white in colour[189]. The stems are extremely supple and can be tied in knots[11, 182]. It is used to make edible rice paper. Carbon Farming Solutions - Industrial Crop: fiber (Crops grown for non-food uses. Industrial crops provide resources in three main categories: materials, chemicals, and energy. Traditional materials include lumber and thatch, paper and cardboard, and textiles) [1-1].

nrakta E. Asia - China. ksacta Forests and streamsides, at elevations of 300 - 1600 metres in Ichang Province[109,

propta Seed - best sown as soon as it is ripe in a cold frame. Place the pot in a plastic bag to keep it moist[175]. The seed might germinate in the spring, though it could take another 12 months. Stored seed usually requires 8 -12 weeks warm stratification at 20°c followed by 12 - 14 weeks at 3°c[175]. Germination can still take 12 months or more at 15°c[175]. Prick out the seedlings into individual pots as soon as they are large enough to handle, and grow on in a greenhouse for at least a year before planting out in late spring or early summer[175]. Consider giving the plants some protection from the cold for their first winter outdoors. Cuttings in spring. Cuttings of half-ripe wood, July/August in a frame[200]

nwatta Industrial Crop: Fiber Management: Coppice-Climate: warm temperate to subtropical. Humidity: humid. Succeeds in any soil in sun or part shade[175, 184, 200], growing well in light woodland[200]. Prefers a welldrained soil with plenty of moisture in the growing season[1, 200]. Plants are hardy to about -15°c according to one report[184], whilst others say that it is only hardy in the milder areas of Britain[1, 11]. It succeeds on a wall at Kew[K] and as a free-standing shrub in Cornwall[11]. The flowers are damaged by frost, so the plant is best grown on a south or west-facing wall[188]. Plants resent root disturbance and should be put into their permanent positions as soon as possible[188]. Cultivated in Japan for the paper that can be made from the bark[11, 200]. The stems are harvested every second year[61]. This species is very closely related to and scarcely distinct from E. gardneri and E. chrysantha[200]. The flowers diffuse a pronounced clove-like perfume and will scent the air to some distance on a calm day[245]. Carbon Farming Solutions - Cultivation: regional crop: Management: coppice (Describes the non-destructive management systems that are used in cultivation) [1-1].

### 8.2.358 Coprosma virescens

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153].

nrakta New Zealand. ksacta Lowland to lower montane forest and shrubland, North, South and Stewart Islands[44].

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[K]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Succeeds in most soils[225]. Somewhat intolerant of frost, this species is only likely to succeed outdoors in the milder areas of Britain[200]. Another report says that plants are reasonably hardy in Britain[225]. A polymorphic species[44], it hybridizes freely with other members of this genus[200, 225]. Plants are tolerant of heavy clipping or pruning[225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

#### 8.2.353 Ericameria nauseosa

Rubber Rabbithrush

7 tlin 9 cyuc 1 kcak 3 tcan 2 dwat 2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Ericameria nauseosa is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. The flowers are pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: RootEdible Uses: Edible Portion: Chewing gum, tea. A gum obtained from the root is used for chewing[46, 61, 95, 257].

tcanta The plant is a source of latex, used in making rubber[46, 61, 95]. There is no commercially viable method of extracting it as yet[212]. This species has been identified as one of the more promising species from western N. America for the production of biocrude (hydrocarbon and hydrocarbon-like chemical fraction of plants which may be extracted by organic solvents and upgraded to liquid fuels and chemical feedstocks). Finding the cyclohexane extract to be 15.1%, the ethanol extract 20.8%, McLaughlin and Hoffmann (1982) calculated 13.2 kBTU/lb, in the extractables, a biomass yield of ca 4.5 MT/ha or 12.5 bbls, at a per barrel cost of 50.00or13.10/million BTU[269]. The leaves have been used as a sanitary towel, especially after childbirth[257]. A green dye is obtained from the bark[168]. A yellow-gold dye is obtained from the flowers[95, 168]. The growing plant repels insects[99]. The cottony fruiting heads are used as a stuffing material for pillows etc[99]. Along with associated species, like big sage and western wheat grass, rubber rabbitbrush is a significant source of food for browsing wildlife on winter ranges. An ornamental xeriscaping shrub. Carbon Farming - Industrial Crop: hydrocarbon.

dwatta A decoction of the twigs has been used in the treatment of toothaches, coughs and chest pains[257]. An infusion of the flowering stems has been used in the treatment of colds and TB[257]. An infusion of the leaves and stems has been used to treat colds, diarrhoea, stomach cramps etc[257] l. It has also been used externally as a wash for sores and skin eruptions, especially smallpox[257]. The plant shows slight bactericidal activity[269 ]. In small doses, the extracts lowered the blood pressure briefly in rabbits. In large doses, the fall in blood pressure was pronounced, accompanied by circulatory and respiratory failure[269].

nrakta Western N. America - Canada to California. ksacta It is a temperate plant. Dry sandy, gravelly, or heavy

clayey and alkali soils in open places in sagebrush, juniperpinyon and ponderosa-pine zones at low elevations and occasionally found at higher elevations[60, 269].

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse and only just covering the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, mid summer in sand in a frame[200].

nwatta Experimental Crop Industrial Crop: Hydrocarbon Management: CoppiceThis species thrives on poor soils and so is an indication that the land is poor, has been allowed to erode, has been overgrazed or in other ways neglected[212]. It is also reported to tolerate alkaline conditions, drought, heavy clays and poor soils[269]. The following notes are based on the general needs of the genus. Requires a sunny position and prefers a well-drained sandy soil[1, 11]. Plants do not require a rich soil[11]. They tolerate alkaline soils[200 ]. The sub-species C. nauseosus ssp., consimilis, is characteristic of sites with highly saline soils[269]. Climate: boreal to warm temperate. Humidity: semi-arid. Carbon Farming - Cultivation: experimental. Management: coppice.

#### 8.2.354 Osteomeles schwerinae

7 tlin 10 cvuc 1 kcak 0 tcan 0 dwat 2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Osteomeles schwerinae is an evergreen Shruh growing to 2 m (6ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[105]. The white fruit has a sweet flavour[2]. The fruit is about 8mm in diameter[200]

nrakta E. Asia - W. China in Yunnan and W. Sichuan. ksacta By streams and in hot dry river valleys, 350 - 2000 metres[109, 200]. Among shrubs, slopes, fields, roadsides and mixed forests at elevations of 1500 - 3000 metres[266].

propta The seed requires a period of cold stratification and can be sown in late autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Pot up in the autumn and overwinter in a greenhouse. Fair to good percentage[78]. Layering.

nwatta Succeeds a sheltered position in full sun in any fertile well-drained soil[166, 182, 188]. Plants usually require protection outside the mildest areas of Britain[11], they are hardy to about -5°c, though the sub-species O. schwerinii microphylla. Rehder, and Wils, is hardier to about -10°c[184]. This sub-species is often mistakenly sold under the name O. subrotunda[219]. They can be grown on a sunny wall[11]. Seed is seldom set in Britain[219].

#### 8.2.355 Rhaphiolepis umbellata

Japanese Hawthorn

1434

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 2.5 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Rhaphiolepis umbellata is an evergreen Shrub growing to 2.5 m (8ft) by 2.5 m (8ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid,

is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Tubers - cooked. Rich in starch[105, 177], but with a fairly bland flavour.

nrakta Southern N. America - Mexico. ksacta Not known

propta Seed - sow March in a greenhouse. The seed usually germinates in 4 - 5 weeks at 20°c[164]. When they are large enough to handle, prick the seedlings out into individual pots plant them out in late spring or early summer, after the last expected frosts. Division in early spring. Make sure that each portion has at least one growing bud[111, K]. Cuttings during the growing season. Very easy[200].

nwatta Prefers a light well-drained loam with added leafmold[42]. Succeeds in an ordinary, reasonably moist soil in a sunny position with some shelter [164]. Plants are hardy to about -10°c if the roots are protected from freezing[187]. It is probably best to dig up the roots in autumn and stored them like dahlias in a cool frost free place[200]. When grown in a light well-drained soil and mulched well, the roots usually survive the winter outdoors[1]. A very ornamental plant[1].

### 8.2.276 Origanum dictamnus

Dittany Of Crete, Hop Marjoram

7 tlin 9 cvuc 2 kcak 0 tcan 1 dwat 0.2 m hkuc htut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatprikl-

wisslip hpa7tmwatli xre7t hjonli

drutta Origanum dictamnus is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.4 m (1ft 4in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil

kcakta Edible Parts: LeavesEdible Uses: Condiment TeaThe leaves are used for flavouring salads and vermouth[183, 238]. A pleasant aromatic flavour, especially when mixed with parsley, thyme, garlic, salt and pepper[183]. The flowering tops are dried and brewed into a herb tea[183, 238].

dwatta Antirheumatic Oxytoxic Stomachic VulneraryThe flowering plant has been used as an antirheumatic, oxytocic. stomachic and vulnerary[148], though these uses appear to be obsolete in modern herbalism[238]..

nrakta S. Europe - Crete. ksacta Shady rocks in dry places in high mountains[50, 148].

propta Seed - sow early spring in a greenhouse at 10 -13°c and only just cover the seed. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. The seed can also be sown in situ in late spring. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal cuttings of young barren shoots in June. Very easy. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Landscape Uses:Border, Container. Requires a rather dry, warm, well-drained soil, but is not fussy as to soil type, thriving on chalk[1]. Prefers slightly alkaline conditions[1]. This species is not fully hardy in Britain according to one report[1] whilst another says that it is hardy to zone 7[200], which means that it can succeed outdoors in most parts of the country. It is, however, very susceptible to winter wet and so is more commonly grown under cover in this country[238]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attractive foliage, Fragrant foliage, Suitable for dried flowers.

### 8.2.277 Abronia fragrans

Snowball Sand Verbena

7 tlin 10 cvuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Abronia fragrans is a PERENNIAL growing to 0.6 m (2ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: RootEdible Uses: Root cooked[46]. Dried then ground into a powder and mixed with corn[61, 105, 161]. Use of the root was said by some North American Indian tribes to give one a good appetite and make

dwatta Cathartic Diaphoretic EmeticThe plant is cathartic, diaphoretic and emetic[257]. The roots and flowers were used by the North American Indians to treat stomach cramps and as a general panacea or 'life' medicine[257]. A cold infusion was used as a lotion for sores or sore mouths and also to bathe perspiring feet[257].

nrakta South-western N. America - South Dakota to Nebraska, Colorado, Texas and Mexico ksacta Dry sandy soils, scrub and grasslands at elevations of 400 - 2000 metres[60. 235, 2701,

propta Seed - sow autumn or early spring very shallowly in pots of sandy soil in a greenhouse[133]. Germination can be very slow unless you peel off the outer skin and pre-soak the seed for 24 hours in warm water[200, 245]. The seed usually germinates in 1 - 2 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Seedlings are prone to damp off and so should be kept wellventilated[200]. Plant out in late spring, after the last expected frosts. Cuttings in spring, rooted in sand[200].

nwatta Prefers a light well-drained sandy soil in full sun[200]. This species is not very hardy in Britain, though it should succeed outdoors in the southern part of the country, especially if given a warm sheltered site [200]. The flowers are produced in terminal clusters, they only open in the coolness of the evening, diffusing a vanilla-like perfume[245]. Seed is rarely ripened on plants growing in Britain[1].

### 8.2.278 Helichrysum italicum

1407

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Helichrysum italicum is an evergreen Shrub growing to 0.6 m (2ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Edible Uses: Condiment TeaLeaves used as a flavouring in salads and cooked foods[183, 238, 244]. They have a slight flavour of curry, though they do not impart this very well to other foods[K]. An essential oil (from the leaves?) is used as a flavouring to enhance fruit flavours in sweets, ice cream, baked goods, soft drinks and chewing gum[183]. A tea is made from the flower heads[183].

tcanta Hedge HedgePlants can be grown as a low hedge, the subspecies H. italicum serotinum(Boiss.)P.Fourn. is normally used[29]. It responds well to trimming.

nrakta S. Europe, ksacta Arid hills, rocks and cliffs[190] propta Seed - sow February/March in a greenhouse. The seed usually germinates in 2 - 3 weeks at 20°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5cm with a heel, June/July in a frame. Roots in 4 weeks. Good percentage[78].

nwatta Requires a light well-drained soil in a sunny sheltered position[1, 200]. Intolerant of excessive moisture[1]. Established plants are drought resistant[190]. Plants have proved to be fairly wind tolerant in an exposed site in Cornwall (Kl. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -10°c[200]. Plants can be pruned back to the old wood in spring in order to maintain the shape of the plant and promote lots of new growth[238]. The whole plant smells of curry, especially after rain[238]. The flowering stems are often dried and used as 'everlasting flowers'[238]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 8.2.279 Fritillaria thunbergii

he Bei Mu

7 tlin 10 cyuc 2 kcak 0 tcan 3 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fritillaria thunbergii is a BULB growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Bulb-fried or candied[177]. The bulb is up to 3cm in diameter[266]. Young plants and buds - cooked[177].

dwatta Antitussive Expectorant FebrifugeThe bulbs are antidote, antitussive, astringent, expectorant, galactogogue and purgative[147, 174, 176, 218]. They contain fritimine which diminishes excitability of respiratory centres, paralyses voluntary movement and counters effects of opium[61]. The bulbs are thought to act specifically on tumours and swellings of the throat, neck and chest, and they are taken in the treatment of thyroid gland nodules, scrofula, abscesses and boils and breast cancer[254]. The bulb is used internally in the treatment of coughs, bronchitis, pneumonia, feverish illnesses, abscesses etc[238]. The bulbs also have a folk history of use against cancer of the breast and lungs in China[218, 238]. This remedy should only be used under the supervision of a qualified practitioner, excessive doses can cause breathing difficulties and heart failure[238]. The bulbs are harvested in the winter whilst they are dormant and are dried for later use[238].

nrakta E. Asia - E. China. ksacta Bamboo forests, shady and moist places from near sea level to 600 metres[163, 266].

propta Seed - best sown as soon as ripe in a cold frame, it should germinate in the spring[1]. Protect from frost[134]. Stored seed should be sown as soon as possible and can take a year or more to germinate[134]. Sow the seed quite thinly to avoid the need to prick out the seedlings. Once they have germinated, give them an occasional liquid feed to ensure that they do not suffer mineral deficiency. Once they die down at the end of their second growing season, divide up the small bulbs, planting 2 - 3 to an 8cm deep pot. Grow them on for at least another year in light shade in the greenhouse before planting them out whilst dormant. Division of offsets in August[1]. The larger bulbs can be planted out direct into their permanent positions, but it is best to pot up the smaller bulbs and grow them on in a cold frame for a year before planting them out in the autumn. Bulb scales[163].

nwatta Best grown in a moist peaty soil in the open garden[90]. Easily grown in a moderately fertile soil in sun or semi-shade[200]. Succeeds in drier soils and is drought tolerant when established[190]. The dormant bulbs are fairly hardy and will withstand soil temperatures down to at least 5°c[214]. The scaly bulbs are best planted on their sides or surrounded in sand to prevent water collecting in their hollow crowns[238]. This species is cultivated as a medicinal plant in Europe and Asia[163]. Plants take 3 - 5 years to flower from seed.

#### 8.2.280 Salvia carduacea

Thistle Sage

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.7 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia carduacea is a ANNUAL/PERENNIAL growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: DrinkSeed - raw or cooked. It can be roasted, then ground into a powder and used with other seeds as a mush[161, 177, 183, 257]. The seeds can be added to wheat to improve the flavour[257]. It can also be used as a cooling beverage[161, 177, 183].

nrakta South-western N. America - California. ksacta Sandy and gravelly places below 1350 metres[71]. Open grassy places[260].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Plants can be killed by excessive winter wet[200]. This species is not very cold-hardy in Britain, tolerating short periods when temperatures fall to about -3°c[260]. An autumn-germination plant in the wild, it might succeed outdoors in the milder areas of the country but is usually either grown as a spring-sown annual in Britain or grown in an alpine greenhouse[1, 200]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 8.2.281 Gaillardia pinnatifida

Blanket Flower, Red dome blanketflower 7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gaillardia pinnatifida is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: The dried seeds can be ground into a powder then kneaded into seed butter and spread on bread[257].

dwatta Antirheumatic DiureticThe plant is used as a diuretic, taken to give relief from painful urination[216, 257]. An infusion of the leaves is taken internally, and a poultice applied externally, in the treatment of gout[257].

nrakta Southern N. America. ksacta Open grasslands[228].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division, with care[200]. Root cuttlings in the winter[200].

nwatta Requires a position in full sun, succeeding in any moderately fertile well-drained soil[200]. Performs well in poor soils and copes well with hot dry conditions[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Some winter protection, especially in areas experiencing heavy snows, is recommended. Covering the plants with brush wood should be enough[200]. Plants are so prolific and long blooming that they often exhaust themselves and are then short-lived[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

nrakta E. Asia - China to the Himalayas. ksacta Scrub and dry valleys, 1500 - 3000 metres in the Himalayas[184]. Also found in forests in Srinagar[145].

propta Seed - best sown as soon as it is ripe in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy. Cuttings of mature wood in November Layering

nwatta Succeeds in a good well-drained loam in a sunny position[1, 200]. Tolerates light shade[202]. Tolerates most soil types, including dry soils once it is established[202]. This species is not very cold hardy, tolerating temperatures down to about -10°c[184]. It requires some protection such as a warm wall when grown outdoors in Britain[200]. There are some named varieties selected for their ornamental value[188]. The flowers are slightly scented[245]. Plants produce suckers and these can sometimes be invasive[202]. Pruning can be carried out in early to mid spring. Removing one third of the oldest growth down to ground level rejuvenates the plant and encourages greater flowering[202]. Plants in this genus are notably resistant to honey fungus[200].

### 8.2.349 Eriodictyon trichocalyx

Hairy Yerba Santa

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 2 m hkuc

htut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Eriodictyon trichocalyx is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: TeaThe fresh or dried leaves have been used as a tea[257]. The leaves have been used as a wayside nibble to quench the thirst[257].

tcanta Fire retardant Soil stabilizationPlanted as a firebreak and also for erosion control in California[200].

dwatta Antiasthmatic Antirheumatic Blood purifier FebrifugeThe leaves are blood purifier and febrifuge[257]. A poultice of the freshly pounded leaves has been applied to relieve the pain of rheumatic joints[257]. A decoction of the leaves has been taken internally to treat TB, sore throats, rheumatism, asthma, catarrh, fevers, coudhs and colds[257].

nrakta South-western N. America - California to Mexico. ksacta Drv hills[200].

propta Seed - sow spring in a greenhouse[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts

nwatta Requires a position in full sun in a well-drained sandy soil[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -5°c[200]. It is probably best grown against a sunny wall.

#### 8.2.350 Osteomeles subrotunda

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Osteomeles subrotunda is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in July, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 177]. The fruit is 6 - 12mm in diameter[266]. No more details are given.

nrakta E. Asia - China, Japan. ksacta Hot dry river valleys[200]. Mixed forests, among shrubs at mountain summits, roadsides at elevations of 200 - 500 metres[266].

propta The seed requires a period of cold stratification and can be sown in late autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5-8cm with a heel, July/August in a frame. Pot up in the autumn and overwinter in a greenhouse. Fair to good percentage[78]. Layering.

nwatta Succeeds a sheltered position in full sun in any well-drained soil[166, 182]. Plants usually require protection outside the mildest areas of Britain[11], they are hardy to about -5°c[184]. They can be grown on a sunny wall in colder parts of the country[1]. Plants sold under this name are often O. schwerniae microphylla[219].

### 8.2.351 Meconopsis napaulensis

Himalayan Poppy

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 2 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Meconopsis napaulensis is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in June, and the seeds ripen in August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: OilEdible Uses: OilAn edible oil is extracted from the seed[105, 177, 183].

dwatta NarcoticThe root is used as a narcotic[240].

nrakta E. Asia - Himalayas to China, Nepal and Szechwan. ksacta Open slopes and grazed ground, 3000 - 4500 metres[51]

propta Seed - best sown in a cold frame as soon as it is ripe in late summer. Spring sown seed is slower to germinate[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the

nwatta Grows best in a woodland soil in partial shade[1, 201]. The soil should be lime-free, moist, well-drained and moderately rich[200]. Dislikes full sun and windy positions[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. A very ornamental plant[1]. Monocarpic, the plants living for a number of years before flowering but then dying once they flower[200]. A fine plant for growing in open woodland[1]. Plants are subject to 'crown rot' when they are growing in damp conditions[1].

### 8.2.352 Coprosma rhamnoides

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 2 m hkuc

1433

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Coprosma rhamnoides is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw or cooked. Sweet, but with little flavour[225]. The dark red fruit is about 4mm in diameter[200, 225]. The roasted seed is an excellent coffee substitute[153].

tcanta WoodWood - hard, durable. Used for bridges, shingles  ${\sf etc[46, 61]}$ . When burned, it gives off a delicious  ${\sf aroma[245]}$ .

dwatta Antihalitosis Antiphlogistic Astringent Depurative Sedative StomachicThe leaves and young shoots are antihalitosis, antiphlogistic, astringent, depurative, sedative and stomachic

nrakta New Zealand. ksacta Lowland to montane shrubland, especially on margins, North and South Islands[44].

propta Seed - sow spring in a greenhouse and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts, and give some protection from the cold for their first winter or two outdoors. The seed remains viable for many years. Cuttings of half-ripe wood, 5 - 8 cm with a heel, early August in a frame. Over-winter in the greenhouse for its first year and plant out after the last expected frosts. Good percentage[78]. Cuttings of almost mature wood, 4 - 5 cm with a heel, October/November in a frame. Good percentage[78].

nwatta Succeeds in almost any neutral or acid soil of good or reasonable quality, preferring a light sandy loam and full sun[200]. Grows best in an acid sandy soil[260]. Prefers a position sheltered from hot or cold drying winds[200]. This species is not very cold-hardy, tolerating temperatures down to about -5°c, though there are montane forms that might be hardier[260]. It only succeeds outdoors in the milder areas of Britain[200]. Resentful of root disturbance, plants should be pot grown and planted out in their final positions as soon as possible[200]. The flowers have a delicate sweet perfume[245]. Plants do not regenerate from old wood[200]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.346 Heimia salicifolia

Erva De Vida, Shrubby yellowcrest 7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Heimia salicifolia is a deciduous Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: DrinkAn intoxicating and euphoric drink is made by crushing the wilted leaves in water and leaving the liquid in a sunny position for three days to ferment[192]. In larger quantities this can induce hallucinations and produces a vision that is typically overcast in yellow[192].

dwatta Antispasmodic Hallucinogenic SedativeThe leaves are antispasmodic, hallucinogenic and sedative[192]. An infusion serves to stabilize the blood pressure and relieve anxiety[192].

nrakta Southern N. America from Texas to Mexico and south to Central America. ksacta Along the sides of streams [192].

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse. Prick out the seedlings into individual pots once they are large enough to handle. Grow the young plants on for at least their first winter in a greenhouse and plant out in late spring or early summer. Mulch the roots well in the autumn to protect them from the cold. Cuttings of half-ripe wood, July/August in a frame[2001.

nwatta Easily grown in any well-drained soil in full sun[200]. Especially in the colder areas of the country this plant is best grown against a sunny south or south-west facing wall and given a good mulch of bracken in the winter[200]. The rootstock is fairly hardy in most of Britain, whilst the top growth tolerates temperatures down to about 10 to -15°c[200]. If cut back by severe weather the plant usually grows again from the base[200]. Flowers are produced on the current seasons growth[200]. Plants growing by the side of a greenhouse at Cambridge Botanical Gardens flower freely[11]. This species is closely related to H. myrtifolia,

differing mainly in having larger flowers[11]. Any pruning is best carried out in early spring by removing excess growth at the base of the plant[200].

### 8.2.347 Leptospermum polygalifolium

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 3 m hkuc

htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Leptospermum polygalifolium is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid and neutral soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Edible Uses: TeaThe leaves are a tea substitute[46, 61, 177].

tcanta WoodWood - tough, close grained. Used for poles, stakes, fuel etc[154].

nrakta Australia - Tasmania, Victoria. ksacta Montane area, especially on fairly poor soils[154, 156]. Heaths and dry sclerophyll forests, usually on sandstones and deep sandy soils[265].

propta Seed - sow spring in a greenhouse and only just cover the seed. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts, and give some protection from the cold for their first winter or two outdoors. The seed remains viable for many years. Cuttings of half-ripe wood, 5 - 8 cm with a heel, early August in a frame. Over-winter in the greenhouse for its first year. Good percentage[78]. Cuttings of almost mature wood, 4 - 5 cm with a heel, October/November in a frame. Good percentage[78].

nwatta Succeed in almost any neutral or acid soil of good or reasonable quality, preferring a light sandy loam and full sun[200]. Prefers a position sheltered from hot or cold drying winds[200]. Only succeeds outdoors in the mild areas of Britain, tolerating temperatures down to about - 10°c[200]. Grows well in coastal areas so long as it is not too exposed[188]. Resents root disturbance[200]. Plants do not regenerate from old wood[200]. Closely related to L. lanigerum[11]. A good bee plant[108]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.348 Jasminum humile

Yellow Jasmine

1432

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 3 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Jasminum humile is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaThe leaves are used as a condiment[177, 183]. A tea is made from the leaves and bark[183].

tcanta Parasiticide WoodWood - even-grained, moderately hard[146].

dwatta Astringent Cardiotonic Decongestant Parasiticide Stomachic TonicThe flowers are astringent and a tonic for the heart and bowels[240]. A paste made frm the flowers is considered effective in the treatment of intestinal problems[272]. The juice of the root is used in the treatment of ringworm[240, 272]. The milky juice of the plant is used for destroying the unhealthy lining walls of chronic sinuses and fistulas[240].

### 8.2.282 Coprosma acerosa

Sand Coprosma

7 tlin 10 cvuc 2 kcak 0 tcan 0 dwat 0.5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli nyanhjen hjonli

drutta Coprosma acerosa is an evergreen Shrub growing to 0.5 m (1ft 8in) by 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit -raw[177]. Sweet and juicy[173], but with little flavour[225]. The fruit is usually pale blue and up to 8mm long x 6mm wide[200, 225]. The roasted seed is an excellent coffee substitute[153].

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153].

nrakta New Zealand. ksacta Coastal sand dunes[44] and elevations up to 1200 metres[11], on North, South and Chatham Islands[225]

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[X]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. An easily grown plant, it succeeds in most soils, so long as they are well-drained[225]. Judging by its habitat this plant should be tolerant of maritime exposure[K]. Somewhat intolerant of frost[200], this species is hardy at Kew but it prefers milder winters[11]. It does not succeed in the colder areas of the country[11]. Fruits are freely produced in Ireland[11]. Does well on a sunny ledge in the rock garden[11, 182]. A widely spreading mat-forming prostrate plant, though it will eventually build up to a height of 60cm[225]. Hybridizes freely with other members of this genus[200, 225], especially C. petriei[225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is required.

#### 8.2.283 Mirabilis jalapa

Marvel Of Peru, Miracle Flower of Peru, Four O'Clock 7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Mirabilis jalapa is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to October, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

pcista The seeds and the roots are reported to cause digestive disturbances[274].

kcakta Edible Parts: LeavesEdible Uses: Colouring CondimentTender young leaves - cooked as a vegetable[105, 183, 272]. An emergency food, only eaten when all else fails[177]. An edible crimson dye is obtained from the flowers[46, 61, 105, 177]. It is used for colouring cakes and jellies[183]. The seed is crushed and used as a pepper substitute[105, 177, 183].

tcanta Cosmetic DyeThe powdered seed is used as a cosmetic[46, 61].

dwatta Diuretic Purgative VulneraryThe root is aphrodisiac, diuretic and purgative. It is used in the treatment of dropsy[46, 61, 154, 218, 240]. A paste of the root is applied as a poultice to treat scabies and muscular swellings[272]. The juice of the root is used in the treatment of diarrhoea, indigestion and fevers[272]. The powdered root, mixed with corn flour (Zea mays) is baked and used in the treatment of menstrual disorders[272]. The leaves are diuretic[272]. They are used to reduce inflammation[240]. A decoction of them is used to treat abscesses[218]. The leaf juice is used to treat wounds[218].

nrakta S. America - Peru. Naturalized in France and possibly other places in Europe. ksacta Not known

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer, after the last expected frosts. The seed remains viable for several years[196]. Division in spring as the plant comes into growth[200].

nwatta Landscape Uses:Border, Container, Specimen. Succeeds in almost any ordinary garden soil[1]. Prefers a fertile well-drained soil in full sun or part day shade[200] This species is not very hardy in Britain. The top growth is cut back by frost but the tuber survives the winter outdoors if the temperature does not fall much below -5°c, a good mulch would be beneficial[200]. Tubers can be lifted and stored over winter in a cool frost free place in the same way that dahlia tubers are stored[1, 200]. The marvel of Peru is usually grown as a half-hardy annual in temperate zones, it flowers freely in its first year[200]. Plants also self-sow freely in warmer areas (these seedlings can be easily transplanted) and they can become a weed in such situations due to their deep rooting habit[200]. This species was cultivated as a medicinal plant by the Aztecs prior to the Spanish congust[274]. The flowers are sweetly scented and do not open until the afternoon[233]. The young growth is particularly susceptible to aphis infestation[200]. Members of this genus are rarely if ever troubled by browsing deer[233]. Special Features: Attracts birds. Not North American native. Naturalizing. Fragrant flowers.

### 8.2.284 Carpobrotus aequilaterus

Sea Fig

1409

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatprikl-

wishsom hpa7tmwatli xre7t hjonli drutta Carpobrotus aequilaterus is an evergreen Perennial growing to 0.2 m (0ft 8in) by 2 m (6ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils, prefers well-

drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit -

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit raw[257]. They are said to remotely suggest the flavour of strawberry[183]. Leaves - baked[183]. We find them too mucilaginous to be enjoyable[K].

tcanta Fire retardant Soil stabilizationPlanted in maritime areas to prevent soil erosion in sandy soils and on steep banks[200, 265]. The plant is moderately fire-resistant and can be used in barrier plantings to prevent the spread of forest fires[200].

nrakta Southern N. America - California, Mexico. Australia - New South Wales, Tasmania, Victoria. ksacta Naturalised in California where it grows along the coastal strand and in coastal sage scrub at elevations up to 100 metres [276].

propta Seed - surface sow March to June in a greenhouse. Lower night-time temperatures are beneficial. The seed usually germinates in 7 - 10 days at 23°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected

frosts. Cuttings at any time during the growing season. Allow the cutting to dry in the sun for a day or two then pot up in a very sandy mix. Very easy[K].

nwatta Requires a well-drained sandy soil in a sunny position[1, 200]. Plants can be grown on dry walls or in the flower border[166]. Established plants are very drought resistant[200]. Very resistant to wind and salt spray[166]. Moderately fire-retardant[200]. Plants are not very frost resistant, tolerating temperatures down to between -5 and -10°c, and only succeeding outdoors in the milder areas of the country[200]. A vigorous prostrate plant, rooting as it spreads. The flowers only open in the afternoon[200].

### 8.2.285 Gaultheria trichophylla

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.1 m hkuc hmimhtut cyutli tcup hwicli hrasjlut hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Gaultheria trichophylla is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[51, 272]. The blue ovoid fruit is about  $10\ x\ 6mm[200]$ .

tcanta A useful ground cover for shady places.

nrakta E. Asia - W. Himalayas to China. ksacta A creeping shrub in alpine pastures[145], growing on rocks and banks up to elevations of 4500 metres[51]. Montane grasslands, mountain slopes and rocky places[266].

propta The seed requires a period of cold stratification. Pre-chill for 4 - 10 weeks and then surface sow in a limefree compost in a shady part of the greenhouse and keep the compost moist[78]. The seed usually germinates well, usually within 1 - 2 months at 20°c, but the seedlings are liable to damp off. It is important to water them with care and to ensure that they get plenty of ventilation. Watering them with a garlic infusion can also help to prevent damping of Kl. Prick out the seedlings into individual pots when they are about 25mm tall and grow them on in light shade in the greenhouse for at least their first winter[K]. Plant them out in late spring or early summer. The seedlings are susceptible to spring frosts so might need some protection for their first few years outdoors. The leaves remain very small for the first few years[11]. Cuttings of half-ripe wood 3 - 6cm long, July/August in a frame in a shady position. They form roots in late summer or spring[78]. A good percentage usually take. Division in spring when new growth is about 7cm tall. Divided plants can be rather slow to get established[182]. We have found that it is best to pot up the clumps and grow them on in a shady position in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a moist but not boggy humus rich soil in sun or semi-shade[11]. A peat and moisture loving species, it requires a lime-free soil[11]. Prefers a fairly light open position so long as the soil is kept moist[11]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. This species does not always fruit well in Britain[11]. The plant can make a good nesting place for mice, these mice then eat the bark of the stems in winter causing die-back. The bruised leaves release a hot, aromatic fragrance[245]. Plants in this genus are notably resistant to honey fungus[200].

### 8.2.286 Cnicus benedictus

Blessed Thistle

7 tlin 10 cyuc 2 kcak 2 tcan 3 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cnicus benedictus is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to September, and the seeds ripen from July to October. The species is hermaphrodite (has both

male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista May cause allergic reaction if sensitive to the Asteraceae/Compositae family. Possible eye irritation. Excess of 5g per cup of tea may cause stomach irritation and vomiting. Possible cross-reactivity with mugwort and echinacea (also bitter weed, blanket flower, chrysanthemum, colt's foot, dandelion and marigold. Increases stomach acid secretion so caution needed with gastric ulcers and heartburn. Possible increase in bleeding - care needed with anticoagulants or blood thining agents [301].

kcakta Edible Parts: Flowers Leaves Oil RootEdible Uses: Condiment OilYoung leaves - raw[4, 268]. Flower heads, harvested before the flowers open, have been used as a globe artichoke (Cynara cardunculus) substitute[268]. The flower heads are rather small and using them in this way is very fiddly[K]. Root - boiled as a pot herb[268]. The herb is used as a flavouring[105, 183] (the part that is used is not specified).

tcanta OilA good quality oil is obtained from the seed[4, 61]. It has been used in emergencies when other oils were not available[222].

dwatta Appetizer Astringent Bitter Cholagogue Contraceptive Diaphoretic Diuretic Emetic Emmenagogue Galactogogue Homeopathy Stimulant Stomachic Tonic VDThe blessed thistle was widely cultivated in the middle ages, when it was seen as a cure-all for all manner of diseases including the plague[238]. Although less widely used nowadays, it is still seen to have a wide range of applications though it is mainly employed as an ingredient in herbal tonics[268]. The whole plant is astringent, bitter, cholagogue. diaphoretic, diuretic, strongly emetic in large doses, emmenagogue, galactogogue, stimulant, stomachic and tonic[4, 7, 9, 21, 165, 207, 222, 268]. A warm infusion of the plant is said to be one of the most effective means of improving the milk supply of a nursing mother[4]. An infusion of the whole plant has also been used as a contraceptive [213] and is often used in the treatment of liver and gall bladder problems[9]. The plant is also used internally in the treatment of anorexia, poor appetite associated with depression, dyspepsia, flatulent colic etc[238]. The whole plant was infused overnight in cold water and the liquid drunk three times daily in the treatment of VD. Men were required to run after each dose in order to encourage sweating. The treatment often caused nausea and vomiting[213] - excessive doses of the plant cause vomiting[7]. The plant is used externally in the treatment of wounds and ulcers[238]. The plant is harvested in the summer as it comes into flower and is dried for later use[4]. A homeopathic remedy is made from the plant[9]. It is used in the treatment of the liver and gall bladder[9]. The German Commission E Monographs, a therapeutic guide to herbal medicine, approve Cnicus benedictus for dyspepsia (indigestion) and loss of appetite (see [302] for critics of commission

nrakta S. Europe to W. Asia. An infrequent casual in Britain[17]. ksacta Dry sunny places in arable, stony and waste ground[7, 9, 165].

propta Seed - sow in situ in the spring or early autumn[111]. The seed usually germinates in 2 - 6 weeks at 10°c[164].

nwatta Easily grown in ordinary garden soil[1]. Prefers a dry soil and a sunny position[7]. Grows best in a well manured soil[268]. A very ornamental plant, it is often cultivated in Europe as a medicinal herb and for its oil yielding seed[9,61]

### 8.2.287 Brassica tournefortii

Wild Turnip-Rape, Asian mustard

1410

7 tlin 11 cyuc 2 kcak 1 tcan 0 dwat 0.6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Brassica tournefortii is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 7. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic

germination. Stored seed should be soaked overnight and then stratified for 1- 2 weeks at  $3^{\circ} c [134]$ . The seed usually germinates in 1- 3 months or more at  $20^{\circ} c [134]$ . When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Once they are  $20 \, \mathrm{cm}$  or more tall, plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of mature wood of the current season's growth, 15-  $20 \, \mathrm{cm}$  long outdoors at any time between September to February though October and November are best[78]. Very easy, even small branches will root[1]. Layering in autumn. Takes 12 months[78].

nwatta Landscape Uses: Border, Container, Foundation, Massing, Specimen, Woodland garden, A very tolerant and easily grown plant[1], it thrives in most soils and even in the total shade of trees[11, 182, 200] though for good fruit production a position with at least moderate sun should be chosen[11]. Tolerates dry soils and drought[184, 200]. Grows well in heavy clay soils. Tolerates salt winds[200] Very tolerant of atmospheric pollution[11]. Plants are hardy to about -15°c[184, 200]. Often grown in the ornamental garden, there are many named varieties[182]. The foliage can be scorched in very long hot summers if the plant is in an open position[200]. Very tolerant of pruning, plants can be cut right back into the old wood if required[184, 200]. Plants in this genus are notably resistant to honey fungus[200]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

### 8.2.343 Nicotiana glauca

Tree Tobacco

7 tlin 10 cyuc 1 kcak 3 tcan 2 dwat 3 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Nicotiana glauca is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from August to October, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are poisonous[200].

kcakta The leaves have been made into a drink[257]. Some care should be exercised here. The tea will contain nicotine, and this can be toxic to the body. There is some evidence that Nicotiana glauca may have led to accidental poisoning when it was mistaken for other plants. We would recommend that ingestion is not considered. Please see the warning in Known Hazards.

tcanta InsecticideAll parts of the plant contain nicotine, this has been extracted and used as an insecticide[46, 61]. Dynamic accumulator.

dwatta Antirheumatic Poultice SkinA poultice of the leaves can be applied to cuts, bruises, swellings and other wounds[257]. The plant has been used as a poultice for removing the pus from scrofulous sores or boils[257]. A poultice of the leaves has been applied to inflamed throat glands[257]. An infusion of the leaves has been used as a steam bath in the treatment of theumatism[257]

nrakta S. America - S. Bolivia to N. Argentina. Naturalized in the Mediterranean. ksacta Rocks, walls and roadsides in the Mediterranean[50].

propta Seed - surface sow in a warm greenhouse about 10 weeks before the last expected spring frosts. The seed usually germinates in 10 - 20 days at  $20^{\circ}\mathrm{c}$ . Keep the soil moist and pot up as soon as the plants are big enough to handle, planting them out after the last expected frosts.

nwatta Industrial Crop: Pesticide Regional CropPrefers a well-drained deep rich moist soil in a sunny position[1, 200]. This species is hardy to about -5°c[200]. Plants can survive the winter outdoors in the milder parts of Britain, though they usually act as herbaceous perennials in such conditions[200]. Plants require more than 14 hours daylight per day in order to induce flowering[169].

#### 8.2.344 Buddleia asiatica

Bai Bei Feng

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 3 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Buddleia asiatica is an evergreen Shrub growing to 3 m (9ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from January to April. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

kcakta Edible Parts: Edible Uses: DrinkThe dried and powdered root is used in the preparation of a fermented liquor[183].

tcanta WoodWood - tough, moderately hard. It could be used for making walking sticks[158].

dwatta Abortifacient SkinThe plant has been used as an abortifacient and also in the treatment of skin complaints[240, 243]. The juice f the plant is applied as a wash to treat skin diseases[272].

nrakta E. Asia - India to the Philippines. ksacta Second growth forest, sandy river banks, grass, savannah, landslips and deserted village sites[146, 260].

propta Seed - cold stratify for 4 weeks at 4°c[138] and surface sow the seed in February/March in a greenhouse[78, 113] (the pre-chilling might not be required for this species). Germination usually takes place within 3 - 4 weeks at 21°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early sumer, after the last expected frosts. Seedlings are inclined to damp off and so should be watered with care and kept well-ventilated[78]. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Use short side-shoots[78]. Very high percentage[113]. Cuttings of mature wood of the current season's growth, 15 - 20cm long, October/November in a frame[2001]

nwatta Requires a sunny position, succeeding in most reasonably good soils so long as they are well-drained[1, 11. 182, 2001. Prefers a rich loamy soil[11]. Plants are very tolerant of alkaline soils[200]. Of doubtful hardiness in most of Britain, it is likely to be damaged or killed by temperatures lower than 0°c[260]. However, one report says that it succeeds outdoors in southern Cornwall[1] whilst other reports say that it might be hardy on a south or south-west facing wall in the mildest areas of this country[11, 166, 182, 188] So long as the plant is well mulched it resprouts freely from the base if cut back by severe weather[200]. A very ornamental plant[1], the cut flowers last well in water[200]. Hybridizes freely with other members of this genus[200]. Any pruning is best done after flowering[200]. An excellent plant for bees and butterflies Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.345 Leptospermum ericoides

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Leptospermum ericoides is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: Edible Uses: TeaA refreshing tea can be made from the young shoot tips[173, 183].

pcista There is a report that the fresh plant contains the toxin hydrogen cyanide [243]. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death.

kcakta Edible Parts: Edible Uses: TeaThe leaves are used as a tea substitute[177, 183]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - China to the Himalayas. ksacta Scrub and forest in the mountains, 1200 - 2700 metres from Uttar Pradesh to S.W. China and Burma[51, 184]. Dense forests or thickets in valleys or on mountain slopes[266].

propta Seed - surface sow in a greenhouse in spring[113]. Cover the pot with paper until the seed germinates[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 8cm long, July/August in a frame. Overwinter in a greenhouse and plant out in late spring[78]. Cuttings of mature wood in late autumn in a frame[200]. Mound layering in spring. Takes 12 months[78]. Leaf-bud cuttings of the current seasons growth in a frame[200].

nwatta Landscape Uses:Specimen. Succeeds in most good soils, including chalk[184]. This species is one of the most chalk-tolerant members of the genus[200]. Tolerates most soils[200], thriving in a well-drained loamy soil[1], but resenting dryness at the roots[11, 200]. Succeeds in full sun or semi-shade[200], but if it is grown in a low rainfall area then it requires shade at the hottest part of the day[11]. Does well on very acid soils with a pH around 4.5[200]. The colour of the flowers reflects the pH of the soil the plant is growing in, the flowers are pink in a neutral to alkaline soil and blue in an acid soil. Grows well in an open woodland garden[200]. Although fairly tolerant of soil type, this species is not very easy to grow well, it is best given a dryish soil, it resents winter wet[11]. Dormant plants are hardy to about -15°c[184]. They are somewhat tender when young, and the young growth of older plants is also susceptible to damage by late frosts[11]. Plants resent being pruned[202]. This species is notably susceptible to honey fungus[200]. Special Features: Suitable for cut flowers, Suitable for dried flowers, Blooms are very showy.

### 8.2.341 Ilex cornuta

Horned Holly, Chinese holly 7 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta llex cornuta is an evergreen Shrub growing to 4 m (13ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower in April, and the seeds ripen from October to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

kcakta Edible Parts: FruitEdible Uses: The fruit is thinskinned with a sweet taste[178]. Is this report suggesting that it is edible?[K].The fruit is about 8 - 10mm in diameter[200].

dwatta Abortifacient Carminative Contraceptive Febrifuge TonicThe whole plant is abortifacient, carminative, contraceptive, febrifuge and tonic[147, 178]. It particularly strengthens the back and knees[147]. The leaf is made into a tea which is said to be contraceptive if used by women and is also used for termination pregnancies[218]. The stem bark is tonic[218]. The whole plant is used in the treatment of

arthritis, recurring fever in pulmonary tuberculosis, tubercular lymph nodes, joint pained and lumbago[147, 218].

nrakta E. Asia - E. China, Korea. ksacta Ravines and hills, 150 - 600 metres[184]. Wild places and alongside mountain paths in full sunshine[147].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Landscape Uses:Border, Espalier, Pest tolerant, Screen, Standard, Specimen, Street tree. Succeeds in most soils that are not water-logged[200]. Plants are hardy to about -15°c[184]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. A number of named forms have been developed for their ornamental value[182]. Dioecious. Male and female plants must be grown if seed is required. Special Features:Not North American native, Inconspicuous flowers or blooms

### 8.2.342 Aucuba japonica

Spotted Laurel, Japanese laurel, Japanese Gold Dust Tree 7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 3 m hkuc

pcimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyikfrip hpa7tli frusflatpriklwisslip hpa7tmwatli nyanhien hionli

drutta Aucuba japonica is an evergreen Shrub growing to 3 m (9ft) by 2.5 m (8ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from March to April, and the seeds ripen from October to February. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

kcakta Edible Parts: LeavesEdible Uses: Leaves - cooked. An emergency food[177]. It would have to be quite an emergency to convince me to eat them[K].

tcanta Hedge HedgeMakes a good hedge but its large leaves mean that it is quite labour intensive to maintain if a neatly clipped appearance is desired[29]. Unless you are happy with the large leaves being cut in half, it means that you have to trim the hedge with secateurs[29]. The plant will eventually make large weed-excluding shrubs and are suitable for covering large areas of ground, there are some dwarf forms that can be grown for ground cover[208]. 'Nana Rotundifolia' has been mentioned and will form a hummock of growth about 1 metre across[208].

dwatta PoulticeThe leaves are pounded and applied to burns, swellings, chilblains etc[218].

nrakta E. Asia - China, Japan. ksacta Woods in lowland and mountains all over Japan[58]. In rich forest soils of moist valleys, dense forests, thickets, by streams and near shaded moist rocks in China[266].

propta Seed - best sown as soon as it is ripe in a cold frame[134]. Wash off the pulpy coating since this can inhibit

(mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Leaves OilEdible Uses: OilLeaves and young shoots - cooked[177, 183]. An edible oil is obtained from the seed[177, 183].

nrakta Europe - E. Mediterranean to W. Asia. ksacta Dunes, roadsides and fields in the maritime belt[74].

propta Seed - sow spring in situ.

nwatta We have very little information on this species and do not know if it will be hardy in Britain, though it should be possible to grow it as a spring-sown annual. The following notes are based on the general needs of the genus. Succeeds in full sun in a well-drained fertile preferably alkaline soil[200]. Grows well in the heavier soils.

#### 8.2.288 Geranium tuberosum

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Geranium tuberosum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf from October to July, in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Edible tubers[177]. Up to 15mm wide[200].

nrakta Europe - Mediterranean. ksacta Cultivated ground, fields, vineyards and meadows[89].

propta Seed - sow spring in a cold frame or as soon as it is ripe in the summer. Division in late summer or early autumn. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Succeeds in any moderately fertile retentive soil in a sunny position[200]. Tolerates a wide range of soil types[200]. Established plants are drought resistant[190]. This species is not hardy in all parts of Britain, it tolerates temperatures down to between -5 and -10°c[200]. Plants come into growth in the autumn and die down in midsummer[190]. Plants spread by means of underground tubers and can be invasive[190]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. At least one named variety has been selected for its ornamental value[200]. 'Charlesii' has a low spreading habit[200].

#### 8.2.289 Tulbaghia alliacea

Society Garlic

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Tulbaghia alliacea is a CORM growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK cone 8. It is in flower from June to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves RootEdible Uses: Bulb - cooked[183]. Leaves and stems - they can be cooked like spinach or chopped fine and used as a relish[183]. Flowers. They are regarded as a delicacy by the native Zulu women[183].

nrakta S. Africa - Cape province. ksacta Sandy flats[245]. Clay or gravelly flats[282].

propta Seed - best sown as soon as it is ripe in the greenhouse[200]. Sow stored seed in early spring in the greenhouse[200]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in the greenhouse for at least their first winter. If planting them outdoors, this is best done in late summer when the plants are dormant. Division of the dormant plants in late summer.

nwatta Requires a well-drained soil in a sunny sheltered position[200]. This species is hardy in the mildest areas of

Britain, tolerating temperatures down to about -5°c[200]. However, it is in leaf during the winter and so is best grown with some protection such as a cold greenhouse or conservatory[200]. Plants grow from a cluster of small bulbs attached to a basal plate that is sometimes regarded as a rhizome[200]. The flowers are very fragrant at night[200]. Another report says that they have an unpleasant smell[245]. The whole plant has a powerful aroma of garlic[200, 245].

### 8.2.290 Atriplex truncata

Wedgescale Saltbush

7 tlin 10 cvuc 2 kcak 4 tcan 0 dwat 0.9 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwissliphsom hpa7tmwatli hjonli

drutta Atriplex truncata is a ANNUAL growing to 0.9 m (3ft) by 0.9 m (3ft in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September, and the seeds ripen from August to October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista No member of this genus contains any toxins, all have more or less edible leaves. However, if grown with artificial fertilizers, they may concentrate harmful amounts of nitrates in their leaves.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves and young plants - cooked. A salty flavour. Seed -cooked[161, 177, 257]. Used in piñole or ground into a meal and used as a thickener in making bread or mixed with flour in making bread.

tcanta FodderA good fodder crop.

nrakta Western N. America - southern British Columbia to California. ksacta Saline saltgrass-greasewoodrabbitbrush communities, and other pans or palustrine or lacustrine habitats at elevations of 400 - 2700 metres[270].

propta Seed - sow April/May in situ[134]. Germination is usually rapid.

nwatta Fodder: Bank Management: Coppice Management: Fodder Regional CropWe have very little information on this species and do not know if it will be hardy in Britain, though it should be possible to grow it as a spring-sown annual. The following notes are based on the general needs of the genus. Succeeds in full sun in any well-drained but not too fertile soil[200]. Most species in this genus tolerate saline and very alkaline soils[200].

#### 8.2.291 Abronia latifolia

Sand Verbena, Coastal sand verbena 7 tlin 10 cyuc 2 keak 0 tcan 0 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Abronia latifolia is a PERENNIAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: RootEdible Uses: Root - large and sweet[46, 61, 118]. An emergency food, used when all else fails[177]. Long and stout[183], it can be more than 60cm in length[2]. The root was usually harvested in the autumn[257].

nrakta South-western N. America - California to Vancouver Island. ksacta Coastal sand dunes and sea beaches[60]. Sandy soils, coastal scrub, lees of dunes adjacent to strand from sea level to 50 metres[270]

propta Seed - sow autumn or early spring very shallowly in pots of sandy soil in a greenhouse[133]. Germination can be very slow unless you peel off the outer skin and pre-soak the seed for 24 hours in warm water[200, 245]. The seed usually germinates in 1 - 2 months at  $15^{\circ}$ (133]. When large

enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Seedlings are prone to damp off and so should be kept wellventilated[200]. Plant out in late spring, after the last expected frosts. Cuttings in spring, rooted in sand[200].

nwatta Prefers a light well-drained sandy soil in full sun[200]. This species is not very hardy in Britain, though it should succeed outdoors in the southern part of the country, especially if given a warm sheltered site[200]. Seed is rarely ripened on plants growing in Britain[1].

### 8.2.292 Ophiopogon japonicus

Snake's Beard, Dwarf lilyturf, Mondo Grass, Monkey Grass,

7 tlin 11 cvuc 2 kcak 0 tcan 3 dwat 0.3 m hkuc

hmimhtut cyutli tcuphja7nhs6s hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ophiopogon japonicus is an evergreen Perennial growing to 0.3 m (1ft) by 1 m (3ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil and can grow in water.

kcakta Edible Parts: RootEdible Uses: Root[61]. A bitterness should be removed according to some reports[105, 177] whilst another says that it is sweet and aromatic[178]. Mucilaginous[179, 218]. The root contains about 1.6% protein, 0.5% fat, 80% carbohydrate, 2.3% ash[179].

tcanta Soil stabilizationA good carpeting plant[1, 200] that spreads quite freely[208], it is commonly planted as a ground cover or as a low-maintenance grass substitute[187, 208]. It is particularly valuable for preventing soil erosion[200]. Plants should be spaced about 45cm apart each wav[208]

dwatta Antipyretic Antiscrophulatic Antitussive Aphrodisiac Cancer Emollient Expectorant Nutritive Pectoral Sedative Sialagogue Stomachic TonicThe root is antitussive, aphrodisiac, expectorant, pectoral, sedative, sialogogue, stomachic and tonic[147, 174, 176, 218, 238]. It is said to have anticancer activity[218]. It is used internally in the treatment of dry coughs, fevers, thirst, dry constipation, insomnia, anxiety and palpitations[238]. It is also frequently used in polyherbal treatments of diabetes mellitus[218]. The roots have an antibacterial action, inhibiting the growth of Staphylococcus, E. coli, Bacillus subtilis, B. typhi etc[176]. The roots are harvested in the spring and dried for later use[238]. The plant is antipyretic, antiscrofulatic, antitussive, emollient, expectorant and tonic[218]. Lowers blood pressure[176]. Nodules on the fibrous roots are used as a nutritive tonic in the treatment of TB[174].

nrakta E. Asia - China, Japan, Korea. ksacta Damp ground[174] in shady places in lowland and foothills[58]. Forests, dense scrub in ravines, moist and shady places on slopes and along streams, cliffs at elevations of 200 - 2800 m in China[266].

propta Seed - best sown as soon as it is ripe in a sandy compost in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring[188].

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Seashore, Specimen, Woodland garden. Prefers a sandy soil[1]. Succeeds in any moderately fertile well-drained soil and also as a submerged aquatic plant, though it does not flower in such a situation[200]. Succeeds in a sunny position if the soil remains moist all year round, otherwise it should be grown in semi-shade[200]. Plants may require winter protection according to one report[1], whilst another says that they are hardy to about -20°c[200]. Plants only succeed outdoors in the milder areas of the country[208]. This species is cultivated as a medicinal plant in China[178]. Special Features:Not North American native, Invasive, Naturalizing, Inconspicuous flowers or blooms.

### 8.2.293 Asclepias eriocarpa

Woollypod Milkweed

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 0.9 m hkuc hmimhtut cyutli kyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asclepias eriocarpa is a PERENNIAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, insects, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist

pcista Although no specific reports have been seen for this species, many, if not all, members of this genus contain toxic resinoids, alkaloids and cardiac glycosides[274]. They are usually avoided by grazing animals[274]. The plant is said to be poisonous to sheep[1].

kcakta Edible Parts: Edible Uses: GumA gum obtained from the latex in the stems can be used for chewing[46, 61, 92. 161. 1771. It is usually boiled in water first until it coagulates and is sometimes mixed with oil[257].

tcanta Fibre Gum LatexA fibre from the stems is used for ropes, clothing etc[46, 61, 92, 95, 257]. The fresh stems are soaked in water or the dried and decaying stems basted with boiling water, in order to remove the fibre [257]. Rubber can be made from latex in the stems and leaves[46, 61, 92, 161, 177]. The leaves contain up to 2.4% latex[112].

dwatta Antiasthmatic Skin Sternutatory WartsA decoction of the plant, and a salve made from it, is used in the treatment of colds[257]. The milky sap is applied on a regular basis to corns in order to gradually remove them[257]. It is also applied to cuts, sores and warts[257]. The powdered dried roots are inhaled to cause sneezing[257]. Smoke from the burning dried plant is inhaled as a treatment for asthma[257]

nrakta South-western N. America - California ksacta Dry barren places below 2000 metres[71].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn or in late winter[134, 169]. We have also had good results from sowing the seed in the greenhouse in early spring[K], though stored seed might need 2 - 3 weeks cold stratification[134]. Germination usually takes place in 1 - 3 months at 18°c[134]. As soon as the seedlings are large enough to handle, prick them out into individual pots and grow them on in the greenhouse for their first winter. Plant out when they are in active growth in late spring or early summer and give them some protection from slugs until they are growing away strongly. Division in spring. With great care since the plant resents root disturbance. Pot the divisions up and place them in a lightly shaded position in the greenhouse until they are growing away strongly, then plant them out in the summer, giving them some protection from slugs until they are established.. Basal cuttings in late spring. Use shoots about 10cm long with as much of their white underground stem as possible. Pot them up individually and place them in a lightly shaded position in a greenhouse until they are rooting and growing actively. If the plants grow sufficiently, they can be put into their permanent positions in the summer, otherwise keep them in the greenhouse until the following spring and when they are in active growth plant them out into their permanent positions. Give them some protection from slugs until they are established.

nwatta Prefers a well-drained light rich or peaty soil in full sun[1, 200]. Succeeds in poor soils. This species is not very hardy in Britain, the plants may need root protection in severe winters[1] but if this is applied as a mulch then it should be removed before new growth begins in the spring because plants are particularly at risk from slugs[K]. Many members of this genus seem to be particularly prone to damage by slugs. The young growth in spring is especially vulnerable, but older growth is also attacked and even well-established plants have been destroyed in wet years[K]. Plants resent root disturbance and are best planted into their final positions whilst small[134]. The flower of many members of this genus can trap insects between its anther cells, the struggles of the insect in escaping ensure the pollination of the plant[207].

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or 8.2.339 Pyracantha koidzumii cooked[158, 177, 272]. The fruit is up to 12mm in diameter[200].

tcanta Fibre ParasiticideA strong fibre is obtained from the stem bark[272]. It is used for making twine and rope[146, 158]. Wood is used mainly for fuel[272].

dwatta ParasiticideThe juice of the leaves is applied to areas of the skin affected by scabies[272].

nrakta E. Asia - China to the Himalayas. ksacta Mainly found on old cultivated land to 2100 metres in the Himalayas[146]. Along the banks of streams at elevations of 500 - 2200 metres in Nepal[272].

propta Seed - sow late winter to mid-summer in a greenhouse and only just cover the seed. Germination usually takes place within 1 - 2 months at 20°c[175]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Softwood cuttings in early summer[1].

nwatta Prefers a fertile well-drained loam with some shelter at the hottest part of the day[200]. Plants tolerate occasional lows to about -5°c[260]. This species is probably not. very hardy in Britain and will probably require greenhouse protection, though it might be possible to grow it outdoors in the mildest areas of the country, especially if it is given the protection of a warm wall. A very variable species[266]. Dioecious, male and female plants must be grown if seed and fruit is required.

### 8.2.338 Baccharis viminea

Mule's Fat

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 4 m hkuc

htut cyutli kyuctcup hwicli hyishrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Baccharis viminea is an evergreen Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young shoots cooked[257]. Roasted and eaten as a famine food when little else is available[257].

tcanta Hair Soil stabilizationAn effective ground-cover plant for sunny banks[200]. The plant has an extensive root system and is very useful for stabilizing sand dunes etc[200]. The leaves have been used as a tonic wash for the scalp and hair to prevent baldness[257]. A charcoal made from the stems has been used to make gunpowder[257].

dwatta Ophthalmic Skin StingsA decoction of the leaves and stems has been used as a female hygienic agent[257]. An infusion of the leaves has been used as an eyewash and has also been applied to bruises, wounds or insect stings[257].

nrakta South-western N. America - California to Mexico. ksacta Dry stream beds, ditch banks etc, usually below 450 metres[71].

propta Seed - no pre-treatment is required[113]. Surface sow in pots a cold frame in the spring, do not let the compost dry out. Germination usually takes place within 1 -2 weeks[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood. July/August in a frame. Very easy[K]. Cuttings of mature wood of the current seasons growth, November in a frame. Easy[K].

nwatta Succeeds in almost any soil, from heavy clays to pure sands, if it is growing in a sunny position[11, 200]. Very tolerant of poor dry soils[200]. This species is not hardy in the colder areas of the country, it requires an almost frostfree climate and tolerates temperatures down to between -5 and -10°c[200]. Plants respond well to trimming[200]. Dioecious. Male and female plants must be grown if seed is required.

Formosa firethorn

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Pyracantha koidzumii is an evergreen Shrub growing to 4 m (13ft 1in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to July, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, it belongs to a genus where most, if not all members of the genus produce hydrogen cyanide, a poison that gives almonds their characteristic flavour. This toxin is found mainly in the leaves and seed and is readily detected by its bitter taste. It is usually present in too small a quantity to do any harm but any very bitter seed or fruit should not be eaten. In small quantities, hydrogen cyanide has been shown to stimulate respiration and improve digestion, it is also claimed to be of benefit in the treatment of cancer. In excess, however, it can cause respiratory failure and even death

kcakta Edible Parts: FruitEdible Uses: Fruit[177]. No more details are given. The fruit is about 7mm in diameter[2001

nrakta E. Asia - Taiwan. ksacta Rocky valley areas. seashores, thickets, among shrubs[266].

propta Seed - best sown as soon as it is ripe in a cold frame[200]. Remove all the fruit flesh since this can inhibit germination[200]. Stored seed requires 3 months cold stratification, sow it as early in the year as possible in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of almost mature wood, 5 -10cm with a heel, mid-August in a cold frame[78]. Pot up in October or the following spring[78].

nwatta Prefers a good well-drained, moisture retentive loamy soil[1, 200]. Succeeds in any soil that is warm and not very heavy[11]. Another report says that it grows well in heavy clay soils. Succeeds in sun or part shade, though it does not fruit so well in a shady position[200]. Tolerates atmospheric pollution and reasonable exposure, though it requires protection from cold winds[200]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. It succeeds outdoors at Kew[11]. Plants are susceptible to scab and fireblight[11]. especially when they are grown on acid sandy soils[182]. Closely related to P. rogersiana[11]. There are a number of named forms selected for their ornamental value[200]. 'Santa Cruz', 'Rosedale' and 'Victory' all have fruits larger than the type species[200].

### 8.2.340 Hydrangea aspera

7 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 4 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli frusflatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Hydrangea aspera is a deciduous Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in flower from July to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid and very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

nrakta S. Europe to W. Asia. ksacta Hedges, roadsides and thickets, in maquis and garigue on dry sandy hills to 3000 metres[89].

propta Seed - best sown as soon as it is ripe in a cold frame and moved into the greenhouse in February. Fair to good germination[78]. Prick out the seedlings into individual pots when they are large enough to handle and overwinter them in the greenhouse for their first year. Plant them out in early summer. Cuttings of half-ripe wood, July/August in a frame[200]. Root cuttings 4cm long, December in a greenhouse. Fair to good percentage[78]. Layering

nwatta Succeeds in an ordinary well-drained garden soil in full sun[182, 200]. Tolerates light shade[202]. Prefers a limy soil[200]. Grows well in dry soils and, once established, is drought tolerant[184]. Prefers a light sandy soil in a warm sunny position[245]. Hardy to about -15°c[184]. Plants are of slow to moderate growth[202]. The branches are pliable and excessively spiny[11]. Plants can regrow from the base if they are cut back by severe weather[200]. The flowers are slightly perfumed[245]. Plants in this genus are notably resistant to honey fungus[200].

### 8.2.335 Nannorrhops ritchiana

Mazari Palm

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Nannorrhops ritchiana is an evergreen Tree growing to 5 m (16ft) by 3 m (9ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Flowers Fruit LeavesEdible Uses: Young leafs and buds[2]. No more details are given. Young inflorescence[2].No more details are given. Fruit[2]. No more details are given.

dwatta Dysentery PurgativeThe leaves are purgative[240]. They are used in the treatment of diarrhoea and dysentery[240]. Yes, both these reports come from the same source, without further explanation[K]. The plant is chiefly used in veterinary medicine[240].

nrakta W. Asía - Iran to Afghanistan and Pakistan. ksacta Open, sparsely vegetated semi-arid desert regions where there is a water table close enough to the surface to provide a continuous supply of moisture[231].

propta Seed - best sown as soon as it is ripe in a warm greenhouse at not less than 24°c[188]. Stored seed is very slow to germinate. Pre-soaking the seed for 24 hours in warm water prior to sowing may shorten the germination time. Plants form a long tap-root some time before forming a shoot and so should be sown in fairly deep pots. Germination of fresh seed usually takes place in 3 - 4 months at 25°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first two winters. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts.

nwatta Little is known about this species cultural requirements, but it probably succeeds in most fertile moist but well-drained soils in a sheltered sunny position[231]. Plants experience very cold winters in their native habitat, though this is accompanied by heavy snow which acts to insulate the plant from the extremes of cold. However, this species should be suitable for cultivation in temperate areas that only experience light frosts[231]. Palms usually have deep penetrating root systems and generally establish best when planted out at a young stage. However, older plants are substantially more cold tolerant than juvenile plants[231]. In areas at the limit of their cold tolerance, therefore, it is prudent to grow the plants in containers for some years, giving them winter protection, and only planting them into their permanent positions when sheer size dictates[231]. Palms can also often be transplanted even when very large. Although the thick fleshy roots are easily damaged and/or desiccated, new

roots are generally freely produced. It is important to stake the plant very firmly to prevent rock, and also to give it plenty of water until re-established - removing many of the leaves can also help[231].

#### 8.2.336 Ligustrum japonicum

Japanese Privet, Japanese Ligustrum, Waxleaf Ligustrum, Texas Privet, Waxleaf Privet

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 5 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ligustrum japonicum is an evergreen Shrub growing to 5 m (16ft) by 6 m (19ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, at least one member of this genus is recorded as being mildly toxic and it is quite possible that other members of the genus also contain toxins[65].

kcakta Edible Parts: LeavesEdible Uses: CoffeeThe roasted seed is a coffee substitute[61, 177]. Young shoots - cooked. A famine food, used when all else fails[179]. The shoots contain a glycoside and are probably toxic[K].

tcanta Hedge Hedge WaxA commercial insect wax is produced on the branches as a result of eggs being laid by insects[11]. Another report says that the wax is produced by the plant due to the stimulation of the feeding insects[61, 149]. Yet another report says that the wax is produced by the insects[178]. It is used for candles and as a polish for earthenware pots, book edges etc[178]. The plant can be used as a hedge[11]. It is very amenable to trimming.

dwatta Antibacterial Hypotensive TonicThe fruit is said to be a nutrient tonic[218]. Extracts of the plant show antibacterial, antiulcer and hypotensive activity[218].

nrakta E. Asia - China, Japan, Korea. ksacta Woods and thickets in lowland and hills, C. and S. Japan[58].

propta The seed does not require any pre-treatment and can be sown in the spring in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 10cm with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood, 20 - 30cm in a sheltered outdoor bed in November/December. High percentage[78].

nwatta Landscape Uses:Border, Container, Pest tolerant, Rock garden, Screen, Standard, Seashore, Specimen. A very tolerant and easily grown plant, it succeeds in any soil that is not impoverished or water-logged[11, 182]. Grows well in heavy clay soils. Succeeds in sun or semi-shade[188]. Closely related to L. lucidum[11, 200]. There are many named varieties selected for their ornamental value[200]. This species is notably resistant to honey fungus[200]. Special Features:Attractive foliage, Not North American native, Naturalizing, Attractive flowers or blooms.

#### 8.2.337 Debregeasia longifolia

Wild Rhe

1428

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 5 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Debregeasia longifolia is an evergreen Shrub growing to 5 m (16ft 5in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from July to September, and the seeds ripen from October to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

### 8.2.294 Amaranthus palmeri

Careless Weed

7 tlin 12 cyuc 2 kcak 1 tcan 0 dwat 0.9 m hkuc htut cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Amaranthus palmeri is a ANNUAL growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil and can tolerate drought.

pcista No members of this genus are known to be poisonous, but when grown on nitrogen-rich soils they are known to concentrate nitrates in the leaves. This is especially noticeable on land where chemical fertilizers are used. Nitrates are implicated in stomach cancers, blue babies and some other health problems. It is inadvisable, therefore, to eat this plant if it is grown inorqanically.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves cooked as a spinach[46, 85, 95, 105, 161]. The leaves can also be dried for winter use[257]. Seed - cooked[46, 85, 95, 105, 161]. Very small but easy to harvest and very nutritious. It is usually ground into a powder and then used with cereal flours in making porridge, bread etc[257]. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated[K].

tcanta DyeYellow and green dyes can be obtained from the whole plant[168].

nrakta South-western N. America ksacta Waste places and fields at low elevations, also in interior valleys and deserts in California[71].

propta Seed - sow late spring in situ. An earlier sowing can be made in a greenhouse and the plants put out after the last expected frosts. Germination is usually rapid and good if the soil is warm[133]. A drop in temperature overnight aids germination[133]. Cuttings of growing plants root easily[206].

nwatta We have very little information on this species and do not know how well it will grow in Britain, though it should succeed as a spring-sown annual. The following notes are based on the general needs of the genus. Prefers a well-drained fertile soil in a sunny position[200]. Requires a hot sheltered position if it is to do well[K]. Plants should not be given inorganic fertilizers, see notes above on toxicity. Most if not all members of this genus photosynthesis: by a more efficient method than most plants. Called the 'C4 carbon-fixation pathway', this process is particularly efficient at high temperatures, in bright sunlight and under dry conditions[196].

#### 8.2.295 Centella asiatica

Gotu Kola, Spadeleaf

7 tlin 10 cyuc 2 kcak 0 tcan 5 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Centella asiatica is an evergreen Perennial growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is polinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

pcista There is a warning that the plant can irritate the skin[238], though it is widely used to treat skin complaints[238].

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked. Used in salads and in curries[238]. Cooked as a vegetable[272]. An aromatic flavour, we have found them to

be rather overpowering in salads when used in any but small quantities[K].

tcanta CosmeticExtracts of the plant are added to cosmetic masks and creams to increase collagen and firm the skin[238]

dwatta Adaptogen Anticonvulsant Antidiarrhoeal Antiinflammatory Antipanic Antirheumatic Cardiac Depurative Diuretic Febrifuge Hypotensive Leprosy Malaria Nervine Sedative Skin TonicGotu kola is an outstandingly important medicinal herb that is widely used in the Orient[238] and is becoming increasingly popular in the West[254]. Its Indian name is 'Brahmi' which means 'bringing knowledge of the Supreme Reality' and it has long been used there medicinally and as an aid to meditation[238]. It is a useful tonic and cleansing herb for skin problems and digestive disorders[254]. In India it is chiefly valued as a revitalizing herb that strengthens nervous function and memory[254]. The whole plant is alterative, cardio-depressant, hypotensive, weakly sedative and tonic[240]. It is a rejuvenating diuretic herb that clears toxins, reduces inflammations and fevers, improves healing and immunity, improves the memory and has a balancing effect on the nervous system[147, 152, 238, 240]. It has been suggested that regular use of the herb can rejuvenate the neryous system and it therefore deserves attention as a possible cure for a wide range of nervous disorders including multiple sclerosis[K]. Recent research has shown that gotu kola reduces scarring, improves circulatory problems in the lower limbs and speeds the healing process[238]. It is used internally in the treatment of wounds, chronic skin conditions (including leprosy), venereal diseases, malaria, varicose veins, ulcers, nervous disorders and senility[238, 240]. Caution should be observed since excess doses cause headaches and transient unconsciousness[238]. Externally, the herb is applied to wounds, haemorrhoids and rheumatic joints[238]. The plant can be harvested at any time of the year and is used fresh or dried[238]. Another report says that the dried herb quickly loses its medicinal properties and so is best used fresh[237].

nrakta E. Asia - India, China and Japan. Australia. ksacta Old stone walls and rocky sunny places in lowland hills and especially by the coast in central and southern Japan[58]. Shady, damp and wet places such as paddy fields, and in grass thickets[147, 238].

propta Seed - sow spring in a greenhouse[238]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a greenhouse for their first winter. Plant them out in late spring or early summer of the following year, after the last expected frosts[K]. Division is simple at any time in the growing season, though the spring is probably best[K]. We find that it is best to pot up the divisions until they are rooting away well, though in selected mild gardens it should be possible to plant the divisions out directly into their permanent positions[K].

nwatta Prefers a moist to wet soil in sun or partial shade[238]. Plants also grow on walls in the wild and so should tolerate drier conditions[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It grows and spreads very well outdoors during the summer in most parts of the country and is very easy to increase by division. It can therefore be grown as a summer crop with divisions being taken during the growing season and overwintered in a greenhouse in case the outdoor plants are killed by winter cold[K].

#### 8.2.296 Ophrys scolopax

Woodcock Orchid

1413

woodcock Orleint 7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli yre7t hionli

drutta Ophrys scolopax is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into

a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta S. Europe. ksacta Grassy places and stony ground.

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

# 8.2.297 Hemiphragma heterophyllum

7tlin10cyuc2kcak0tcan1dwat0.1m hkuc htut cyutli tcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Hemiphragma heterophyllum is a PERENNIAL growing to 0.1 m (0ft 4in) by 1 m (3ft 3in). See above for

USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw. The bright red ripe fruits are eaten fresh[272].

dwatta StypticThe juice of the plant is applied to cuts and wounds[272].

nrakta E. Asia - Western Himalayas. ksacta Dry slopes[272], forest and scrub at elevations of 1800 - 4000 metres[200, 272].

propta Seed - sow spring in a greenhouse[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first winter. Plant them out in late spring or early summer. Division of plants in mid spring[200]. Layering. Plants often produce new roots along the stems at the nodes[272]. Cuttings[272].

nwatta Grows best in a warm, sheltered sunny position in a light well-drained soil[200]. Plants are not very cold hardy, tolerating temperatures down to around -7°c[200]. It succeeds outdoors in the milder areas of Britain but elsewhere needs protection from winter cold[200]. A prostrate perennial, forming spreading carpets of growth[200].

### 8.2.298 Cyathodes fraseri

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hionli

drutta Cyathodes fraseri is an evergreen Shrub growing to 0.2 m (0ft 8in) by 0.3 m (1ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[2, 11, 128]. Sweet and juicy[1, 153, 173]. Contains up to 24% dry weight of oil[158]. (does this refer to the seed?[K]).

tcanta A most attractive ground cover plant for the winter garden[182].

nrakta Australia and New Zealand. ksacta Coastal dunes, lowland to sub-alpine open grassland and rocky places on North, South and Stewart Islands in New Zealandi 441.

propta Seed - surface sow in an ericaceous soil mix, February/March in a cold frame[164]. Do not exclude light[164]. Germination can take place within 1 - 2 months at 18°c but often takes as long as 3 - 5 years[200]. Scarification will reduce the germination time and 2 or 3 periods of 4 - 6 weeks cold stratification alternated with 4 weeks warm stratification can also help[175]. Perhaps sowing the seed as soon as it is ripe would also be beneficial[K]. The seedlings can be very slow to form roots and need to be potted up with great care[200]. Grow them on in the greenhouse for at least their first 2 growing seasons and, when large enough, plant them out into their permanent positions in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame. Neither easy nor reliable[200]. Air layering[200]. Division of the plants as they come into growth in the spring. We have found it best not to dig up the main clump, but to tease out small divisions from the sides of the plant. Make sure that these are well rooted and pot them up in light shade in a greenhouse. Grow them on for their first summer in the greenhouse and plant them out in late spring, after the last expected frosts.

nwatta Requires a moist well-drained lime-free humus rich soil in a sheltered site in partial or dappled shade[11, 164, 200]. Plants are very susceptible to drought[200]. A good rock garden plant[11]. Slow growing[11]. This plant is not very hardy in Britain though it succeeds outdoors in the milder areas of the country[1]. Plants grow best in areas with moderate winters and cool moist summers[200]. Plants have

is not large enough nor common enough for commercial production, though it is used locally for fencing posts, telegraph poles railroad ties and fuel[82, 229].

nrakta Southern N. America - Missouri to Texas, south to Mexico. ksacta Found at lower elevations, growing mainly on limestone hills or in soils underladen with limestone[229].

propta The seed requires a period of cold stratification. The seed has a hard seedcoat and can be very slow to germinate, requiring a cold period followed by a warm period and then another cold spell, each of 2 - 3 months duration[78, 81]. Soaking the seed for 3 - 6 seconds in boiling water may speed up the germination process[11]. The seed is best sown as soon as it is ripe in a cold frame. Some might germinate in the following spring, though most will take another year. Another possibility is to harvest the seed 'green' (when the embryo has fully formed but before the seedcoat has hardened). The seedlings can be potted up into individual pots when they are large enough to handle. Grow on in pots until large enough, then plant out in early summer. When stored dry, the seed can remain viable for several years[1]. Cuttings of mature wood, 5 - 10cm with a heel, September/October in a cold frame. Plant out in the following autumn[1, 78]. Layering in September/October. Takes 12 months[78].

nwatta Landscape Uses:Screen, Specimen, Street tree. Succeeds in most soils if they are well drained, preferring a neutral or slightly alkaline soil[1, 11, 200]. Established plants are drought tolerant, succeeding in hot dry positions[200]. They require a sheltered position in full sun[81]. This species is only hardy in the milder areas of Britain[81]. A slow-growing plant, though it may live for 200 - 350 years in good conditions[229]. Fruit production is cyclic, a year of heavy crops being followed by 1 - 2 years of light crops[229]. The seed ripens in its first year[229]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attracts birds, North American native, Fragrant foliage, Inconspicuous flowers or blooms.

### 8.2.332 Illicium anisatum

Star Anise, Chinese Anise, Japanese Anise
7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat 6 m hkuc
hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatprik
hpa7tmwatli xre7t hjonli

drutta Illicium anisatum is an evergreen Shrub growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7 and is not frost tender. It is in leaf all year, in flower from March to May, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable PH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The essential oil obtained from this plant is poisonous[270]. The fruit is poisonous in quantity[19, 177].

kcakta Edible Parts: Edible Uses: CondimentThe fruit is used as a flavouring[2, 132, 177] and is also chewed after meals in order to sweeten the breath[4]. The fruit is about 25mm in diameter[2]. Some caution is advised because it is said to be poisonous in quantity[19, 177].

dwatta Antibacterial Carminative Diuretic Odontalgic Stimulant StomachicDiuretic, odontalgic, stimulant[4, 61]. The fruit is carminative, stimulant and stomachic[21, 240]. It is used primarily to promote digestion and the appetite, and to relieve flatulence[21]. It also makes a good additive to other medicines to improve their taste[21]. The leaves and the seeds are antibacterial[240].

nrakta E. Asia - S. China, Japan, Taiwan. ksacta Thickets and woods in foothills, S. and C. Japan[58].

propta Seed - it does not require pre-treatment and can be sown in early spring in a greenhouse[113]. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts, and give some protection from the cold over the winter for the first year or two. Layering in early spring. Takes 18 months[78]. Cuttings of half-ripe wood, August in a frame[113]. Pot up the cuttings when they start to root and grow them on in the greenhouse for their first winter, planting out after the last expected frosts.

nwatta Landscape Uses:Border, Pest tolerant, Massing, Screen, Woodland garden. Prefers a light, moist well-drained loam and a sheltered position[1, 11]. Prefers a humusrich lime-free soil[182, 200]. Succeeds in sun or semishade[200]. A slow-growing plant[188]. This species is not very cold-hardy, it tolerates temperatures down to about -10°c but normally requires the protection of a wall in most of Britain[184]. It succeeds outdoors in the mildest areas of the country[59]. Star anise is a very ornamental and aromatic plant that is much planted near Buddhist shrines and temples in Japan[184]. The plants have the scent of anise[219]. All parts of the plant are pleasingly aromatic. The leaves release a powerful aromatic odour when touched and the flowers have a spicy odour[245]. Plants seldom grow larger than about 2 metres in Britain, but are often 10 metres tall in their native habitat[58]. Special Features: Attracts birds, Fragrant foliage, Not North American native, Fragrant flowers. Attractive flowers or blooms.

#### 8.2.333 Marah fabaceus

Bigroot, California manroot,

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyif hjonli

drutta Marah fabaceus is a PERENNIAL CLIMBER growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The root is said to be poisonous to fish[257]. We have no reports as to whether or not it is toxic to mammals[K].

kcakta Edible Parts: LeavesEdible Uses: Used as a vegetable [177]. We do not know if the fruit, root or the leaves are used[K].

tcanta HairThe crushed seeds, mixed with oil, have been rubbed on the hair to prevent baldness[257].

nrakta South-western N. America - California. ksacta Banks and slopes below 750 metres in coastal strand and mixed evergreen forests[71].

propta Seed - sow early spring in pots of rich soil in a greenhouse. Germination usually takes place within 1 - 2 weeks at  $20\,^\circ\text{c}$ . Put 2 or 3 seeds in each pot and thin to the best plant. Grow on fast and plant out after the last expected frosts.

nwatta Requires a rich soil and abundant moisture[1]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. A climbing plant, supporting itself by means of tendrils[219].

### 8.2.334 Paliurus spina

Christ's Thorn, Jeruselem thorn

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 5 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Paliurus spina-christi is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August, and the seeds ripen from October to December. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or dried for later use. A pleasant sub-acid taste, somewhat resembling dried apples[183]. The woody fruit is up to 30mm in diameter[200]

tcanta Hedge HedgeThe plants are used for hedging they have a loose but bushy habit[11, 200].

dwatta Astringent Diuretic TonicAnticathartic, astrin gent, diuretic and tonic[218].

out before the cutting is inserted in the soil. Fair to good percentage[78]. Layering in summer[188].

nwatta Landscape Uses:Cascades, Erosion control Ground cover, Pest tolerant, Massing. Requires a welldrained moderately retentive soil in full sun or with part-day shade[200]. Requires a good humus-rich soil[11]. Succeeds in moderately alkaline or acid soils[202]. Requires the protection of a wall[11]. Plants are not very hardy outside the milder areas of Britain[166], but they can tolerate temperatures down to about -15°c when grown in a suitable position that makes sure the wood is fully ripened[200]. Young plants are particularly susceptible to cold winds[202]. A twining plant[182]. Plants are self-clinging on walls according to other reports[166, 200]. The plant is of slow to moderate growth[202]. Flowers are produced on short laterals that grow from old wood[200]. The flowers have a sweet refreshing perfume[245]. Special Features: Not North American native, Naturalizing, Fragrant flowers, Inconspicuous flowers or blooms, Flowers are rare.

#### 8.2.329 Photinia glabra

Japanese Photinia, Red Top, Red Leaf Photinia, 7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 6 m hkuc mimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Photinia glabra is an evergreen Shrub growing to 6 m (19ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower in May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - dried[177]. The fruit is about 5mm in diameter[200].

tcanta WoodThe wood is hard and heavy, suitable for making furniture and other small articles[266].

dwatta Anthelmintic DysenteryAnthelmintic. Also used in the treatment of obstinate dysentery, piles and jaundice[178, 218]

nrakta E. Asia - C. and S. Japan. ksacta Hills in Szechwan[178]. Slopes, mixed forests a elevations of 500 - 800 metres[266].

propta Seed - best sown in a cold frame as soon as it is ripe in the autumn. Stored seed will probably require stratification and should be sown as early in the year as possible[78]. Germination is usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Basal cuttings in a frame[200]. Harvest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer. Cuttings of half-ripe wood, 7 - 10cm with a heel, July/August in a frame[11, 78]. They take about 2 months to root and should be overwintered in a greenhouse, planting out in late spring[78]. Fair to good percentage[78]. Cuttings of almost ripe side shoots, 7 - 12cm with a heel, October/November in a cold frame[78]. Lift the following autumn and plant in their permanent positions[78]. Layering in autumn. Partially sever the layer about 12 months later and lift in the following spring. High percentage[200]

nwatta Landscape Uses:Screen, Standard, Specimen, Street tree. Requires a well-drained fertile soil in a sheltered position in sun or light shade[1, 200]. Prefers a warm soil that is not too heavy or close[11]. Tolerates calcareous soils[11, 200]. Dislikes windy sites[11]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -10°c[200]. Plants are susceptible to fireblight[200]. Plants in this genus are notably resistant to honey fungus[200]. Plants are very tolerant of pruning[202]. There are some named forms selected for their ornamental value[200]. Special Features:Attractive foliage, Not North

American native, Fragrant flowers, Flowers have an unpleasant odor, Attractive flowers or blooms.

### 8.2.330 Daphniphyllum himalense

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 6 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Daphniphyllum himalense is an evergreen Tree growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: The very closely related D. macropodum is said to have edible leaves. Are the leaves of this species also edible cooked?[K]

tcanta WoodWood - soft, close and even grained, very handsome. Used for turnery, carving etc[146, 272]. The wood of the roots is especially handsome, it is deep red in colour[158].

dwatta SkinA paste of the wod is applied as a poultice to boils[272].

nrakta E. Asia - Central and Eastern Himalayas to Northern Burma. ksacta Cool moist forests[200], shady ravines[158] and valleys alongside streams, 1200 - 3000 metres[146].

propta Seed - sow spring in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of moderately ripened wood, 7 - 10cm with a heel or at a junction with old wood, July in individual pots in a frame. The cuttings are slow to root, give them brisk bottom heat[78]. Fair percentage[78]. Layering of current seasons growth, 12cm long in August/September. Takes 12 - 18 months. High percentage[78].

nwatta Succeeds in any good soil, tolerating lime but perhaps not suitable for very chalky soils[11]. A useful plant for moist shady positions[11]. Dislikes cold drying winds[200]. D. macropodum. Miq. is hardy at Kew and tolerates temperatures down to about -20°c[11, 184]. It is very closely related to this species and is perhaps no more than a sub-species of it[11]. This species, however, is less hardy than D. macropodum[182]. The flowers have a pungent aroma[182]. They are produced in racemes on the previous year's wood[11]. Dioecious, male and female plants must be grown if seed is required.

### 8.2.331 Juniperus ashei

Ashe Juniper, Mountain Cedar

1426

7 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Juniperus ashei is an evergreen Tree growing to 6 m (19ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. The cones are about 6 - 8mm in diameter[200], they are thin-skinned sweet, juicy and resinous[82, 229].

tcanta WoodWood - close-grained, hard, durable, slightly fragrant, light and easily worked[82, 229]. The wood

very fine root systems and great care must be taken when transplanting them[157].

### 8.2.299 Liriope graminifolia

Lilvturf

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Liriope graminifolia is an evergreen Perennial growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to August, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: RootEdible Uses: Root -cooked[105, 177, 179]. Candied and used medicinally[61]. The root has a fleshy, tuberous part near its tip[266]. Rich in mucilage, the root also contains about 1.6% protein, 0.5% fat, 80% carbohydrate and 2.3% ash[179].

tcanta A good drought tolerant evergreen ground cover plant[200].

dwatta Aphrodisiac Pectoral StimulantThe root is aphrodisiac, pectoral and stimulant[61].

nrakta E. Asia - China, Japan. ksacta Lowland and foothills all over Japan[58]. Forests, thickets, shady places along ravines, grassy and rocky places from near sea level to 2300 metres[266].

propta Seed - we have no information on this species but suggest sowing it in a cold frame or greenhouse as soon as the seed is ripe if possible, if not then sowing the stored seed in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a sandy soil[1]. Succeeds in full sun so long as the soil does not dry out in the summer, otherwise it should be grown in partial shade in any moderately fertile well-drained soil[200]. Not very hardy in Britain, it is best to give the plants some protection in the winter[1]. Members of this genus are rarely if ever troubled by browsing deer[233]. Most plants grown under this name in British gardens are actually L. muscari[200]. The Flora of Japan treats L. graminifolia as two separate species, L. minor. (Maxim.)Makino. and L. platyphylla. F.T.Wang. and Tang. The New RHS Dictionary of Gardening recognizes L. graminifolia as a distinct species and gives L. platyphylla as a synonym of L. muscari whilst allotting specific status to L. minor as a plant closely related to L. muscari. This is the treatment followed here.

### 8.2.300 Asparagus filicinus

Fern Asparagus

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.7 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Asparagus filicinus is a PERENNIAL growing to 0.7 m (2ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June, and the seeds ripen from July to August. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots cooked[158, 177]. Used as a vegetable[272].

1415

dwatta Antipyretic Antitussive Diuretic Expectorant Nervine Stomachic TonicThe dried root is antipyretic, antitussive, diuretic, expectorant, stomachic, nervous stimulant and tonic[218].

nrakta E. Asia - China, India. ksacta Loose humus rich soils in forests, 1700 - 2700 metres in the Himalayas[145]. Forests, thickets, shady and moist places along valleys; 1200 - 3000 metres in western China[266].

propta Seed - pre-soak for 12 hours in warm water and then sow in spring or as soon as the seed is ripe in early aumm in a greenhouse. It usually germinates in 3- 6 weeks at  $25\,^{\circ}\mathrm{c}[134].$  Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a sunny position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Division in early spring as the plant comes into growth.

nwatta Easily grown in any good garden soil[200]. Prefers a rich sandy loam[1]. Plants are hardy to between -10 and -15°c[200]. Dioecious. Male and female plants must be grown if seed is required.

### 8.2.301 Arum dioscoridis

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.3 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Arum dioscoridis is a PERENNIAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf from October to July, in flower in May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semishade (light woodland) or no shade. It prefers moist soil.

pcista The plant contains calcium oxylate crystals. These cause an extremely unpleasant sensation similar to needles being stuck into the mouth and tongue if they are eaten, but they are easily neutralized by thoroughly drying or cooking the plant or by steeping it in water[65].

kcakta Edible Parts: RootEdible Uses: Tuber - cooked and used as a vegetable[2, 61, 105, 177]. It must be thoroughly dried or cooked before being eaten, see the notes above on toxicity.

dwatta AbortifacientThe root is abortifacient[61].

nrakta S. Europe and N. Africa - E. Mediterranean. ksacta Hedges and rocky places, often on calcareous soils[90, 200]

propta Seed - best sown in a greenhouse or cold frame as soon as it is ripe[134]. The seed usually germinates in 1 - 6 months at 15°c[134]. Stored seed should be sown in the spring in a greenhouse and can be slow to germinate, sometimes taking a year or more. A period of cold stratification might help to speed up the process. Sow the seed thinly, and allow the seedlings to grow on without disturbance for their first year, giving occasional liquid feeds to ensure that they do not become mineral deficient. When the plants are dormant in the autumn, divide up the small corms, planting 2 - 3 in each pot, and grow them on in light shade in the greenhouse for a further year, planting out when dormant in the autumn. Division of the corms in summer after flowering[200]. Larger corms can be planted out direct into their permanent positions, though it is best to pot up the smaller corms and grow them on for a year in a cold frame before planting them out.

nwatta Prefers a humus rich soil and abundant water in the growing season[1]. Grows well in woodland conditions[1]. Succeeds in sun or shade. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Because it comes into growth in the late autumn it is best grown by a warm wall or in a bulb frame[90] A polymorphic species[200]. The inflorescence is pollinated by flies and it smells of dung and carrion in order to attract the flies[200]. It also has the remarkable ability to heat itself above the ambient air temperature to such a degree that it is quite noticeable to the touch[4]. This probably protects the flowers from damage by frost, or allows it to penetrate frozen ground. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.302 Rubus rolfei

'Emerald Carpet' raspberry

7 tlin 9 cyuc 2 kcak 3 tcan 0 dwat 0.1 m hkuc

pcimhmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flat-priklwis hpa7tmwatli xre7t hjonli

drutta Rubus rolfai is an evergreen Shrub growing to 0.1 m (0ft 4in) by 0.6 m (2ft). It is not frost tender. It is in leaf all year, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[183]. The yellow to orange-reddish fruit is up to 14mm in diameter[266].

tcanta DyeA purple to dull blue dye is obtained from the fruit[168]. A good ground cover plant for a sunny position or deep shade[11]. It makes a firmly matted cover though it requires weeding for the first year or so[197]. Plants are best spaced about 60cm apart each way[208].

nrakta E. Asia - Formosa. ksacta Open places, mixed forests at elevations of 1300 - 3800 metres[266].

propta Seed - requires stratification and is best sown in early autumn in a cold frame. Stored seed requires one month stratification at about  $3^\circ c$  and is best sown as early as possible in the year. Prick out the seedlings when they are large enough to handle and grow on in a cold frame. Plant them out into their permanent positions in late spring of the following year. Cuttings of half-ripe wood, July/August in a frame[200]. Division in early spring or just before leaf-fall in the autumn[200].

nwatta Easily grown in a good well-drained loamy soil in sun or semi-shade[1, 11, 200]. Succeeds in deep shade. Plants are evergreen in most climates but they can lose their leaves in severe winters. Occasionally cultivated for its edible fruit, there are some named varieties[183], 'Emerald Carpet' is an ornamental thornless form with orange berries that resemble small raspberries[183]. Plants in this genus are notably susceptible to honey fungus[200]. Rubus pentalobus Hayata is a synonym of Rubus rolfei J.E.Vidal The plant is heat tolerant in zones 9 through 7. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree. shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. An evergreen. A clumping mat former. Forming a dense prostrate carpet with a limited spread [1-2]. The root pattern is suckering with new plants from underground runners away from the plant [1-2].

#### 8.2.303 Cyathodes colensoi

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.3 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Cyathodes colensoi is an evergreen Shrub growing to 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) by 0.3 m (1ft) colensor as low rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked. A sweet mealy flesh[153]. Rarely seen on plants growing in Britain[11]. The fruit is about 5mm in diameter[200]. One report says that the fruit contains up to 24% by dry weight of oil[153], does this refer to the seed?[K].

tcanta A most attractive ground cover plant for the winter garden[182].

nrakta New Zealand. ksacta Montane to lower subalpine open grassland to rocky places and fellfield on North and South Islands[44].

propta Seed - surface sow in ericaceous soil, February/March in a cold frame[164]. Do not exclude light[164]. Germination can take place within 1 - 2 months at 18°c but often takes 3 - 5 years[200]. Scarification will reduce the germination time and 2 or 3 periods of 4 - 6 weeks cold stratification alternated with 4 weeks warm stratification can also help[175]. Perhaps sowing the seed as soon as it is ripe would also be beneficial[K]. The seedlings can be very slow to form roots and need to be potted up with great care[200]. Grow them on in a greenhouse for at least two years before planting them out in late spring or early summer. Cuttings of half-ripe wood, July/August in a frame[188]. Neither easy nor reliable[200]. Air layering[200].

nwatta Requires a moist well-drained lime-free humus rich soil in a sheltered site in partial or dappled shade[11, 164, 200]. Plants are very susceptible to drought[200]. A good rock garden plant. Slow growing[11]. This species is fairly hardy in Britain but it can be damaged in very severe winters[11]. Another report says that it is only hardy to about -5°c[200], but plants have been seen growing on a very shady north-facing slope in a rock garden at Kew, which experiences lower temperatures than this[K]. These plants were undamaged after the very cold winter of 1996 - 97 and were flowering freely in April 1997[K]. Plants grow best in areas with moderate winters and cool moist summers[200]. The sweetly scented flowers are produced in axillary clusters[245]. Plants have very fine root systems and great care must be taken when transplanting them[157].

### 8.2.304 Carpobrotus edulis

Hottentot Fig

7 tlin 10 cyuc 2 kcak 2 tcan 2 dwat 0.1 m hkuc

htut cyutli hgatkyuctcup hwicli hyishras hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Carpobrotus edulis is a PERENNIAL growing to 0.1 m (0ft 4in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from May to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

kcakta Edible Parts: Fruit LeavesEdible Uses: Fruit - raw, cooked, dried for later use or made into pickles, chutney etc[1, 2, 3, 5, 7, 183]. There is very little flesh in the fruit and it must be fully ripe otherwise it is very astringent[K]. Mucilaginous and sweetly acid[183]. Leaves - raw or cooked[2, 173]. Succulent, they are eaten in salads and can also be used as a substitute for pickled cucumber[183]. We find them too mucilaginous to be enjoyable[K].

tcanta Fire retardant Soil stabilization TanninUsed in maritime areas to prevent soil erosion in sandy soils[188, 200]. Plants form a dense carpet and make an effective ground cover[208]. Can be grown as a fire barrier in areas subject to forest fires, it is moderately fire retardant[200]. The dried leaves contain about 19.4% tannin and the dry stems 14.2%[223]. Yields of 1700 kilos per hectare of cultivated plants have been achieved[223]. A popular plant for growth as an ornamental or for ground cover [1d].

dwatta Used as a traditional medicinal plant (GRIN, 2008), some anti-cancer properties have been shown by methanolic extracts of C. edulis (Ordway et al., 2003); and also anti-bacterial properties (van de Watt and Pretorius, 2001)[1d].

nrakta S. Africa - Cape Province. Naturalized in Britain[17]. ksacta Sandy and rocky places by the sea[260]. Naturalized on cliffs and banks by the sea in Cornwall and S. Devon[17].

propta Seed - surface sow March to June in a greenhouse. Lower night-time temperatures are beneficial. The seed usually germinates in 7 - 10 days at 23°c[138]. When in Anhui, Fujian, Gansu, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan and Yunnan [266].

propta Seed - sow March in a warm greenhouse[1]. This note probably refers to the tropical members of the genus, seeds of plants from cooler areas seem to require a period of cold stratification, some species taking 2 or more years to germinate[K]. We sow the seed of temperate species in a cold frame as soon as we receive it, and would sow the seed as soon as it is ripe if we could obtain it then[K]. When the seedlings eventually germinate, prick them out into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first year, though we normally grow them on in pots for 2 years. Plant them out into their permanent positions in early summer. Division in early spring as new growth begins[238]. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer. Cuttings of half-ripe shoots, July in a frame[238].

nwalta Succeeds in most soils in sun or semi-shade[200]. Not very hardy in Britain, it tolerates temperatures down to about -10°c and succeeds outdoors in milder parts of the country[200]. Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.326 Metrosideros excelsa

Pohutukawa

7 tlin 10 cvuc 1 kcak 0 tcan 1 dwat 7 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Metrosideros excelsa is an evergreen Tree growing to 7 m (23ft) by 15 m (49ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. The plant can tolerate maritime exposure

kcakta Edible Parts: NectarEdible Uses: An edible nectar is obtained from the flowers[173].

tcanta Hedge Hedge WoodPlants can be used as a hedge, succeeding in exposed maritime positions[166, 200]. Wood - dense, compact, heavy, durable, very strong. Used for ship-making, bearings, machine beds etc/46, 611.

dwatta Astringent DysenteryAstringent. Used in the treatment of dysentery[46, 61].

nrakta New Zealand. ksacta Coastal forests in North and Three Kings Islands[44].

propta Seed - sow spring in a warm greenhouse and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Give the plants some protection from the cold for at least their first winter outdoors. Cuttings of half-ripe wood, 7 - 10cm with a heel, in individual pots in a frame. Good percentage[200].

nwatta Prefers a well-drained but moisture-retentive lime-free soil in a sunny position[182, 200]. Plants are somewhat lime-tolerant but are unsuitable for shallow soils over chalk[200]. Very resistant to maritime exposure[166, 200]. This species is not very hardy in Britain, tolerating temperatures down to about -5°c[184] and succeeding outdoors only in the mildest areas of the country where it makes a small shrub[1, 200]. Plants grow very well on the Isles of Scilly, where they are cut back by cold perhaps once every twenty years. They usually sprout again from their thick branches[260]. A good bee plant[173]. Very ornamental[1]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.327 Adenostoma sparsifolium

Rodehank

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 6 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Adenostoma sparsifolium is an evergreen Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Seeds[257]. No further information is given.

tcanta The bark is fibrous and has been stripped off the plants to make women's skirts[257]. The wood has been used to make fencing posts and as construction material[257]. The wood burns well, giving a high intensity heat[257].

dwatta The plant is cathartic[257]. The plant has been used externally in the treatment of arthritis[257]. An infusion of the leaves has been used in the treatment of colds and chest complaints, and also as a mouth wash to treat toothaches[257]. An infusion of the dried leaves, or the branches, has been used in the treatment of stomach ailments, inducing either bowel movements or vomiting[257]. The crushed twigs have been mixed with oil and used as a salve[257].

nrakta South-western N. America - Southern California. ksacta Grows in chapparal at elevations of 300 - 2500 metres[276].

propta Seed - we have no information for this species but suggest sowing the seed in a greenhouse in early spring. When large enough to handle, prick the seedlings out into individual pots and grow the plants on for at least their first winter in a greenhouse or cold frame, planting them out in late spring or early summer, after the last expected frosts. Cuttings could be tried in August of half-ripe wood, preferably with a heel, in a frame. Lavering.

nwatta Requires a sheltered sunny position in a well-drained soil[182, 200] and protection from cold winds[200]. Plants are not very hardy in Britain and do not withstand exposure to prolonged winter frosts though they succeed out-doors in the milder areas of the country[182, 200]. In colder areas they are best grown against a south or south-west facing wall[200]. The leaves are resinous and catch fire easily[181]. They have a pleasant aroma[200].

#### 8.2.328 Trachelospermum asiaticum

Japanese Star Jasmine, Small Leaf Confederate Jasmine, Asiatic Jasmine

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Trachelospermum asiaticum is an evergreen Climber growing to 6 m (19ft) by 6 m (19ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 9. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young buds - cooked[105, 177]. No more details are given, we do not know if it is the leaf or flower buds that are referred to

tcanta Can be grown as a ground cover plant in a sunny position[188]. One of the most common ground cover plants used in Texas[274].

nrakta E. Asia - Japan, Korea. ksacta Thickets in hills and low mountains, C. and S. Japan[58]. Growing in scrub and climbing up trees in the forest[260].

propta Seed - we have no information for this species but suggest sowing the seed in a greenhouse in early spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 6 - 8cm with a heel, August in a frame. Ensure that the milky sap, which is excreted from the heel when the cutting is taken, has dried

permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy[200]. Cuttings of mature wood of the current seasons growth, 15 - 25cm long, planted outdoors in late autumn in a nursery bed or straight into their permanent position. High percentage[11, 200].

nwatta An easily grown plant, succeeding in most soils and tolerant of saline conditions[11]. Grows well in heavy clay soils as well as in sands and even shingle[182]. Usually found near the coast, it succeeds inland if given a fairly good deep loam and a sunny position[11, 200]. Tolerant of maritime winds and dry soils when grown near the coast[11]. plants require a moister soil and shelter from cold drying winds when they are grown inland in non-saline soils because they use the soil salts that are found in saline soils to help them reduce transpiration[200]. This species is not very hardy outdoors in Britain[1], but it succeed in the milder areas of the country, tolerating temperatures down to between -5 and -10°c[200]. This species flowers on the current year's growth[200]. Any pruning is best carried out in spring, hedges are also best trimmed at this time[188]. Plants are tolerant of severe pruning, sprouting freely from old wood[K]. Plants in this genus are notably resistant to honey fungus[200].

### 8.2.323 Dicksonia antarctica

Tree Fern Australian treefern

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 9 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Dicksonia antarctica is an evergreen Fern growing to 9 m (29ft) by 4 m (13ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland). It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B. though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: Leaves StemEdible Uses: The pith in the upper part of the trunk just below the growing point is eaten raw or roasted[46, 61, 154, 193]. It is rich in starch[105, 144] but also contains tannin and is astringent[154]. Descriptions of the taste vary from bitter to sweet, astringent and like a bad turnip[193]. The core of the plant near the growing tip is used[193]. Harvesting the stem kills the plant so this use cannot normally be condoned[193]. The stem contains about 61 kilocalories per 100g[193]. Young leaves - cooked. Harvested just before they unfurl, they are juicy and slimy, tasting like bitter celery[193].

tcanta Soil stabilizationThis species is used in New Zealand to stabilize roadside cuttings[200].

dwatta AstringentAstringent[154].

nrakta Australia - New South Wales, Tasmania, Victoria. ksacta Damp sheltered woodland slopes and moist gullies[144].

propta Spores - can be sown at any time in a warm greenhouse. Surface sow and enclose the pot in a plastic bag in order to keep it moist. Place in light shade. Germinates in 1 - 3 months at 20°c. Prick out small clumps of plants when they are large enough to handle and grow on in a shaded part of the greenhouse for at least the first 2 years. Plant out in late spring after the last expected frosts. The spores can be stored dry for up to 10 years[200].

nwatta Requires a sheltered woodland position and a moist soil[11, 200]. Strongly resents drought or dryness at the roots[200]. A very ornamental plant[1], it is hardy to about -5°c[184, 200], succeeding outdoors in the milder areas of Britain where it thrives and often self-sows in Cornish gardens[49]. One report says that some forms are hardy to at least -7°c[157]. Plants can tolerate snow but are intolerant of severe frosts[11, 200]. Members of this genus are rarely if ever troubled by browsing deer[233]. The 'trunk' of

this plant is merely the decaying remains of earlier growth of the plant and forms a medium through which the roots grow[157]. Plants can be cut down and, if they are kept moist, the top portions can be replanted and will form new roots[157]. The stump, however, will not regenerate since it is simply dead organic matter[157]. It is best to leave old fronds on the plant in order to protect the trunk from cold and desiccation[166].

### 8.2.324 Chilopsis linearis

Desert Willow

7 tlin 11 cyuc 1 kcak 0 tcan 1 dwat 9 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Chilopsis linearis is a deciduous Shrub growing to 9 m (29ft 6in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers SeedpodEdible Uses: The blossoms and seedpods have been used for food[257].

tcanta Basketry Fibre WoodThe young pliable twigs are woven into baskets[227, 274]. The bark is removed and the shoots are used unsplit as rod foundations in coil basketry[257]. The bark has been used to make shirts and nets[257]. Wood - coarse-grained, soft, weak, rather durable in the soil. Used for fence posts and fuel[227].

dwatta PectoralA decoction of the flowers is used for coughs and bronchial disturbances[227].

nrakta South-western N. America - California to Texas south to Mexico, ksacta Gravelly or rocky soils in arid desert washes and desert grasslands 400 - 1600 metres[227 229] Plants attain their greatest size when growing along streams and in low places[229].

propta Seed - we have very little information on this species but would suggest sowing the seed in a greenhouse in the spring. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. It will probably pay to protect the plants for their first winter or two in the open ground. There are about 75,000 seeds per pound, only half of which are viable. About 4.000 plants are usually raised from a pound of seed[227]. Grows readily from cuttings[227].

nwatta Landscape Uses:Border, Pollard, Standard, Specimen. Requires a very warm sunny position in a very well-drained soil[260]. Plants are likely to be intolerant of wet conditions especially in the winter (K). This species is not very hardy outdoors in Britain, tolerating temperatures down to about -3°c[260]. The showy flowers are fragrant[229]. Special Features: Attracts birds, North American native, Fragrant flowers, Blooms are very showy.

#### 8.2.325 Smilax discotis

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 7 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Smilax discotis is a deciduous Climber growing to 7 m (23ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). . The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[177]. The black fruit is up to 8mm in diameter[266]. No more details are given.

nrakta E. Asia - China. ksacta Forests, thickets and shaded places on slopes at elevations of 600 - 2100 metres

they are large enough to handle, prick the seedlings out into USDA hardiness. It is hardy to UK zone 8 and is frost tenindividual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings at any time during the growing season. Allow the cutting to dry in the sun for a day or two then pot up in a very sandy mix. Very easy[K].

nwatta Requires a well-drained sandy soil in a sunny position[1, 200]. Plants can be grown on dry walls or in the flower border[166]. Established plants are very drought resistant[200]. Very resistant to wind and salt spray[166]. Moderately fire-retardant[200]. Plants are not very frost resistant and can be killed by temperatures below about -2°c. They have naturalized themselves on cliffs along the coast of S. Britain but do not succeed inland unless grown in a sunny sheltered position[200]. A vigorous prostrate plant, rooting as it spreads. The flowers only open in the afternoon[200]. Grows on shallow soil [1d].

### 8.2.305 Chlorogalum parviflorum

Smallflower Soapplant

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flat-

priklwis hpa7tmwatli xre7t hjonli drutta Chlorogalum parviflorum is a BULB growing to 0.6 m (2ft) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista The bulb contains saponins. Although fairly toxic, these substances are very poorly absorbed by the body and most of them simply pass straight through. Saponins are found in a number of common foods, including many beans They are destroyed by thorough cooking[K]. Saponins are much more toxic to some creatures, such as fish, and hunting tribes have traditionally put large quantities of them in streams, lakes etc in order to stupefy or kill the fish[K].

kcakta Edible Parts: RootEdible Uses: Bulb cooked[105, 161, 177]. A slow baking will remove any soapiness in the taste. The bulbs can be very large and are up to 7cm in diameter[270].

nrakta South-western N. America - California, ksacta Dry open areas of coastal sage scrub from sea level to 800 metres[270]

propta Seed - sow spring or summer 2mm deep in a peat/sand mix. Germination usually takes place within 1 -6 months at 15°c, but it can be slow and erratic. Sow the seed thinly so that the seedlings do not need to be thinned and grow them on in the pot for their first year of growth. giving an occasional liquid feed o ensure that they do not become mineral deficient. When dormant, pot up 3 young bulbs per pot and grow them on for at least another 2 years before planting them out into their permanent positions in the spring[164]. Division of offsets when the bulb dies down in late summer. Larger offsets can be planted out direct into their permanent positions but it is best to pot up the smaller bulbs and grow them on for at least a year in the greenhouse.

nwatta Succeeds in any reasonably good well-drained soil[1, 42]. Prefers a rich well-drained moisture retentive soil[164]. Tolerates partial shade[164]. Dislikes dry soils according to one report[200] but plants grow in dry soils in the wild[71]. Plants are frost hardy but they come into new growth in the autumn and so need to be grown in a warm sheltered position, especially in colder areas of the coun-

### 8.2.306 Carpobrotus deliciosus

Sweet Hottentot Fig

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwishsom hpa7tmwatli xre7t hionli

drutta Carpobrotus deliciosus is an evergreen Perennial growing to 0.2 m (0ft 8in) by 1 m (3ft 3in). See above for der. It is in leaf all year. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or used as a garnish for fruit salads[183, 200]. The fruit can also be dried and eaten like candy or made into jams and preserves[183]. There is very little flesh in the fruit and it must be fully ripe otherwise it is very astringent[K].

tcanta Fire retardant Soil stabilizationThe plant is moderately fire-retardant and can be planted as a barrier to the spread of forest fires in Mediterranean and similar climates[200]. Planted on sunny banks and sandy soils in order to prevent soil erosion[200].

nrakta S. Africa - Cape Province and Riversdale districts. ksacta Not known

propta Seed - surface sow March to June in a greenhouse. Lower night-time temperatures are beneficial. The seed usually germinates in 7 - 10 days at 23°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer after the last expected frosts. Cuttings at any time during the growing season. Allow the cutting to dry in the sun for a day or two then pot up in a very sandy mix. Very easy[K].

nwatta Requires a well-drained sandy soil in a sunny position[1, 200]. Plants can be grown on dry walls or in the flower border[166]. Established plants are very drought resistant[200]. Very resistant to wind and salt spray[166]. Moderately fire-retardant[200]. Plants are not very frost resistant, they can be damaged by temperatures below about -2°c and only succeed outdoors in the milder areas of the country[200]. A vigorous prostrate plant, rooting as it spreads. The flowers only open in the afternoon[200].

### 8.2.307 Ophrys iricolor

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Ophrys iricolor is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe - Mediterranean. ksacta Chalk and marl soils in Israel.

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able

to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. This species is not hardy in the colder areas of the country it tolerates temperatures down to between -5 and -10°c[200]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

#### 8.2.308 Microcachrys tetragona

7 tlin 10 cyuc 2 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Microcachrys tetragona is an evergreen Shrub growing to 0.2 m (0ft 3in) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw[K]. It is rather small, about the size of a small blackcurrant, and does not have much flavour[K].

nrakta Australia - Tasmania. ksacta Mountains in the alpine and sub-alpine zones[11].

propta Seed - best sown as soon as it is ripe in a cold frame. The seed can be very slow to germinate, stored seed often requiring 12 months stratification[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Bird-sown seedlings, if they can be obtained, are the best way of propagating this plant[200].

nwatta Requires a moist soil and very high humidity with plenty of rain[200]. Succeeds on a north facing slope[11]. This species is fairly hardy in Britain, succeeding outdoors in all but the coldest parts of the country[200]. A slow growing plant[157]. Plants are usually dioecious but monoecious

forms are sometimes found. Female plants can set fruit in the absence of a male but male plants must also be grown if fertile seed is required[11].

#### 8.2.309 Ophrys lutea

Yellow Bee Orchid

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Ophrys lutea is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf from October to June, in flower from March to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Ūses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe - Mediterranean. ksacta Calcareous soils in open places in the maquis and garigue, often in full sun[230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Plants prefer a shady position[188]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will

long outdoors in Britain, even though it is the hardiest member of the genus[1]. Another says that it is quite hardy in Britain[11] whilst a third says that it can tolerate temperatures down to about -7°c[200]. A specimen planted at Kew in 1987 was  $2^{1/2}$  metres tall and looking very healthy in August 1999[K]. Trees are relatively slow-growing in the wild[229].

### 8.2.320 Maytenus boaria

Mayten Tree, Mayten

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Maytenus boaria is an evergreen Tree growing to 10 m (32ft) by 8 m (26ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: OilEdible Uses: OilAn edible oil is obtained from the seed. Used for cooking[183].

nrakta S. America - Argentina and Chile. ksacta Pasturelands, avoiding the competition for light from other trees[11].

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200]. Division of suckers in the autumn or spring[188].

nwatta Succeeds in most soils in a sunny position[182] and also in semi-shade[188]. The soil should be well-drained but must not be allowed to dry out[200]. Requires a position sheltered from strong cold winds[188]. Tolerates temperatures down to about to about -10°c[200]. This species has a very wide natural range, so far all the introductions have come from Chile but provenances in Argentina might provide even hardier trees that could succeed in colder areas of the country[11]. Plants succeed outdoors in S. England and have produced self-sown seedlings at Lanarth in Cornwall[11]. Large mature trees are growing in woodland conditions at Hilliers Arboretum in Hampshire[K]. The flowers are usually either male or female, though both sexes are found on the same plant[219]. Occasional hermaphrodite flowers are produced[219]. Cattle are very strongly attracted to the leaves of this plant and will not touch other forage when this species is available[11]. A slow growing tree[200].

### 8.2.321 Ilex cassine

Cassine, Dahoon, Cassine Holly 7 tlin 11 cyuc 1 kcak 0 tcan 1 dwat 10 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta llex cassine is an evergreen Tree growing to 10 m (32ft 10in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in leaf all year, in flower from May to June, and the seeds ripen from October to February. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

kcakta Edible Parts: Edible Uses: TeaThe dried roasted leaves can be used as a tea substitute[161, 177]. Some caution is advised since it can cause dizziness and have a laxative effect[183].

tcanta Soap WoodThe plant has been used as a soap[257]. No more information is given. Wood - soft, light, close-grained, not strong[82]. It weighs 30lb per cubic foot[235]. Of no commercial importance[229].

dwatta Emetic Hypnotic LaxativeThe leaves are hypnotic and laxative[183, 192]. A strong decoction of the plant was used by some native North American Indian tribes to induce vomiting. This was seen partly as a physical and partly a spiritual cleansing[257].

nrakta South-eastern N. America - Virginia to Florida, west to Texas. ksacta Cold swamps and on their borders in rich moist soils. Occasionally also found on high sandy banks of pine barren streams[82].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Landscape Uses:Pest tolerant, Specimen. Tolerates most soils that are not water-logged[200]. A slow-growing and generally short-lived species in the wild[229]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Flowers are produced on the current year's growth[229]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required. Special Features: Attracts birds, North American native, Wetlands plant, Inconspicuous flowers or blooms.

#### 8.2.322 Tamarix aphylla

Athel Tamaris

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 10 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hjonli

drutta Tamarix aphylla is a deciduous Tree growing to 10 m (32ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: MannaEdible Uses: DrinkA sweet manna-like substance that forms on the twigs is used to adulterate cane sugar[177, 183]. It can also be eaten with porridge etc or mixed with water to make a refreshing drink[183].

tcanta Hedge Hedge TanninVery tolerant of maritime exposure, it makes a good shelter hedge in coastal gardens[229]. Galls produced on the twigs and flowers (probably as a result of insect activity[K]) contain up to 55% tannin[223]. The wood has been used for fuel[257].

dwatta Astringent BitterThe galls are astringent[240] The bark is astringent and bitter[240].

nrakta W. Asia to N.E. Africa. ksacta Wadis in hot desert areas in salty and non-salty habitats.

propta Seed - sow spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their

tcanta WoodWood - hard, heavy, close-grained, very strong, rather brittle[82, 229, 235]. It weighs 40lb per cubic foot[235]. The wood works well and is suitable for interior uses such as cabinets, but trees with large straight trunks are not sufficiently common to make the tree of commercial interest[229].

dwatta Abortifacient Analgesic Antirheumatic Appetizer Emetic FebrifugeRed bay was widely employed medicinally by the Seminole Indians who used it to treat a variety of complaints, but especially as an emetic and body cleanser[257]. It is little, if at all, used in modern herbalism. The leaves are abortifacient, analgesic, antirheumatic, appetizer, emetic and febrifuge[257]. An infusion can be used to abort a foetus up to the age of four months[257]. An infusion is also used in treating fevers, headaches, diarrhoea, thirst, constipation, appetite loss and blocked urination[257]. A strong decoction is emetic and was used as a body purification when treating a wide range of complaints[257]. A decoction of the leaves is used externally as a wash on rheumatic joints and painful limbs[257].

nrakta South-eastern N. America - Virginia to Florida, west to Texas. ksacta Sandy to rich moist soils of low woodlands, coastal forests, along the sides of bogs, streams and swamps[229]. Sometimes found in dry sandy areas in Florida[229].

propta Seed - we have no information for this species but suggest sowing the seed in a greenhouse in early spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for their first 2 winters. Plant them out into their permanent positions in early summer and give some protection from winter cold for their first winter or two outdoors.

nwatta Landscape Uses:Pest tolerant, Seashore, Specimen. Street tree. We have found no cultivation details for this species in Britain, though the tree is likely to require a welldrained light to medium soil in a sunny sheltered position[K]. It is only likely to be hardy in the mildest areas of the country[11]. Special Features: Attracts birds, Attractive foliage, North American native, Fragrant foliage, Attracts butterflies, Inconspicuous flowers or blooms. The plant is heat tolerant in zones 12 through 8. (Plant Hardiness Zones show how well plants withstand cold winter temperatures. Plant Heat Zones show when plants would start suffering from the heat. The Plant Heat Zone map is based on the number of "heat days" experienced in a given area where the temperature climbs to over 86 degrees F (30°C). At this temperature, many plants begin to suffer physiological damage. Heat Zones range from 1 (no heat days) to 12 (210 or more heat days). For example Heat Zone. 11-1 indicates that the plant is heat tolerant. in zones 11 through 1.) For polyculture design as well as the above-ground architecture (form - tree, shrub etc. and size shown above) information on the habit and root pattern is also useful and given here if available. The plant growth habit is a standard with a non-suckering single trunk [1-2]. An evergreen

### 8.2.318 Firmiana simplex

Chinese Parasol Tree, Chinese parasoltree, Japanese Varnish Tree, Chinese Parasol Tree

7 tlin 10 cvuc 1 kcak 0 tcan 1 dwat 15 m hkuc

hmimhtut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Firmiana simplex is a deciduous Tree growing to 15 m (49ft) by 10 m (32ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 9. It is in flower in July. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: SeedEdible Uses: Seed roasted[105, 177]. An oily texture[178].

tcanta Fibre Hair WoodA fibre is obtained by retting the bark[46, 61]. It is used for coarse cordage[109] and cloth[178]. A hair wash is made from the leaves and fibre[178]. Wood. Used for making furniture and coffins[46. 61. 1781.

dwatta Antiphlogistic Astringent Expectorant Refrigerant SalveAstringent, salve[178]. The seed is antiphlogistic,

1422

expectorant and refrigerant[218]. A decoction of the roots is used to reduce swellings[218]. A lotion of the leaves is used in the treatment of carbuncles, haemorrhoids and sores[218].

nrakta E. Asia - China. ksacta Along the sides of roads at low altitudes[109].

propta Seed - best sown as soon as it is ripe in a warm greenhouse[200]. The stored seed can be sown in the early spring in a greenhouse[1] and usually germinates within 2 months[K]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Consider giving the plants some protection from the cold for at least their first winter out-

nwatta Industrial Crop: Fiber Industrial Crop: Gum Management: Standard Regional CropLandscape Uses: Pest tolerant, Pollard, Specimen. Prefers a good sandy loam[1]. Requires a well-drained but moisture-retentive fertile soil in full sun or light shade[188]. Plants are not very hardy in Britain, they succeed outdoors in the mildest parts of the country[11, 166], though they do not reach tree-size[188]. Trees cast a heavy shade[178]. Special Features:Not North American native, Naturalizing, Attractive flowers or blooms

### 8.2.319 Sapindus drummondii

Western Soapherry

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 12 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hionli

drutta Sapindus drummondii is a deciduous Tree growing to 12 m (39ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf from April to October, in flower from May to June, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The seed is poisonous[1]. The fruit is poi-

kcakta Edible Parts: FruitEdible Uses: Fruit[105]. No more details from this report but another report says that it is poisonous[149]. The berry-like fruits have a leathery coat that contains poisonous saponins[229]. The fruit is about 15mm in diameter[200] and often hangs on the tree until the

tcanta Buttons Soap WoodA soap is obtained from the fruit by rubbing the fruit in water[1, 11, 95, 103]. Used in Mexico for washing clothes[227]. The fruit can be dried and stored for later use[169]. Buttons and necklaces are made from the seed[149]. Wood - heavy, strong and closegrained[82, 149]. It weighs 51lb per cubic foot[227]. It splits easily into thin strips and is often used in basket making, it is also used as a fuel[61, 82, 227, 229].

dwatta Antirheumatic Febrifuge Kidney PoulticeThe fruit is antirheumatic and febrifuge[149]. It is used in the treatment of kidney diseases [149, 227]. A poultice of the sap has been used to treat wounds[257].

nrakta South-western N. America - Kansas to Northern Mexico. ksacta Limestone bluffs, slopes and by streams[43], in moist clay or dry limestone[82]. Mexican valleys from the upper desert to the woodland zones[181].

propta Seed - requires some cold stratification. Pre-soak the seed for 24 hours in warm water and sow in a cold frame in mid-winter. Move to a greenhouse in early spring. The seed should germinate in late spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in early summer. Cuttings of almost ripe wood, 5 - 8cm with a heel, July/August in a frame. Fairly good percentage[78].

nwatta Succeeds in any well-drained soil in full sun[220]. This species tolerates a wide range of soils, including those that are dry, stony and nutrient deficient[200]. One report says that this species will probably not survive sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

### 8.2.310 Ophrys bombyliflora

7 tlin 10 cvuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ophrys bombyliflora is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe - Mediterranean. ksacta Not known

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being dormant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil

### 8.2.311 Lesquerella hybrids

Perennial Lesquerella

7 tlin 11 cyuc 2 kcak 4 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Lesquerella hybrids is a PERENNIAL growing to 0.6 m (2ft) by 0.8 m (2ft 7in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Carbon Farming Solutions - Staple Crop: oil (The term staple crop typically refers to a food that is eaten routinely and accounts for a dominant part of people's diets in a particular region of the world) [1-1].

tcanta The seed of some species yields up to 28% oil and 22% protein[269]. Average yields of 1.1 tonnes per hectare have been postulated and in small-scale experiments 1.6 tonnes has been attained[269]. The oil has possibilities in the manufacture of grease thickeners due to the hydroxyacid content. Major amounts of hydroxy-acids occur in the obscure seed oils, among them Lesguerella, but few of them have been subjected to development. According to Osman and Ahmad (1981), the only hydroxylated vegetable oil commercially available is castor oil. Other potential sources include Castalis, Coriaria, Dimorphotheca, Hiptage, and Osteospermum[269].

dwatta None Known

nrakta Origin: SW N. America. ksacta Warm temperate to subtropical

propta See individual species.

Standard New Perennial nwatta Management: Crop Staple Crop: Oil Under DevelopmentClimate: warm temperate to subtropical. Humidity: semi-arid. Carbon Farming Solutions - Cultivation: new crop as annual, perennials under development. Management: standard (Describes the non-destructive management systems that are used in cultivation) [1-1].

### 8.2.312 Asphodelus fistulosus

1419

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Asphodelus fistulosus is a ANNUAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves RootEdible Uses: Root cooked.[46, 61, 105] The root is fibrous according to one report[100] whilst another says that the swollen root has radi-

cal root fibres[42]. The plant is eaten as a vegetable, records of 'edible bulbs' seem to be erroneous[177].

dwatta Diuretic SkinThe seed is diuretic[240]. It is also applied externally to ulcers and inflamed parts of the body[240]. The seed contains oils rich in linoleic acid and are of value in preventing atherosclerosis[240].

nrakta S. Europe - Mediterranean. W. Asia. ksacta Dry sandy or rocky places[50] in fields, track-sides and uncultivated ground[89].

propta Seed - sow March/April in a greenhouse and only just cover the seed. Germination usually takes place in 1 - 3 months at 15°c[134]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. When the plants are large enough to handle, plant them out into their permanent positions in late spring or early summer. Division in early spring or autumn[111].

nwatta Succeeds in ordinary garden soil, tolerating partials shade[200]. Requires a well-drained soil. Prefers a deep rich sandy loamy soil[1, 42]. Prefers a sunny position in a soil that is not too rich[200]. Grows well on hot dry banks[42]. This species is often a short-lived perennial[270], though it is not very hardy in Britain. This has contributed to the mistaken belief that it is an annual. A covering of bracken overwinter is usually ample protection in most districts[42]. Asphodelus fistulosus has become a noxious weed in California and in other places with Mediterranean climates worldwide[270]. The flowers are sweetly scented[245]. Plants seem to be immune to the predations of rabbits[233].

### 8.2.313 Ophrys vernixia

7 tlin 10 cyuc 2 kcak 0 tcan 2 dwat 0.3 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ophrys vernixia is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Üses: Root - cooked. It is a source of 'salep', a fine white to yellowish-white powder that is obtained by drying the tuber and grinding it into a powder[200]. Salep is said to be very nutritious and is made into a drink or added to other cereals and used in bread etc[183]. One ounce of salep is said to be enough to sustain a person for a day[100, 115]. The salep can also be made into a drink[100].

dwatta Demulcent NutritiveSalep (see above for more details) is very nutritive and demulcent[4]. It has been used as a diet of special value for children and convalescents, being boiled with water, flavoured and prepared in the same way as arrowroot[4]. Rich in mucilage, it forms a soothing and demulcent jelly that is used in the treatment of irritations of the gastro-intestinal canal[4]. One part of salep to fifty parts of water is sufficient to make a jelly[4]. The tuber, from which salep is prepared, should be harvested as the plant dies down after flowering and setting seed[4].

nrakta Europe - Mediterranean. ksacta Not known

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. This species only rarely forms new offsets and so division is seldom feasible, the following methods can be tried, however[230]. Division of the tubers as the flowers fade[230]. This species produces a new tuber towards the end of its growing season. If this is removed from the plant as its flowers are fading, the shock to the plant can stimulate new tubers to be formed. The tuber should be treated as being domant, whilst the remaining plant should be encouraged to continue in growth in order to give it time to produce new tubers[230]. Division can also be carried out when the plant has a fully developed rosette of leaves but before it comes into flower[230]. The entire new growth is removed from the old tuber from which it has arisen and is potted up, the cut being made towards the bottom of the stem but leaving one or two roots still attached to the old tuber. This can often be done without digging up the plant. The old tuber should develop one or two new growths, whilst the new rosette should continue in growth and flower normally[230].

nwatta Plants can be grown in a lawn, but the lawn must not be cut until the plants have set seed[200]. Plants prefer a shady position[188]. Orchids are, in general, shallowrooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. This symbiotic relationship makes them very difficult to cultivate, though they will sometimes appear uninvited in a garden and will then thrive. Transplanting can damage the relationship and plants might also thrive for a few years and then disappear, suggesting that they might be short-lived perennials[230]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The flowers resemble a female insect and also emit a scent similar to female pheremones, they are pollinated by a male insect of that species attempting to copulate with the flower[200]. Tubers should be planted out whilst they are dormant, this is probably best done in the autumn[200]. They should be planted at least 5cm below soil level[200].

### 8.2.314 Eriogonum latifolium

Seaside Buckwheat

1420

hpa7tmwatli xre7t hjonli

7 tlin 10 cyuc 2 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis

drutta Eriogonum latifolium is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: StemEdible Uses: Young stems - raw[105]. Tender[161, 177]. Eaten by children in early summer[257]

dwatta Analgesic Ophthalmic StomachicA decoction of the root, stalk and leaves has been used in the treatment of headaches, stomach aches, coughs and colds[257]. A decoction of the roots has been used as a wash for sore eyes[257].

nrakta South-western N. America - California and Oregon. ksacta Sandy coastal flats, slopes, bluffs, and mesas, coastal scrub and grassland communities, from sea level to 80 metres, occasionally to 200 metres[270].

propta Seed - best sown as soon as it is ripe in the autumn in a sandy compost in a greenhouse. Sow stored seed in early spring in a warm greenhouse[1]. As soon as they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant out in late spring or early summer, after the last expected frosts. Division in early spring[1]. This has to be done with care because the plant resents root disturbance[200]. Try to obtain divisions from around the edges of the plants without digging up the whole clump. Tease the divisions out with as much root on them as possible and pot them up. Grow them on in light shade in the greenhouse until they are rooting well and plant them out in the summer. Cuttings of greenwood with a heel in the summer[200].

nwatta Requires a loose lean gritty well-drained soil in a very sunny position[200]. Succeeds in dry soils. Tolerates exposed positions[200]. Requires some protection from winter wet[1]. This species is not hardy in the colder areas of the

country, it tolerates temperatures down to between -5 and -10°c[200]. Established plants resent root disturbance[200].

### 8.2.315 Quercus falcata

Southern Red Oak, Cherrybark Oak, Spanish Oak, Southern Red Oak

7 tlin 9 cyuc 1 kcak 0 tcan 2 dwat 25 m hkuc

hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Quercus falcata is a deciduous Tree growing to 25 m (82ft 0in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in flower from April to May, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. The plant can tolerates strong winds but not maritime exposure.

kcakta Edible Parts: SeedEdible Uses: CoffeeSeed cooked. The seed is about 12mm long[227], it can be dried, ground into a powder and used as a thickening in stews etc or mixed with cereals for making bread. The seed contains bitter tannins, these can be leached out by thoroughly washing the seed in running water though many minerals will also be lost. Either the whole seed can be used or the seed can be dried and ground it into a powder. It can take several days or even weeks to properly leach whole seeds, one method was to wrap them in a cloth bag and place them in a stream. Leaching the powder is quicker. A simple taste test can tell when the tannin has been leached. The traditional method of preparing the seed was to bury it in boggy ground overwinter. The germinating seed was dug up in the spring when it would have lost most of its astringency. The roasted seed is a coffee substitute.

tcanta Repellent Tannin WoodA mulch of the leaves repels slugs, grubs etc, though fresh leaves should not be used as these can inhibit plant growth[20]. Oak galls are excrescences that are sometimes produced in great numbers on the tree and are caused by the activity of the larvae of different insects. The insects live inside these galls, obtaining their nutrient therein. When the insect pupates and leaves, the gall can be used as a rich source of tannin, that can also be used as a dyestuff[4]. The bark is a good source of tannin[82, 227]. Wood - coarse-grained, durable, heavy, hard, strong[43, 227, 229]. It cracks badly when left in the sun and rots when in contact with the soil[229]. It weighs 43lb per cubic foot[227]. It is not a prime timber, but is used for rough lumber, tools, furniture etc and as fuel[43, 227, 229].

dwatta Antiseptic Astringent Dysentery Febrifuge Salve TonicThe bark is antiseptic, astringent, febrifuge and tonic[82, 227, 257]. An infusion has been used in the treatment of chronic dysentery, indigestion, asthma, lost voice and intermittent fevers[257]. The bark has been chewed as a treatment for mouth sores[257]. An infusion of the bark has been used as a wash on sore, chapped skin[257]. Any galls produced on the tree are strongly astringent and can be used in the treatment of haemorrhages, chronic diarrhoea, dysentery etc[4].

nrakta Eastern N. America - New York to Florida, west to Texas. ksacta Dry sandy or clay upland soils, to 600 metres[229]. It is also occasionally found on moister fertile bottomlands or near streams, where it achieves its greatest size[43, 229].

propta Seed - it quickly loses viability if it is allowed to dry out. It can be stored moist and cool overwinter but is best sown as soon as it is ripe in an outdoor seed bed, though it must be protected from mice, squirrels etc. Small quantities of seed can be sown in deep pots in a cold frame. Plants produce a deep taproot and need to be planted out into their permanent positions as soon as possible, in fact seed sown in situ will produce the best trees[11]. Trees should not be left in a nursery bed for more than 2 growing seasons without being moved or they will transplant very badly.

nwatta Landscape Uses: Aggressive surface roots possible, Specimen, Street tree. Prefers a good deep fertile loam which can be on the stiff side[1, 11]. Young plants tolerate reasonable levels of side shade[200]. Tolerates moderate exposure, surviving well but being somewhat stunted[200]. A

moderately fast-growing tree in its native range, where it lives about 100 - 10 years[229]. It prefers warmer summers than are usually experienced in Britain, trees often grow poorly in this country and fail to properly ripen their wood resulting in frost damage overwinter[200]. Trees commence bearing seed when about 25 years old, production is cyclic with a year of high yields being followed by a few years of low yields[229]. The tree flowers on new growth produced in spring, the seed taking two summers to ripen[229]. Intolerant of root disturbance, trees should be planted in their permanent positions whilst young[11]. Hybridizes freely with other members of the genus[200]. Plants in this genus are notably resistant to honey fungus[200]. Special Features:Attracts birds, North American native, Attracts butterflies, Inconspicuous flowers or blooms.

### 8.2.316 Xylosma japonica

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 25 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Xylosma japonica is an evergreen Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

pcista The leaves contain a glycoside [179]. We are not sure if this means that it is poisonous[K].

kcakta Edible Parts: LeavesEdible Uses: Young shoots - cooked. A famine food, they are only used when all else fails[179]. The leaves contain a glycoside[179], see the notes above on toxicity.

tcanta Hedge HedgeTolerant of clipping, the plant can be grown as a formal hedge especially in areas cooler than its native range where it only develops into a shrub or small tree[200].

dwatta Oxytoxic PoulticeThe ashes of the stem bark are mixed with water and used to treat jaundice scrofula, sores, tumours etc[218]. They are also used to speed parturition[218].

nrakta E. Asia - China, Japan, Korea. ksacta Near seashores, C. and S. Japan[58]. Woodlands in Korea[109].

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame[200].

mwatta Succeeds in full sun or light shade in most well-drained soils[200]. Tolerant of poor rocky soils[200]. Judging by the plants native habitat in Japan, it probably tolerates maritime exposure[K]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Even in the milder areas of the country it usually only makes a small tree or shrub[11].

### 8.2.317 Persea borbonia

Red Bay Sweethay

1421

7 tlin 11 cyuc 1 kcak 2 tcan 2 dwat 15 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Persea borbonia is an evergreen Tree growing to 15 m (49ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 9. It is in leaf all year, in flower from April to May, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil

kcakta Edible Parts: Edible Uses: CondimentThe fresh or dried leaves can be used as a flavouring in soups etc[229].

or with a heel, July/August in a frame. Good percentage[78].

nwatta Prefers a moist position and some shade[200]. Grows well in a rock garden[200]. Plants are not very hardy in Britain[11], but they succeed outdoors in the milder areas of the country[182].

# 8.2.374 Helenium puberulum

Rosilla

7 tlin 10 cvuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Helenium puberulum is a ANNUAL/PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Leaves and flowering heads - raw[257].

dwatta Antiscorbutic Poultice Sternutatory TonicAntiscorbutic, tonic. The dried powdered plant has been applied to wounds and has also been rubbed onto the forehead and nose in the treatment of colds[257]. It has been used as a snuff[257]. The plant has also been used in the treatment of venereal disease[257].

nrakta South-western N. America, ksacta Moist meadows, marshes, slough banks etc. below 600 metres in California[71].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer. If you have sufficient seed it would be worthwhile trying a sowing in situ outdoors in mid to late spring.

nwatta Grows well in ordinary garden soil[1, 111], succeeding in most conditions other than boggy soils[233]. It prefers a fertile moisture retentive soil[200] in a sunny position[108, 111]. Dislikes dry soil[200]. An annual or shortlived perennial, this species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Plants seem to be immune to the predations of rabbits[233]. A good bee and butterfly plant[30].

### 8.2.375 Sasa veitchii

Kuma-Zasa, Kuma bamboo grass

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Sasa veitchii is an evergreen Bamboo growing to 1.5 m (5ft) by 3 m (9ft). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots

tcanta Hedge HedgeA good medium high ground cover plant[200], it is a very good weed suppresser. Plants can be used as a low loose hedge[200].

nrakta E. Asia - Japan. ksacta Woodlands and damp hollows, C. and S. Japan[58, 200].

propta Seed - if possible, surface sow the seed as soon as it is ripe in a greenhouse at about 20°c. Stored seed is best sown as soon as it is received. Do not allow the compost to dry out. Germination usually takes place fairly quickly so long as the seed is of good quality, though it can take 3 -6 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a lightly shaded place in the greenhouse until large enough to plant out, which could be a few years. Plants only flower at intervals of several years and so seed is rarely available. Division in late spring as new growth commences. Take large divisions, trying to cause as little root disturbance to the main

clump as possible. Grow them on in light shade in a greenhouse in pots of a high fertility sandy medium. Mist the foliage regularly until plants are established. Plant them out into their permanent positions when a good root system has developed, which can take a year or more[200]. Divisions of less than 5 - 6 culms rarely succeed[200].

nwatta Requires a good humus rich loam with ample moisture in the growing season[200]. Prefers partial shade, growing well in thin woodland. A very hardy plant, tolerating temperatures down to about -22°c. The leaf margins are damaged by even light frosts, this gives a distinctive white margin to the leaves but does not otherwise damage the plant[195]. This species is notably resistant to honey fungus[200]. Plants only flower at intervals of many years. When they do come into flower most of the plants energies are directed into producing seed and consequently the plant is severely weakened. They sometimes die after flowering. but if left alone they will usually recover though they will look very poorly for a few years. If fed with artificial NPK fertilizers at this time the plants are more likely to die[122]. The rhizome is gently running. The plant is very invasive but fairly easy to control.

#### 8.2.376 Aristolochia debilis

Ma Dou Ling

7 tlin 10 cyuc 1 kcak 0 tcan 3 dwat 1 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aristolochia debilis is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August, and the seeds ripen from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

pcista We have no specific details for this species but most members of this genus have poisonous roots and stems[179]. The plant contains aristolochic acid, this has received rather mixed reports on its toxicity. According to one report aristolochic acid stimulates white blood cell activity and speeds the healing of wounds, but is also carcinogenic and damaging to the kidneys[254]. Another report says that it is an active antitumour agent but is too toxic for clinical use[218]. Another report says that aristolochic acid has anti-cancer properties and can be used in conjunction with chemotherapy and radiotherapy and that it also increases the cellular immunity and phagocytosis function of the phago-

kcakta Edible Parts: LeavesEdible Uses: Leaves cooked[177, 179]. It is said that the leaves of this species are not poisonous[179] but caution is advised.

dwatta Alterative Anodyne Antibacterial Antifungal Antiinflammatory Antitussive Carminative Cytotoxic Diuretic Expectorant Hypotensive Stomachic TonicAlterative, antibacterial, antifungal, diuretic[178]. Stimulates energy circulation[147]. The fruit and its capsule are antiasthmatic, antiseptic, antitussive and expectorant[176, 218]. It is used internally in the treatment of asthma and various other chest complaints, haemorrhoids and hypertension[238]. The root is anodyne and anti-inflammatory[238]. It is used internally in the treatment of snakebite, gastric disorders involving bloating, and is clinically effective against hypertension[218]. It is harvested in the autumn and dried for later use[238]. The whole plant is antitussive, carminative, stimulant and tonic[218]. The root contains aristolochic acid. This has anti-cancer properties and can be used in conjunction with chemotherapy and radiotherapy[176]. Aristolochic acid can also be used in the treatment of acute and serious infections such as TB, hepatitis, liver cirrhosis and infantile pneumonia[176]. It also increases the cellular immunity and phagocytosis function of the phagocytic cells[176]. Aristolochic acid is said to be too toxic for clinical use[218].

nrakta E. Asia - China, Japan ksacta Roadside thickets and meadows in lowland, C. and S. Japan and in China[58.

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Pre-soak stored seed for 48 hours in hand-hot water and surface sow in a greenhouse[134]. Germination usually takes place within  $1 \cdot 3$  months at  $20\,^{\circ} (134].$  Stored seed germinates better if it is given 3 months cold stratification at  $5\,^{\circ} (200].$  When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer after the last expected frosts. Division in autumn[200]. Root cuttings in winter[200].

nwatta Prefers a well-drained loamy soil, rich in organic matter, in sun or semi-shade[134, 200]. Succeeds in ordinary garden soil[134]. This species is not very hardy in Britain, tolerating temperatures down to about -5°c[238]. Most species in this genus have malodorous flowers that are pollinated by flies[200].

# 8.2.377 Helwingia chinensis

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 1.5 m hkuc pcimhmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Helwingia chinensis is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers moist soil.

kcakta Edible Parts: Flowers LeavesEdible Uses: The flowers and leaves might be edible[177].

dwatta SkinA decoction of the leaves and the bark are ingested for treating skin inflammations[218].

nrakta E. Asia - W. China. ksacta Thickets, 1300 - 2300 metres in W. Szechwan [109]. Mixed woods and thickets on slopes, broad-leaved forests, at elevations of 1000 - 2600 metres [266].

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame.

nwatta Succeeds in ordinary garden soil[1]. Requires a sheltered position beneath a good tree canopy cover[200]. Plants are not very hardy outdoors in Britain, only thriving in milder areas of the country where winter temperatures do not fall below about  $-7^{\circ}$ c[200]. The flowers are produced on the midribs of the leaves[200]. Dioecious, male and female plants must be grown if seed is required.

# 8.2.378 Helwingia japonica

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Helwingia japonica is a deciduous Shrub growing to  $1.5~\mathrm{m}$  (5ft) by  $1.5~\mathrm{m}$  (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from April to May, and the seeds ripen from August to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: Flowers Leaves Edible Uses: Young leaves - cooked with rice or boiled as a pother [1, 2, 179, 183]. The young flowers and young shoots are also eaten [105, 179, 183].

nrakta E. Asia - China, Japan. ksacta Woods and thickets in hills and low mountains of Japan[58]. Moist rich soil in woods, thickets, valleys, streamsides and roadsides at elevations of 100 - 3400 metres[266].

propta Seed - we have no information on this species but suggest sowing the seed in a greenhouse in late winter. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame.

nwatta Succeeds in ordinary garden soil[1]. Requires a sheltered position beneath a good tree canopy cover[200]. Not very hardy in Britain, tolerating temperatures down to about -7°c, it only succeeds outdoors in the milder areas of the country[200]. Cultivated for its leaves in Japan[1]. The flowers are produced on the midribs of the leaves[200]. Dioecious, male and female plants must be grown if seed is required.

#### 8.2.379 Asparagus albus

7tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Asparagus albus is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: StemEdible Uses: Young shoots - cooked[46, 61, 177]. A poor substitute for the cultivated asparagus[2].

nrakta Europe - W. and C. Mediterranean. N. Africa. ksacta High plateaux in hedges and scrub[46, 50].

propta Seed - pre-soak for 12 hours in warm water and then sow in spring or as soon as the seed is ripe in early aumn in a greenhouse. It usually germinates in 3- 6 weeks at  $25^{\circ}c[134]$ . Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a sunny position in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer[K]. Division in early spring as the plant comes into growth.

nwatta Easily grown in any good garden soil[200]. Prefers a rich sandy loam[1]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. The edible young shoots of this plant are sold in local markets in the Mediterranean area[46, 61]. Unlike most members of this genus, this species has hermanhrodite flowers

# 8.2.380 Bidens aurea

Arizona beggarticks

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 1 m hkuc

htut cyutlı tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bidens aurea is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from September to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: Edible Uses: TeaThe leaves are possibly used as a tea substitute[177].

nrakta Southern N. America from Mexico south to Guatemala in Central America. ksacta Marshy fields[260].

propta Seed - we have no information for this species but suggest sowing the seed in a greenhouse in the spring. Surface-sow or only just cover the seed and do not allow the compost to dry out. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring.

dwatta Febrifuge Styptic Tonic UrinaryThe roots, stems and leaves are febrifuge, styptic and tonic. Strengthens bones and muscles[147]. A decoction of the root, stems or leaves is used in the treatment of abdominal cramps, amenorrhoea, diarrhoea, myalgia, traumatic injuries and urinary stones[147, 218].

nrakta E. Asia - Japan - Kuroshima, Suwanose, and Uji Islands. ksacta An understory plant, found growing in forests beneath Ardisia crenata and Castanopsis sieboldii[266].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter in the greenhouse. Plant them out in late spring or early summer after the last expected frosts. Division as the plant

comes into growth in the spring[200]. Suckers. Best removed in the autumn and grown on in the greenhouse for the first winter.

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Massing, Specimen, Woodland garden. Prefers a shady position in a rich well-drained soil[200]. Tolerates poor soils and drought[200]. Almost hardy in Britain[1], plants can withstand temperatures down to about -15°c if they are well sited[200]. A plant growing under shrubs in Worcestershire has survived in the garden for over 30 years[233]. This plant used to be commonly grown as a house plant, it tolerates considerable neglect[200]. Special Features:Attractive foliage, Not North American native, Inconspicuous flowers or blooms.

nwatta Succeeds in any moderately fertile moisture-retentive soil in full sun[200]. Prefers a good well-drained soil[260]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10 $^{\circ}$ c[200].

#### 8.2.381 Tamarix canariensis

Tamarisk, Canary Island tamarisk

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwissliphsom hpa7tmwatli xre7t hionli

drutta Tamarix canariensis is a deciduous Tree at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

kcakta Edible Parts: MannaEdible Uses: A sweet manna-like substance that exudes from the stems is collected and mixed with flour, sugar and almonds, formed into cakes and baked as a sweetmeat[183].

tcanta Hedge HedgeVery tolerant of maritime exposure, it makes a good shelter hedge in coastal gardens.

nrakta Europe - Mediterranean. Canary Isles. ksacta Not known

propta Seed - sow spring in a cold frame and only just cover the seed. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Very easy[200]. Cuttings of mature wood of the current seasons growth, 15 - 25cm long, planted outdoors in late autumn in a nursery bed or straight into their permanent position. High percentage[11, 200].

nwatta An easily grown plant, succeeding in most soils and tolerant of saline conditions[11]. Grows well in heavy clay soils as well as in sands and even shingle[182]. Usually found near the coast, it succeeds inland if given a fairly good deep loam and a sunny position[11, 200]. Tolerant of maritime winds and dry soils when grown near the coast[11], plants require a moister soil and shelter from cold drying winds when they are grown inland in non-saline soils because they use the soil salts that are found in saline soils to help them reduce transpiration[200]. This species is not very hardy outdoors in Britain[1], but it succeed in the milder areas of the country, tolerating temperatures down to between -5 and -10°c[200]. Growth can be restricted by cutting back the plants in spring, hedges are also best trimmed at this time[188]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.382 Celastrus dependens

7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Celastrus dependens is a deciduous Climber. See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Édible Parts: Flowers OilEdible Uses: OilThe young flowers are used as a vegetable [183].

tcanta OilThe seed contains 52% oil, and the fruit 30%[240]. This oil is used medicinally (see notes above), we do not know if it has any other applications[K].

dwatta Abortifacient Analgesic Antidote Aphrodisiac Bitter Cancer Diaphoretic Emetic Emmenagogue Laxative Leprosy Stimulant TonicThe plant is used as an antidote to opium[218]. It is also considered to be analgesic, aphrodisiac, diaphoretic, emetic, emmenagogue, stimulant and tonic[218]. The bark is abortifacient[240]. The juice from the

bark is used in the treatment of indigestion[272]. The seed is aphrodisiac, bitter, emetic, laxative and stimulant[240]. It is used in the treatment of rheumatism, leprosy, gout, fevers and paralysis[240, 272]. The oil from the seed is a powerful stimulant. It is used in the treatment of beriberi[240]. Many plants in this genus contain compounds of interest for their antitumour activity[218].

nrakta E. Asia - S.W. China to the Himalayas. ksacta Open moist places to elevations of 300 metres in Nepal[272].

propta Seed - gather when ripe, store in dry sand and sow February in a warm greenhouse[78]. Three months cold stratification leads to a higher germination rate[113]. Remove the aril since this inhibits germination[113]. Germination rates are usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Layering in August of the current seasons growth. Takes 12 months[78]. Root cuttings, 6mm thick 25mm long in December. Plant horizontally in pots in a frame[78].

nwatta Prefers a deep loamy soil[11]. A gross feeder, it requires a rich soil[11]. This species is not hardy in the toolder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. A rampant climber, it requires ample space and is best grown into an old tree[1, 200]. Fruits best when its top growth is in a sunny position[182]. Plants climb by means of twining and by hooked prickles[182]. They do not normally require pruning[219]. This species is closely related to C. scandens[200]. Dioecious, male and female plants must be grown if seed is required.

## 8.2.383 Albuca major

Slime Lilv

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Albuca major is a BULB growing to 0.5 m (1ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in April. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: StemEdible Uses: The succulent stems are chewed to allay thirst[177]. They are rather mucilaginous[2].

nrakta S. Africa. ksacta Sandy places on flats and lower slopes[73].

propta Seed - we have no details for this species but suggest sowing the seed in a greenhouse in a light well-drained compost as soon as it is ripe if possible, otherwise in spring. Sow the seed thinly so that the young plants can be grown on in the same pot for their first year of growth. Apply a liquid feed from time to time if the seedlings look as though they need nutrients and prick them out at the end of their first growing season. Grow on the plants for at least their next winter in a greenhouse and plant out when the bulbs are dormant in late summer or early autumn. Division of offsets in late summer

nwatta Requires a sheltered position in full sun in a light well-drained soil[200]. Succeeds outdoors in areas where frosts are short-lived and light, to a minimum of  $-5^\circ$ , and in such areas grow well in a wild or informal garden[200]. It is best to give the bulbs some protection in the winter, preferably using a cloche or pane of glass[1]. This species is closely related to A canadensis and included in that species by some botanists[73, 200].

#### 8.2.384 Cheilanthes pteridioides

Ressurection Fern

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Cheilanthes pteridioides is an evergreen Fern growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species

is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

kcakta Edible Parts: Edible Uses: TeaThe plant is said to be used as a tea substitute[183].

nrakta S. Europe. ksacta Grows amongst stones[245].

propta Spores - best surface sown as soon as they are ripe in a greenhouse and do not allow the compost to dry out. Placing the pot in a plastic bag helps to maintain a humid atmosphere which promotes germination and growth. Prick out small clumps into pots when they are large enough to handle and keep moist until established. Grow on in a greenhouse for at least the first winter and plant out in late spring.

nwatta Difficult to grow in the garden, requiring part shade (but full sun in the winter in temperate regions), low humidity and infrequent waterings[200]. It requires a very well-drained soil with some lime[200]. One report says that the plant is hardy to zone 8, tolerating temperatures down to about -5° c and therefore succeeding outdoors in the mildest parts of Britain[200]. However, another report says that the plants require a minimum winter temperature of 10°c[245]. The foliage shrivels and appears to be dead during prolonged periods of drought, rehydrating when the rain returns[200]. The bruised, and especially the dried, foliage has a scent of newly mown hay due to the presence of coumarin[245]. Members of this genus are rarely if ever troubled by browsing deer[233].

### 8.2.385 Salvia mellifera

Californian Black Sage

7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat m hkuc

htut cyutİi kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia mellifera is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: SeedEdible Uses: Condiment TeaThe aromatic leaves can be brewed into a tea[183]. The leaves and stems can be used as a food flavouring[183, 257]. The seeds can be dried then ground into a powder and used as a gruel[257].

dwatta Analgesic Cardiac Carminative PectoralThe green leaves are cardiac and carminative[257]. An infusion has been used in the treatment of heart complaints[257]. They can be chewed in the treatment of gas pains[257]. A poultice of the heated leaves can be applied to the ear in the treatment of ear pains, or to the neck in the treatment of sore throats[257]. A decoction of the plant has been used in the treatment of chronic bronchial coughs[257]. The decoction has also been used as a bath in the treatment of paralysis[257].

nrakta South-western N. America - California. ksacta Found in coastal sage scrub and chaparral plant communities[276].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. Soils rich in nitrogen encourage excessive leaf growth at the expense of flowering[11]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between 5 and -10°c[200]. Plants can be killed by excessive winter wet[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.386 Salvia multicaulis

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia multicaulis is an evergreen Shrub growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: Condiment TeaThe plant is used as a condiment for tea or is prepared as a tea in boiling water[183]. The aromatic leaves are a good substitute for common sage (Salvia officinalis) in cooking[187].

nrakta W. Asia - Iran to Turkey. ksacta Dry scrub, steppe and rocky limestone slopes to 2600 metres[187].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained fertile sandy soil in a sunny position[200]. Soils rich in nitrogen encourage excessive leaf growth at the expense of flowering[11]. Hardy to about -25°c[187]. Another report says that the plant only tolerates temperatures down to about -10°c[200]. Plants can be killed by excessive winter wet. A low-growing plant forming mats[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.387 Corema album

Portuguese Crowberry

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli frusflat hpa7tmwatli nyanhjen hjonli

drutta Corema album is an evergreen Shrub growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid soils and can grow in very acid soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit - raw or cooked[200].

nrakta S. W. Europe - Portugal and Spain. ksacta Maritime sands and dunes on the Atlantic littoral.

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed requires 5 months warm stratification followed by 3 months at 5°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Cuttings of mature wood of the current year's growth, November in a frame.

nwatta Requires a light or medium lime-free soil[11, 182], succeeding in full sun or light shade[182]. Plants are growing very well in a sandy peat in a garden near London[11]. This species is not hardy in the colder areas of the

on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at  $20^{\circ}\mathrm{c}$  followed by 12 - 14 weeks at  $3^{\circ}\mathrm{c}$ . Germination may still take another 12 months or more at  $15^{\circ}\mathrm{c}[164]$ . Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame.

nwatta Prefers a cool lime-free well-drained sandy loam and a sunny position[1, 11]. Succeeds in neutral soils[11] and tolerates partial shade[200]. Likes plenty of moisture in the growing season[11]. A good sandy loam and a sunny position suits most members of this genus[11]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Closely related to D. bholua[11]. The flowers are fragrant[272]. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible[188].

# 8.2.481 Garrya elliptica

Coast Silk Tassel, Wavyleaf silktassel 7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 4 m hkuc pcimhmimhtut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhien hjonli

drutta Garrya elliptica is an evergreen Shrub growing to 4 m (13ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from November to February. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure. It can tolerate atmospheric pollution.

tcanta Dye Hedge Hedge Repellent WoodGrows well by the sea and can be grown as a hedge in the milder parts of Britain[29, 166]. A hedge in a sheltered position at Wisley in 1991 was very healthy[K]. Makes a good wind shelter[166]. Grey to black dyes are obtained from the berries. The colour varies according to the ripeness of the fruit, green fruits are the best[168]. The bark and leaves are very bitter, a possible insect repellent?[K]. Wood - hard, close-grained. It has been used for fine cabinet work, though its small size and rarity limits its commercial usefulness[229].

dwatta Abortifacient Antiperiodic FebrifugeThe leaves are intensely bitter and are used as an antiperiodic and febrifuge. They can be used as a quinine substitute[46, 61, 95]. An infusion has been used to induce menstruation, probably acting as an abortifacient[257].

nrakta South-western N. America - California to Oregon. ksacta Chaparral and forest on dry slopes and ridges below 600 metres[71, 184].

propta Seed - best sown as soon as it is ripe in a cold frame. Very slow, the seed can take 2 or more years to germinate. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10 cm with a heel, August in a frame[200]. Cuttings of mature wood 10 - 12 cm with a heel, December/January in a frame[200].

nwatta Prefers a sunny position succeeding in most well-drained fertile soils[182, 200, 202]. Succeeds in a hot dry position. Succeeds in light shade[202], the plants are also tolerant of quite deep shade[219]. Does not require a rich soil or abundant moisture[11], if the soil is too fertile the flowering will be delayed[200]. Plants are resistant to urban pollution and maritime exposure, but they are subject to wind scorch from cold drying winds in colder areas[184]. This species is hardy to about -15°c[184], it is best on a sunny wall in most parts of the country but does very well as a free standing shrub in Devon and Cornwall[11]. In cold winters and springs the previous year's leaves may fall before the new

leaves are produced[202]. A hedge in a relatively open area at Wisley in Surrey is growing well (1991), as is a plant in a friend's garden in Stockton on Teesside(1998)[K]. All pruning should be carried out in spring before new growth starts but after flowering has ended[1]. Plants are strongly resentful of root disturbance[1, 11], they should be planted into their permanent positions as soon as possible. Dioecious. Male and female plants must be grown if seed is required.

## 8.2.482 Spigelia marilandica

Indian Pink, Woodland pinkroot

7 tlin 10 cyuc 0 kcak 0 tcan 3 dwat m hkuc

hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Spigelia marilandica is a PERENNIAL growing to 0.5 m (1ft 8in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista This plant is poisonous in large quantities[21]. dwatta Anthelmintic NarcoticThe whole plant, but especially the root, is anthelmintic and narcotic[4, 21, 46]. A safe and effective anthelmintic when used in the proper dosage, it is especially effective with tapeworms and roundworm[4]. Its use should always be followed by a saline aperient such as magnesium sulphate otherwise unpleasant side effects will follow[4]. Another report says that it can be used with other herbs such as Foeniculum vulgare or Cassia senna[254]. These will ensure that the root is expelled along with the worms since the root is potentially toxic if it is absorbed through the gut[254]. The root is best used when fresh but can be harvested in the autumn then dried and stored[213]. It should not be stored for longer than 2 years[213]. Use with caution and only under professional supervision[21, 254]. The plant contains the alkaloid spigiline, which is largely responsible for the medicinal action but side effects of an overdose can include increased heart action, vertigo, convulsions and possibly death[222, 274].

nrakta South-eastern N. America - New Jersey to Florida. ksacta Rich dry soils on the edges of woods[4, 43].

propta Seed - requires stratification, pre-chill for 3 weeks prior to sowing. It will usually germinate in 1- 3 months at  $20^{\circ}\mathrm{c}.$  Prick out the seedlings into individual pots once they are large enough to handle and grow on in a cold frame for their first winter. Plant out in late spring or early summer. Division in the spring. Basal cuttings in late spring. Harvest the shoots with plenty of underground stem when they are about 8-  $10\mathrm{cm}$  above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Succeeds in most fertile soils in semi-shade[200]. Tolerates full sun if the soil remains reliably moist in the growing season[200], in a shady position it tolerates considerably drier soils[4]. Plants are hardy to about -15°c[200]. A very ornamental plant[1].

### 8.2.483 Aspidistra elatior

Aspidistra, Cast Iron Plant

7 tlin 11 cyuc 0 kcak 0 tcan 2 dwat 0.6 m hkuc

pcimhmim cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Aspidistra elatior is an evergreen Perennial growing to 0.6 m (2ft) by 0.5 m (1ft 8in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from January to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Slugs, snails. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) or semi-shade (light woodland). It prefers dry or moist soil and can tolerate drouotht.

tcanta Aspidistras can be grown as a ground cover in a shady position [188].

frost when they might wait until April. Frost just before flowering or at the time of flowering kills the pollen[185]. New growth takes place from May until the end of September and can be very vigorous, 1.2 metres a year is not uncommon and this can be maintained for 30 years or more[185]. The best trees are found in Devon, Wiltshire, Perthshire and Ireland[185]. The crushed foliage has the scent of candle wax[185]. Special Features: Attracts birds, North American native. Inconspicuous flowers or blooms. Carbon Farming -Climate: warm temperate to subtropical, tropical highlands. Humidity: humid. Cultivation: minor global crop. Management: coppice.

# 8.2.478 Delphinium staphisagria

7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc

htut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Delphinium staphisagria is a BIEN-NIAL/PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant contain diterpene alkaloids and are highly toxic[4, 148, 238]. The plant is most toxic when it is young[200]. Ingestion of a lethal dose produces a feeling of excitement, followed by depression and extreme sensitivity of the nerves, followed by paralysis, a slowing of the pulse and finally death by asphyxia[232].

tcanta Insecticide Parasiticide Parasiticide is obtained from the leaves[172]. It is quite toxic and so is for external use only. The seed is used to make a potent insecticide, parasiticide and to destroy vermin[4, 61, 89, 100, 238]. It is used to kill head lice[238].

dwatta Antispasmodic Cathartic Emetic Homeopathy Odontalgic Parasiticide Sialagogue Vermifuge WartsStavesacre is a very poisonous plant that is rarely used in modern herbal medicine[238]. The seed is antispasmodic, cathartic, emetic and vermifuge[4, 44]. The seeds cause a strong salivation if they are chewed and have been used in the treatment of toothache and other painful conditions of the throat and gums[232]. They are so strongly emetic and cathartic, however, that they are rarely used internally[4]. Externally, a decoction is used to treat itchy skin and parasites4]. The seed is very poisonous and should be used with great caution[4]. The plant has been used externally in the treatment of warts, lice and itches[232]. A homeopathic remedy is made from the seeds[232]. This is used in the treatment of a variety of ailments including toothache, injuries and headache[232].

nrakta Europe - Mediterranean. ksacta Field verges and in scrub, on hot dry soils[89]. Often found in poor soils[232]. propta Seed - sow March in a cold frame or April outdoors. Keep moist and in a shady position until germination takes place[175]. Seed can also be sown either in a

cold frame or in situ as soon as it is ripe in mid to late summer[175], though seedlings from the outdoor sowing can be killed in cold winters[K]. The seed has a limited viability so it should be stored in a sealed container at about 3°c[200]. Temperatures above 15°c inhibit germination[175]. The seed usually germinates in 2 - 9 weeks at 15°c[175].

nwatta Succeeds in most soils and situations[4] but prefers a rich well-drained neutral to alkaline soil[4, 200, 238] and is intolerant of winter-wet soils[200]. Requires an open sunny position[188]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. A greedy plant, inhibiting the growth of nearby plants, especially legumes[54].

# 8.2.479 Boenninghausenia albiflora

7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc htut cyutli tcup hwicli hrasilut hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Boenninghausenia albiflora is a deciduous Shrub growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil

tcanta Essential Parasiticide RepellentThe plant contains 0.2 - 0.4% essential oils[272]. The dried leaves are used as a flea repellent[272].

dwatta Anodyne Malaria Parasiticide StypticThe leaves are pounded and applied to cuts and wounds as a styptic and to speed the healing process[218, 272]. They are crushed and placed in the nostrils in the treatment of malaria[218]. The external application of the leaves is also used in the treatment of scabies[272]. The leaf juice is dropped into wounds in order to kill germs[272]. Applied externally to the forehead, the juice is said to relieve headaches, whilst the whole plant is placed under the pillow whilst sleeping to relieve headaches[272]. A decoction of the root is used in the treatment of malaria[218].

nrakta E. Asia - Himalayas to Japan. ksacta Forests and shrubberies to 3300 metres in the Himalayas[51]. Generally found in moist places in Nepal at elevations of 500 - 3000 metres[272].

propta Seed - best sown as soon as it is ripe in a greenhouse in the autumn[188]. Sow stored seed in February to May in a greenhouse[138]. Only just cover the seed. Germination usually takes place within 1 - 3 months at 15°c[138]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a

nwatta Requires a warm sheltered position in a welldrained soil that is not too dry[11, 138, 200]. Plants are likely to rot if the soil remains too wet in winter[200]. Succeeds on chalk[11, 182]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Plants are often cut to the ground in severe winters but they usually regrow from the base[11, 182]. It is best to give the roots a mulch in the winter[11]. A very ornamental but short-lived plant[1]. The leaves are very aromatic[188].

#### 8.2.480 Daphne papyracea

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc hmim cyutli tcup hwicli jlutnyik hpa7tli flatpriklwis hna7tmwatli xre7t hionli

drutta Daphne papyracea is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from January to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista All parts of the plant are poisonous[76, 200]. Skin contact with the sap can cause dermatitis in some people [65,

tcanta PaperThe inner bark is used in the manufacture of, or as a paper[1, 11, 158, 171]. It is one of the principle sources of Nepalese hand-made paper[272].

dwatta Bitter Febrifuge PurgativeThe plant is bitter, febrifuge and purgative[240, 243]. The reports do not say which part of the plant is used.

nrakta E. Asia - Himalayas from Pakistan to C. Nepal.. ksacta Forests, 1200 - 2800 metres[158]. Shaded places in forested areas at elevations of 1500 - 3200 metres in Nepal[272].

propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries

country, it tolerates temperatures down to between -5 and - 8.2.390 Dryopteris sieboldii 10°c[200]. Dioecious, male and female plants must be grown if seed and fruit is required[182].

## 8.2.388 Incarvillea delavayi

Hardy Gloxinia

7 tlin 9 cvuc 1 kcak 0 tcan 0 dwat 0.4 m hkuc

hmimhtut cyutli hgattcup hwicli hrasjlut hpa7tli priklwis hpa7tmwatli xre7t hjonli

drutta Incarvillea delavayi is a PERENNIAL growing to 0.4 m (1ft 4in) by 0.3 m (1ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH; neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil and can tolerate drought.

pcista One report suggests that the plant might be slightly toxic[179].

kcakta Edible Parts: LeavesEdible Uses: Leaves and young shoots - cooked. A famine food, it is only used when all else fails[179]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - S.W. China in Yunnan. ksacta Grassy places and scrub around 2000 metres[187]. Pastures and open grassland, 2400 - 3500 metres, but it is now uncommon in its native range[200].

propta Seed - sow autumn or spring in a greenhouse Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow on for at least their first winter in a greenhouse and plant out into their permanent positions in spring after the last expected frosts. Division with care in early spring or autumn.

nwatta Landscape Uses:Alpine garden, Border, Container, Rock garden, Specimen. Easily grown in a deep sandy but rich soil in full sun[187, 200]. Plants grow better if given some shade around midday[200]. Prefers a well-drained calcareous or neutral soil[214] and is drought tolerant when established[190]. Another report says that it dislikes dry summer soils[200]. Dislikes winter wet[200]. Prefers a sheltered position[214]. Plants are hardy to about -15°c, tolerating even lower temperatures if the roots are well mulched, preferably with dry bracken[1, 187, 200]. The crown of the plant requires protection from slugs in the winter[187]. A very ornamental plant, it usually takes about 3 - 4 years to come into flower from seed[214]. This species is often confused in cultivation with I. mairei[214]. Plants are intolerant of root disturbance, it is best to place them in their permanent positions whilst small[200]. The plants will often sulk for several years if they are divided[214]. Special Features: Attractive foliage

## 8.2.389 Digitaria ciliaris

Southern Crab Grass, Southern crabgrass 7 tlin 10 cvuc 1 kcak 2 tcan 0 dwat 0.6 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Digitaria ciliaris is a ANNUAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta One report says the plant is edible but does not specify which part[145]. A wild millet grass with possibly edible seeds [1b].

tcanta FodderFodder/animal feed, Forage. Environmental: Agroforestry, Soil conservation. D. ciliaris cv. Red River is a high-yielding forage and conservation-type cultivar developed and released in 1988 [1d].

nrakta Cosmopolitan in warmer areas of the world. ksacta Waste ground and cultivated fields all over Japan[58]. propta Seed

nwatta A polymorphic species[58].

7 tlin 10 cvuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc hmim cyutli hgattcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli hjonli

drutta Dryopteris sieboldii is a FERN growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland). It prefers moist soil and can tolerate drought.

pcista Although we have found no reports for this species, a number of ferns contain carcinogens so some caution is advisable[200]. The fresh plant contains thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people eating an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172]. However, there have been reports for other species of ferns suggesting that even cooked fronds can have a long term harmful effect. Some caution is therefore advised

kcakta Edible Parts: RootEdible Uses: Root - dried and ground into a powder[177]. Some caution is advised, see the notes above on toxicity.

nrakta E. Asia - S. China, Japan. ksacta Woods, C. and S. [apan[58]. On the rather dry floor of mountain forests[275].

propta Spores - can be sown at any time of the year in a greenhouse. Surface sow on a sterilised compost and keep moist, possibly by placing the pot in a plastic bag. Germinates in 1 - 3 months at 20°c. Pot up small clumps of the plants when they are large enough to handle and grow on in a shady part of the greenhouse until large enough to plant out. Division in spring. Larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers an acid to neutral soil, succeeding in ordinary fertile soil in a shady position. Prefers a moist soil[188], but plants are drought tolerant when established[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It is best grown in a greenhouse in many parts of Britain[1]. A very ornamental plant[1]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.391 Sapindus marginatus

Wingleaf soapberry

7 tlin 10 cvuc 1 kcak 0 tcan 0 dwat m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasilutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Sapindus marginatus is a deciduous Tree growing to 15 m (49ft 3in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf from April to October, in flower from May to June, and the seeds ripen in November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista The seed is poisonous[1]. The fruit is poi sonous[149]

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 177]. The fruit is eaten by native North American Indians, though most white people find it repulsive[105].

tcanta Soap WoodA soap is obtained from the fruit by rubbing the fruit in water[46]. Used in Mexico for washing clothes[227]. The fruit can be dried and stored for later use[169]. Wood - heavy, strong, close-grained, splits easily[46, 72]. It splits easily into thin strips and is often used in basket making [46].

nrakta South-western N. America - Florida, Georgia and South Carolina, ksacta Hammocks near the coast[72].

propta Seed - requires some cold stratification. Pre-soak the seed for 24 hours in warm water and sow in a cold frame in mid-winter. Move to a greenhouse in early spring. The seed should germinate in late spring. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse for at least their first winter. Plant out in early summer. Cuttings of almost ripe wood, 5 - 8cm with a heel, July/August in a frame. Fairly good percentage[78].

nwatta We have very little information on this species and do not know if it will be hardy outdoors in Britain, though judging by its native range it could succeed outdoors at least in the mildest areas of the country. The following notes are based on the general needs of the genus. Succeeds in any well-drained soil in full sun[220]. This species tolerates a wide range of soils, including those that are dry, stony and nutrient deficient[200]. Trees are relatively slow-growing in the wild[229].

#### 8.2.392 Mirabilis multiflora

Four O'clock Plant, Colorado four o'clock 7 tlin 10 cyuc 1 kcak 0 tcan 2 dwat m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Mirabilis multiflora is a PERENNIAL growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil

kcakta The dried root can be ground into a powder, mixed with cereal flours and used to make a bread[257]. This bread is eaten to reduce the appetite[257].

dwatta Hallucinogenic Poultice StomachicThe root is used in the treatment of stomach complaints[192]. A pinch of the powdered root is said to relieve hunger[207], it can also be used after overeating to relieve the discomfort[257]. A poultice of the powdered root can be applied to swellings[257]. Large quantities of the root are said to cause intoxication[192]. The root was chewed by native North American Medicine men to induce visions whilst making a diagnosis[257].

nrakta Southern N. America - Texas to Colorado and Utah. ksacta Hillsides and mesas, often amongst rocks and shrubs[192]. Gravelly or sandy soils, pinyon-juniper woodlands, ponderosa pine forests at elevations of 300 - 2300 metres[270].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer, after the last expected frosts. The seed remains viable for several years[196]. Division in spring as the plant comes into growth[200].

nwatta Requires a fertile well-drained soil in full sun or part-day shade[200]. Plants flower in their first year from seed and, although they are not very hardy in Britain, tolerating temperatures down to about -10°c when in a suitable situation[260], they can either be grown as half-hardy annuals or the tubers can be harvested in the autumn and stored overwinter in a cool frost-free place in much the same manner as dahlias[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 8.2.393 Salvia japonica

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Salvia japonica is a PERENNIAL growing to 0.8 m (2ft 7in) by 8 m (26ft). See above for USDA hardiness. It hardy to UK zone 8. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers dry or moist soil

kcakta Edible Parts: FlowersEdible Uses: Children suck the flowers (for the sweet nectar?)[177, 183]. The leaves are used as a flavouring, they are a sage substitute[179].

tcanta A black dye is obtained from the plant, probably from the flowers[178].

nrakta E. Asia - China, Japan, Korea.. ksacta Woods and thickets in hills and mountains, C. and S. Japan[58].

propta Seed - sow March/April in a greenhouse[200]. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out in early summer. In areas where the plant is towards the limits of its hardiness, it is best to grow the plants on in a greenhouse for their first winter and plant them out in late spring of the following year. Cuttings of half-ripe wood succeed at almost any time in the growing season[200].

nwatta Requires a very well-drained light sandy soil in a sunny position[200]. Prefers a rich soil[1]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Plants can be killed by excessive winter wet[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

#### 8.2.394 Bulbinella hookeri

Maori Onion

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.7 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlut hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Bulbinella hookeri is a BULB growing to 0.7 m (2ft 4in) by 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: RootEdible Uses: Root - fleshy[173, 187] No further details are given

nrakta New Zealand. ksacta Northern slopes and damp places from lowland to sub-alpine pastures on North and South Islands south to latitude 42° south[44].

propta Seed - best sown in a cold frame as soon as it is ripe. Sow stored seed in a greenhouse as early in the year as possible. The seed usually germinates in 1 - 3 months at 13°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first two winters, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring. Best done as the plants come into growth. Pot the divisions up and grow them on in a cold frame until they are established then plant them out in the summer.

nwatta An easily grown plant so long as it is in a moist peaty neutral or slightly acidic soil[42, 200, 233], but it also succeeds on dry hillsides[42, 200]. Shade tolerant[1]. Plants only succeed outdoors in the mildest areas of Britain, they are hardy to about -5°c[187], tolerating light short-lived frosts[200]. A plant is growing in the rock garden at Cambridge Botanical Gardens. It is in an open position but does not receive a lot of direct sunlight[K]. This species is becoming much more common in the wild because it is not eaten by grazing animals nor is it killed by burning[187].

#### 8.2.395 Argemone mexicana

Prickly Poppy, Mexican pricklypoppy 7 tlin 10 cyuc 1 kcak 2 tcan 3 dwat m hkuc htut cyutli hgatkyuctcup hwicli hyishras hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Argemone mexicana is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs). The plant is self-fertile. Suitable for: light (sandy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

plains, valleys and foothills[212]. Open or disturbed sites in Texas, often on calcareous soils[274].

propta Seed - sow spring in a greenhouse and only just cover the seed. Prick the plants out into individual pots as soon as they are large enough to handle, using deep pots to accommodate the tap root. Grow on for the first winter in a greenhouse and plant out into their permanent positions in late spring or early summer[200]. Cuttings of half-ripe wood, July/August in a frame.

nwatta Requires a position in full sun in a deep open well-drained soil[200]. Often found in calcareous soils in the wild[274]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Plants are sub-shrubs and may die back to the base in winter[200]. Plants have deep taproots and resent root disturbance[200]. They should be planted into their permanent positions as soon as possible. Because it is unpalatable to livestock, this plant is often an indicator of overgrazed land[274]. Plants are strongly aromatic[200].

# 8.2.476 Loropetalum chinense

Fringe Flower, Chinese Fringe Bush 7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Loropetalum chinense is an evergreen Tree growing to 2 m (6ft) by 1.2 m (4ft in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 9. It is in leaf all year, in flower from February to April, and the seeds ripen from May to July. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Depurative Dysentery Haemostatic PectoralThe whole plant is depurative, haemostatic and pectoral[147]. A decoction is used in the treatment of coughing in tuberculosis, dysentery, enteritis etc[147, 218]. The leaves can be crushed and pulverised for external application on wounds[147].

nrakta E. Asia - Himalayas to China and Japan. ksacta Rocky hills and dry open woods, often on limestone[184, 260]. Stream banks, hilly slopes and roadsides[147].

propta Seed - sow in a warm greenhouse in late winter or early spring[188]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Give the plants some protection from the cold for at least their first winter outdoors. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame[200]. Fair to good percentage[78]. Layering in the spring[188].

nwatta Landscape Uses:Border, Screen, Standard, Superior hedge, Specimen. Requires a rich well-drained neutral to acid soil in full sun or light shade[188]. Requires a lime-free humus-rich soil[182]. One report says that it succeeds on a sheltered north wall[182] whilst another says that it needs a sunny position[219] and another says it needs warm summers[260]. Prefers a cool root run[182]. This species is not very cold-hardy in Britain, it is also slow growing[184]. It succeeds outdoors in the mildest areas of the country, tolerating temperatures down to about -5°c[184]. Plants do not flower well if the temperature drops below 5°c[200]. The Japanese form of this species might be hardier[11]. Plants grow taller in their native habitat, reaching a height of 3 metres[200]. The flowers emit a delicate sweet perfume[245]. Some named forms have been developed in Japan for their ornamental value[182]. Special Features: Attractive foliage, Not North American native, Fragrant flowers. Attractive flowers or blooms.

#### 8.2.477 Seguoia sempervirens

Coastal Redwood, Redwood, California Redwood, Coast Redwood

7 tlin 10 cyuc 0 kcak 4 tcan 1 dwat 110 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli drutta Sequoia sempervirens is an evergreen Tree growing to 110 m (361ft) by 20 m (65ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in leaf all year, in flower from February to April, and the seeds ripen in October. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

tcanta Basketry Dye Insulation Paper Soil conditioner Stuffing WoodA brown dye is obtained from the bark[168]. The bark and the wood contain tannin, but in too low a concentration for economic utilization[223]. On a 10% moisture basis, the bark contains 4.4% tannin and the wood 2.5%[223]. The sprouts from the burls have been used in making baskets[257]. The plant develops a thick covering of a soft and fibrous bark (you can punch it hard without hurting your hand). This can be harvested without harm to the tree and used as an insulating or stuffing material[171]. A fine bark dust that is produced whilst doing this is a good soil conditioner[171]. This fibrous bark is also used for making paper. Branches can be harvested at any time of the year from logged trees, the bark is cut into useable pieces and soaked in clear water prior to cooking for 6 or more hours with lye. The fibres are beaten for six hours in a ball mill and the paper is a brown colour[189]. Wood - straight-grained. knot-free, light, soft, not strong, very durable in contact with the soil. A high quality and easily worked lumber, it is used for joinery, fence posts, construction etc[1, 11, 46, 61, 82, 171, 2291, Carbon Farming - Industrial Crop: biomass.

dwatta Stimulant TonicA poultice of the heated leaves has been used in the treatment of earaches[257]. The gummy sap has been used as a stimulant and tonic in the treatment of rundown conditions[257].

nrakta South-western N. America - Oregon to California. ksacta Deep well-drained soils on flat land and slopes in the coastal fog belt below 600 metres[71, 229].

propta Seed - sow early spring in a cold frame in light shade. Seed can also be sown as soon as it is ripe in a greenhouse. Germination rates are usually very low[11]. Prick out the seedlings into individual pots once they are large enough to handle and grow them on in a cold frame for their first winter, planting them out into their permanent positions in late spring or early summer. Plants will require some protection from the cold and spring frosts for their first year or two outdoors[78]. If there are sufficient seeds, they can be sown in a lightly shaded outdoor bed in late March[78]. Grow on the plants in the seedbed for two years before planting them out into their permanent positions in late autumn or early spring. Cuttings of half-ripe wood. August/September in a frame. They form roots in winter or early spring[1]. Pot them up into individual pots once the roots are developing nicely and plant them out in the summer if they are growing well Otherwise grow them on for the next winter in a cold frame and plant them out in early summer.

nwatta Industrial Crop: Biomass Management: Coppice Minor Global CropLandscape Uses: Christmas tree, Firewood, Hedge, Aggressive surface roots possible, Screen, Specimen, Woodland garden. Requires a rich moist soil[1], growing best in deep sheltered valleys in cool humid areas[81, 200]. Dislikes chalky soils according to one report[1] whilst another says that it succeeds on chalk[200]. Tolerates poorly drained sites[200]. Tolerates partial shade for many years when young[200]. Strongly dislikes windy sites, especially if the winds are cold[200]. Plants dislike atmospheric pollution, growing poorly in cities[185]. Plants are fully hardy in Britain, though they may lose their leaves in cold winters. This seems to have no detrimental effect on the tree[188]. The giant redwood is probably the tallest growing tree in the world[11, 81], it thrives in Britain, especially in the cooler moister western half of the country[11]. It is fast growing in cultivation[81], reaching 25 metres tall in 20 years in a good site[200], and can be successfully coppiced even when quite old[11, 81, 200]. It is a long-lived tree in the wild, often living 1000 years and with some specimens 2200 years old recorded[229]. Plants are tender when young[11]. If trees larger than 80cm are planted out, they should be coppiced in order to allow the roots to become established[200]. Male cones shed their pollen in February unless delayed by

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis 8.2.474 Abronia villosa hpa7tmwatli xre7t hjonli

drutta Oldenlandia diffusa is a ANNUAL growing to 0.3 m (1ft) by 0.3 m (1ft in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

dwatta Alterative Anodyne Antibacterial Antiinflammatory Antitumor Cardiotonic Depurative Diuretic Febrifuge Sedative UrinarySnake-needle grass is a pleasant-tasting cooling, alterative herb that lowers fever, reduces inflammation, relieves pain and is diuretic and antibacterial[238]. It acts mainly on the liver and also stimulates the immune system[238]. The whole plant is alterative, anodyne, antibacterial, anti-inflammatory, antitumor, cardiotonic, depurative, diuretic, febrifuge and sedative[147, 176, 238]. The plant is harvested in the summer and dried for later use[238]. It is taken internally in the treatment of fevers, coughs, asthma, jaundice, impure blood, urinary tract infections, acute appendicitis, biliousness and cancers of the digestive tract[176]. 238, 240]. Externally, it is used in the treatment of snake bites, boils, abscesses and severe bruising[176, 238].

nrakta E. Asia - China, Japan, Korea and Formosa. ksacta Moist ground and fields[238]. A weed of gardens and fields[147]

propta Seed - sow spring in situ.

nwatta Prefers growing in a damp soil in partial shade[238]. This species is not very hardy outdoors in Britain, tolerating temperatures down to about -5°c[238]. It should be possible to grow it as a spring-sown annual in most parts of the country[K].

## 8.2.473 Grindelia humilis

Hairy Gumweed

7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwishsom hpa7tmwatli xre7t hjonli

drutta Grindelia humilis is a PERENNIAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta DyeYellow and green dyes are obtained from the flowering heads and pods. Aromatic.

dwatta Expectorant Homeopathy Sedative SkinThe dried leaves and flowering tops are antiasthmatic, expectorant and sedative[4]. The principal use of this herb is in the treatment of bronchial catarrh, especially when there is an asthmatic tendency[4]. The active principle is excreted from the kidneys, and this sometimes produces signs of renal irritation[4]. The plant has been used in the treatment of itching skin eruptions caused by contact with poison oak (Rhus spp.)[257]. A homeopathic remedy is prepared from the leaves and flowering stems[4].

nrakta Western N. America. ksacta Coastal salt marshes[71].

propta Seed - sow autumn or spring in a cool greenhouse and only just cover the seed. Prick out the plants into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer.

nwatta Succeeds in any well-drained soil in full sun[200]. Does well on dry sandy banks and in poor soils[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. There is some confusion over the correct name for this species. The report on medicinal uses in [4] relates to G. cuniefolia, a name that has been used by two authors. G. cuniefolia. non Nutt. is said to be a synonym of G. humilis and so the entry has been made here.

Desert Sand Verbena

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 0.1 m hkuc htut cyutli kyuctcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Abronia villosa is a ANNUAL growing to 0.1 m (0ft 4in) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

dwatta The plant is used to induce the flow of urine[257]. A poultice of the mashed roots has been used to treat burns[257].

nrakta South-western N. America - Nevada and Arizona to California, ksacta Found in creosote bush scrub from sea level to elevations of 2500 metres in California[276].

propta Seed - sow autumn or early spring very shallowly in pots of sandy soil in a greenhouse[133]. Germination can be very slow unless you peel off the outer skin and pre-soak the seed for 24 hours in warm water[200, 245]. The seed usually germinates in 1 - 2 months at 15°c[133]. When large enough to handle, prick the seedlings out into individual pots and plant them out in early summer.

nwatta Prefers a light well-drained sandy soil in full sun[200]. This species is not very hardy in Britain, though it should succeed outdoors in the southern part of the country, especially if given a warm sheltered site[200]. Seed is rarely ripened on plants growing in Britain[1].

#### 8.2.475 Gutierrezia sarothrae

Broomweed, Broom snakeweed 7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Gutierrezia sarothrae is a deciduous Shrub growing to 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista In large quantities this plant can be toxic to grazing animals, possibly due to the presence of saponins[212,

tcanta Broom Dye Insecticide Kindling SoapThe twigs are tied to sticks and used as brooms[61, 257, 274]. The dried twigs were used as a kindling for starting fires [274]. A vellow dye can be made from the plant tops[257]. An infusion of the leaves has been used as a pleasant and refreshing bath[257]. The chewed leaf juice has an intoxication effect on bees and can kill them[257].

dwatta Antirheumatic Astringent Cancer Cathartic Diuretic Laxative Pectoral Sedative Skin Stings StomachicBroomweed was widely employed medicinally by several native North American Indian tribes who used it to treat a variety of complaints[257]. It is little, if at all, used in modern herbalism. A decoction of the roots has been used in the treatment of painful urination, diarrhoea and stomach aches[257]. The roots have been placed in boiling water and the steam inhaled in the treatment of respiratory complaints[257]. The flowers are laxative[257]. A decoction of the fresh flowers has been used in the treatment of diarrhoea[257]. The leaves are cathartic, febrifuge and sedative[257]. An infusion has been used in the treatment of coughs and colds[257]. It has also been used as a bath to treat fevers and sores, including those caused by venereal diseases[257]. A poultice of the moistened leaves has been used to treat bruises, wounds, sprains, nose bleeds and insect stings[257]. A protein in the plant is reported to have anti-cancer activity[274]. A strong, black infusion of the plant has been used as a rub on rheumatic joints[257].

nrakta Western N. America - Manitoba to Montana, south to Texas and California. ksacta Dry soils of open areas,

pcista All parts of the plant, including the seed, contain toxic alkaloids[175].

kcakta Edible Parts: Leaves OilEdible Uses: Oil-Leaves[177] No further details are given but caution is advised, see the notes on toxicity at the top of the page.

tcanta Essential OilA semi-drying oil is obtained from the seed, used for lighting, soap etc[46, 61, 103, 171, 272]. A medicinal fixed oil (essential oil?) is obtained from the seed[178]. Biodiesel production may be possible from the seed oil using crystalline manganese carbonate.

dwatta Alterative Analgesic Antispasmodic Antitussive Demulcent Emetic Expectorant Hallucinogenic Purgative Sedative Skin WartsThe whole plant is analgesic, antispasmodic, possibly hallucinogenic and sedative [46, 61, 178, 181, 192, 254]. It contains alkaloids similar to those in the opium poppy (P. somniferum) and so can be used as a mild pain-killer[254]. The fresh vellow, milky, acrid sap contains protein-dissolving substances and has been used in the treatment of warts, cold sores, cutaneous affections, skin diseases, itches etc[207, 243, 254]. It has also been used to treat cataracts[254] and has been taken internally in the treatment of dropsy and jaundice[240, 243]. The root is alterative and has been used in the treatment of chronic skin diseases[240, 243]. The flowers are expectorant and have been used in the treatment of coughs and other chest complaints[254]. The seed is demulcent, emetic, expectorant and laxative[240, 243]. An infusion, in small quantities, is used as a sedative for children, but caution is advised since the oil in the seed is strongly purgative[254]. The seed has also been used as an antidote to snake poisoning[240, 243]. The pounded seeds, mixed with mustard oil, are applied externally to treat itchy skin[272]. The oil from the seed is demulcent and purgative[254, 272]. It has been used externally in the treatment of skin problems [240, 243, 272]. Caution is advised in the use of this oil, prolonged ingestion produces toxic effects resembling those occurring in epidemic dropsy[240].

nrakta South-western N. America. Naturalized in C. and S. Europe[50]. ksacta Dry soils along roadsides and in waste places and fields[72, 192].

propta Seed - sow April in situ[200]. The seed usually germinates in 3 - 4 weeks at 15°c[134].

nwatta Easily grown in a light soil in a sunny position[1, 134, 1661. Does best in a poor well-drained soil[134]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Usually grown as a hardy annual in Britain[1]. It resents being transplanted and should be sown in situ[134].

# 8.2.396 Bouteloua gracilis

Blue Grama

7 tlin 10 cvuc 1 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bouteloua gracilis is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH; mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Seed - raw or cooked[257]. It can be ground into a powder, mixed with water and eaten as a mush, often with corn meal[257]. It is also used to make bread[257].

tcanta Basketry Broom BrushThe grass is sometimes used in the fill of coiled basketry[216, 257]. The stems can be used as a comb and broom material[257]. The blades can be bundled by a cord and the stiff end used as a hair comb whilst the other end can be used as a broom[257].

dwatta Salve Women's complaintsThe chewed roots have been applied to cuts[257]. A decoction of the whole plant has been used as a post-partum medicine[257].

nrakta Southern N. America - Wisconsin to North Dakota, south to Arizona and Mexico, ksacta Deserts and prairies[216, 235]. Grows in pure stands in mixed prairie associations and disturbed habitats, usually on rocky or clay soils and mainly at elevations of 300-3000 metres[270].

propta Seed - sow spring in a greenhouse. Only just cover the seed. Prick out the seedlings into individual pots

when large enough to handle and grow on for at least the first winter in a greenhouse. Plant out in early summer. Division.

nwatta Easily grown in full sun on any well-drained garden soil[200]. Prefers a near-neutral or lime-free soil[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. All members of this genus use the method of photosynthesis knwn as C4. This allows for the more effective capture of carbon dioxide and thus less water loss through transpiration since the stomata do not have to be open for transpiration. This is an advantage in the arid environments where these plants are usually found[274].

# 8.2.397 Coprosma serrulata

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.6 m hkuc hmimhtut cyutli tcup hwicli hrasilut hpa7tli flatprik hpa7tmwatli nvanhien hionli

drutta Coprosma serrulata is an evergreen Shrub growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: CoffeeFruit - raw or cooked. Sweet, but little flavour[225]. The orange-red fruits are about 8mm in diameter[225]. The roasted seed is an excellent coffee substitute[153].

tcanta DyeA yellow dye is obtained from the wood, it does not require a mordant[153].

nrakta New Zealand. ksacta Montane to lower subalpine forest, shrubland and grassland, from latitude 41° south and southwards on South Island[44].

propta Seed - probably best sown as soon as it is ripe in a greenhouse or cold frame[K]. Sow stored seed in spring in a cold frame[200]. Germination can be slow, often taking more than 12 months even when fresh seed is used[K]. When the seedlings are large enough to handle, prick them out into individual pots. Grow on the plants for at least their first winter in a greenhouse and plant out in late spring or early summer. Give the plants some protection from the cold for their first winter outdoors[K]. Cuttings of mature wood of the current year's growth, autumn in a frame.

nwatta Requires a moist, very well-drained neutral to slightly acid soil in full sun or light shade[200]. Succeeds in most soils, so long as they are well-drained[225]. Somewhat intolerant of frost, this species is only likely to succeed outdoors in the milder areas of Britain[200]. Plants are proving to be hardy in an Essex garden[225]. Hybridizes freely with other members of this genus[200, 225]. Plants are normally dioecious, though in some species the plants produce a few flowers of the opposite sex before the main flowering and a few hermaphrodite flowers are sometimes produced[225]. Male and female plants must usually be grown if seed is re-

#### 8.2.398 Peganum harmala

Syrian Rue, Harmal peganum 7 tlin 10 cyuc 1 kcak 0 tcan 3 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlut hpa7tli flatpriklwishsom hpa7tmwatli xre7t hionli

drutta Peganum harmala is a PERENNIAL growing to 0.6 m (2ft) by 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. The seeds ripen in September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in saline soils. It cannot grow in the shade. It prefers dry or moist

pcista Use with caution. Although the seed is used medicinally and as a condiment, it does contain hallucinogenic and narcotic alkaloids[238]. When taken in excess it causes hallucinations and vomiting[238].

kcakta Edible Parts: Oil OilEdible Uses: Condiment Oil OilSeed - used as a spice and purifying agent[105, 177, 183, 238]. Some caution is advised because the seed has narcotic properties, inducing a sense of euphoria and releasing inhibitions[169]. An edible oil is obtained from the seed[46, 61].

tcanta Dye Incense Miscellany Oil Oil ParasiticideA red dye is obtained from the seed[46, 61]. It is widely used in Western Asia, especially as a colouring for carpets[192]. The ripe seed contains 3.8 - 5.8% of the alkaloids harmine, harmaline, harmalol and peganine[240]. Ineffective as a contact poison, they are active in vapour form where they are effective against algae, in higher concentrations to water animals and lethal to moulds, bacteria and intestinal parasites[240]. The seed is used as an incense[145].

dwatta Abortifacient Alterative Aphrodisiac Digestive Diuretic Emmenagoque Epilepsy Galactogogue Hallucinogenic Miscellany Narcotic Ophthalmic Parasiticide Urinary Uterine tonic VermifugeAlterative[46, 169]. The fruit and seed are digestive, diuretic, hallucinogenic, narcotic and uterine stimulant[192, 238]. They are taken internally in the treatment of stomach complaints, urinary and sexual disorders, epilepsy, menstrual problems, mental and nervous illnesses[238]. The seed has also been used as an anthelmintic in order to rid the body of tapeworms[240]. This remedy should be used with caution and preferably under the guidance of a qualified practitioner since excessive doses cause vomiting and hallucinations[238]. The seeds contain the substance 'harmine' which is being used in research into mental disease, encephalitis and inflammation of the brain[192]. Small quantities stimulate the brain and are said to be therapeutic, but in excess harmine depresses the central nervous system[192]. A crude preparation of the seed is more effective than an extract because of the presence of related indoles[192]. Consumption of the seed in quantity induces a sense of euphoria and releases inhibitions. It has been used in the past as a truth drug[169, 187]. The oil obtained from the seed is said to be aphrodisiac[192]. The oil is also said to have galactogogue, ophthalmic, soporific and vermifuge properties[192]. The seed is used externally in the treatment of haemorrhoids and baldness[238]. The whole plant is said to be abortifacient, aphrodisiac, emmenagogue and galactogogue[240]. A decoction of the leaves is used in the treatment of rheumatism[240]. The root has been used as a parasiticide in order to kill body lice[240]. It is also used internally in the treatment of rheumatism and nervous conditions[254].

nrakta Europe - Mediterranean and Southeast Europe. ksacta Dry steppes, especially where grazing is heavy[187], and dry waste places[50]. It is often found in saline soils[254].

propta Seed - sow late spring in a greenhouse. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in a sunny part of the greenhouse for their first winter. Be careful not to overwater, especially when the plants are dormant. Plant out into their permanent positions in late spring or early summer[K]. Division in late spring[238].

watta Prefers a light well-drained but moisture retentive soil and an open position in full sun[200]. Prefers a dry soil[187] and succeeds in poor soils[238]. Although this species comes from dry desert areas, it responds well to cultivation so long as the soil is very well drained[238]. It can tolerate temperatures down to about -20°c if the soil is dry[187]. There is speculation that this plant was the sacred 'Soma' plant, which was used by the ancients of India and Persia as an hallucinogenic aid to understanding the deeper meaning of life[238].

#### 8.2.399 Epilobium glabellum

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 0.2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Epilobium glabellum is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid,

neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: LeavesEdible Uses: Young leaves and shoots - cooked.

tcanta A useful ground cover plant[188].

dwatta Diuretic UrinaryTreats urinary disorders[154]. nrakta Australia, New Zealand. ksacta Loamy soils, flats and hillsides in eastern Australia[154].

propta Seed - sow early spring in situ or as soon as the seed is ripe. Division in spring or autumn. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Prefers a well-drained but moisture retentive soil in a sunny position or in partial shade[187, 200]. Succeeds in most soils[1]. Possibly hardy to about -15°c[187]. Plants are semi-evergreen[188].

#### 8.2.400 Sedum stoloniferum

Stolon stonecrop, Sedum

7 tlin 9 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Sedum stoloniferum is an evergreen Perennial growing to 0.2 m (0ft 8in) by 0.5 m (1ft 8in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to July, and the seeds ripen from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

kcakta Edible Parts: LeavesEdible Uses: Leaves - raw or cooked.

nrakta E. Europe to W. Asia - Caucasus to Iran. ksacta Stony soils in meadows and woodlands in the middle and lower mountain zones between 600 and 2000 metres[83].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Landscape Uses:Border, Container, Ground cover, Massing, Rock garden, Seashore. Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are very drought tolerant[200], they grow well in dry soils and can be grown on a wall or in crevices in a rock garden[83]. Hardy to at least -15°c[200]. This plant often disappears from its planted position and then turns up in a new location, are birds responsible for this[83]? Closely related to S. spurium[200]. This species has pink flowers[200]. All members of this genus are said to have edible leaves, though those species that have yellow flowers can cause stomach upsets if they are eaten in quantity[62, 85]. Plants in this genus seem to be immune to the predations of rabbits[233]. Special Features:Attractive foliage, Not North American native, Naturalizing, Attractive flowers or blooms

## 8.2.401 Androstephium caeruleum

Blue Funnel Lily

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc

htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Androstephium caeruleum is a BULB growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy

can be pruned back hard in spring to encourage freer flowering[182]. An excellent plant for bees and butterflies[30]. Dioecious. Male and female plants must be grown if seed is required.

# 8.2.469 Lagerstroemia indica

Crepe Myrtle, Crepeflower

7 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 5 m hkuc

htut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lagerstroemia indica is a deciduous Shrub growing to 5 m (16ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from July to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta WoodWood - hard. A useful timber[146].

dwatta Astringent Depurative Diuretic Febrifuge Hydrogogue Purgative Stimulant StypticThe stem bark is febrifuge, stimulant and styptic[218, 240]. The bark, flowers and leaves are considered to be hydrogogue and a drastic purgative[240]. A paste of the flowers is applied externally to cuts and wounds[272]. The root is astringent, detoxicant and diuretic[147, 218]. A decoction of the flowers is used in the treatment of colds[218].

nrakta E. Asia - China, Korea. ksacta Open grassy places and on cliffs at low altitudes[11], also on forest edges[147].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[78]. Another report says to sow spring in a greenhouse[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 8cm with a heel, July/August in a frame. Fair to good percentage[78]. Cuttings of mature wood in the winter in a frame[200]. Root cuttings 4cm long in December. High percentage[78].

nwatta Landscape Uses:Border, Container, Massing Pollard, Standard, Specimen, Street tree. Succeeds in most well-drained soils in a sunny sheltered position[184, 200]. Succeeds in a hot dry position. Succeeds in soils low in nutrients[200]. Dislikes very alkaline soils[202]. Dormant plants are hardy to about -10°c if the wood is well ripened[184]. They require very hot and humid summers and preferably the protection of a south facing wall if they are to flower in Britain[182, 260]. Plants are hardy in a very sunny position in southern England but they only flower in consistently warm summers[11]. Plants are much hardier when the wood is thoroughly ripened by the sun[166, 200]. A very ornamental plant[1], there are many named varieties[200]. Flowers are produced in broad panicles on the tips of the current years growth[219]. Any pruning is best carried out in the spring in order to encourage new growth[219]. Young plants grow fairly quickly and will often flower in their first year after planting out[219]. Plants do not transplant well and should be moved with a large rootball[200]. This species is notably resistant to honey fungus[200]. Special Features: Not North American native, Blooms are very showy.

# 8.2.470 Geum pentapetalum

Aleutian avens

7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 0.2 m hkuc hmimhtut cyutli tcuphja7n hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Geum pentapetalum is an evergreen Shrub growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist or wet soil.

dwatta Anodyne Astringent FebrifugeThe whole plant, but especially the root, is anodyne, astringent, febrifuge. It is especially good in the treatment of children with fevers etcl 1781

nrakta E. Asia - Japan, Kamchatka, Aleutian Islands. ksacta Wet slopes and sometimes on sphagnum bogs in high mountains, C. and N. Japan[58]. Stony ground in mountain valleys[178].

propta Seed - sow spring or autumn in a cold frame[200]. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in the summer Division in spring or autumn. This should be done every 3 - 4 years in order to maintain the vigour of the plant[200]. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring.

nwatta Easily grown in any moderately good garden soil that is well-drained[1]. Prefers a soil rich in organic matter[200]. Plants are hardy to about -10°c but in areas with prolonged cold winter temperatures it is best to give the plants a protective mulch of evergreen branches or dry bracken[200]. Cultivated as a medicinal plant in Szechwan, W. china[178]. Hybridizes freely with other members of this genus[200].

## 8.2.471 Daphne gnidium

Flay-Leaved Danhn

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 1.5 m hkuc hmimhtut cyutli kyuctcup hwicli hyisjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Daphne gnidium is an evergreen Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista All parts of the plant are poisonous[76]. Skin contact with the sap can cause dermatitis in some people[200].

dwatta CancerThe plant contains toxic compounds that are being investigated for anti-leukaemia effects[238].

nrakta S. Europe, N. Africa and W. Asia. ksacta Grows with other evergreen shrubs on shallow, stony soils, often on billeides.

propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at 20°c followed by 12 - 14 weeks at 3°c. Germination may still take another 12 months or more at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Root cuttings, December in a greenhouse

nwatta Prefers a well-drained but moisture-retentive slightly acid to slightly alkaline soil[200]. A good sandy loam suits most members of the genus[11]. This species is not very hardy in Britain, tolerating temperatures down to about -5°c, it should succeed outdoors in the milder areas of the country[238]. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible[188]. The flowers, which are produced in terminal clusters, are sweetly scented[245].

# 8.2.472 Oldenlandia diffusa

Snake-Needle Grass

7 tlin 10 cyuc 0 kcak 0 tcan 3 dwat 0.3 m hkuc

leaves of Crotalaria alata, is used in the treatment of

nrakta E. Asia - N. India. ksacta Dry slopes and amongst rocks[146], especially on exposed sunny slopes, 1200 - 2250

propta Seed - cold stratify for 4 weeks at 4°c[138] and surface sow the seed in February/March in a greenhouse[78, 113] (the pre-chilling might not be required for this species). Germination usually takes place within 3 - 4 weeks at 21°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Seedlings are inclined to damp off and so should be watered with care and kept well-ventilated[78]. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Use short side-shoots[78]. Very high percentage[113]. Cuttings of mature wood of the current season's growth, 15 - 20cm long, October/November in a frame[200].

nwatta Requires a sunny position[1, 11]. Succeeds in most well-drained garden soils but it prefers a rich loamy soil[1, 11, 200]. Very tolerant of alkaline soils[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. It resprouts freely from the base if cut back by severe weather[200]. Probably not in cultivation[11], this species is much confused with B. crispa. Benth[158]. A very ornamental plant[1], it hybridizes freely with other members of this genus[200]. An excellent plant for bees and butterflies[30]. Dioecious. Male and female plants must be grown if seed is required.

### 8.2.467 Cortaderia selloana

Pampas Grass

7 tlin 11 cyuc 0 kcak 2 tcan 0 dwat 3 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Cortaderia selloana is an evergreen Perennial growing to 3 m (9ft) by 1.2 m (4ft in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 5 and is not frost tender. It is in leaf all year, in flower from August to October, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required), and is pollinated by Wind. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerates strong winds but not maritime exposure

tcanta Fibre PaperA fibre obtained from the leaves is used for making paper[46, 61, 74, 189]. The leaves are harvested in the autumn, they are cut into usable pieces and soaked for 24 hours in clear water. They are then cooked for 2 hours with lve and then beaten in a blender. The fibre makes a yellow paper[189]. The feathery flower head plumes, when dried, are widely used in flower arrangements and other ornamental displays.

nrakta S. America - temperate areas. Sometimes persists in Britain as a garden throw-out[17]. ksacta Moist sandy soils[187] on river banks and mountains in Chile[139].

propta Seed - surface sow March/April in a greenhouse. The seed usually germinates in 2 - 3 weeks at 15°c. Keep the soil moist. The seed has a short viability [200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in late spring[1]. It can be very difficult to obtain divisions from this plant because they tend to be very large and to be very close to the main clump. We have found it best to use a sharp spade to cut into the main clump and break off the divisions. These are then potted up in light shade in a cold frame and are planted out once they have rooted well and are in active growth.

nwatta Agroforestry Services: Windbreak Industrial Crop: Biomass Management: Hay Minor Global CropLandscape Uses:Container, Massing, Specimen. Succeeds in most soils, preferring a damp well-drained sandy or loamy soil[1]. Inclined to be intolerant of cold clay soils[162]. Succeeds in dry soils. Prefers a sunny sheltered position[1, 162, 200]. Very tolerant of maritime exposure[K]. This species is hardy to about -20°c[187] if the winter is not excessively wet, though it is intolerant of prolonged periods of cold weather. Pampas grass is occasionally cultivated in some areas for its fibre which is used in making paper. Plants grow well as a focal point in a lawn and they also succeed in quite coarse grass[1, 233]. A number of named forms have been selected for their ornamental value[187, 200]. The leaves have sawtoothed edges, it is best to wear gloves when working with the plant[200]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. Dioecious. Male and female plants must be grown if seed is required[200]. The inflorescence on the male plant is rather erect whilst it has wide spreading branches on the female[187]. Special Features: Attracts birds, Attractive foliage, Not North American native, Suitable for cut flowers, Suitable for dried flowers, Attractive flowers or blooms

#### 8.2.468 Buddleia officinalis

7 tlin 10 cvuc 0 kcak 0 tcan 2 dwat 2 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Buddleia officinalis is an evergreen Shrub growing to 2 m (6ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from December to February. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

dwatta Antispasmodic Febrifuge OphthalmicFebrifuge[1] 174, 178]. The flowers and flower buds are antispasmodic, slightly cholagogue and ophthalmic[176]. They have an action similar to vitamin P, reducing the permeability and fragility of the blood vessels of the skin and small intestine[176]. They are used in the treatment of various eye problems[176, 218]. They are also used in the treatment of gonorrhoea, hepatitis and hernia[218]. A decoction of the leaves is used in the treatment of collyrium[218]. Also used in the treatment of gonorrhoea, hepatitis and hernia[218].

nrakta E. Asia - western China. ksacta River vallevs of Szechwan in dry rocky areas to 1000 metres[178]. Cliffs, scrub and waste places at elevations up to 1,000 me-

propta Seed - cold stratify for 4 weeks at 4°c[138] and surface sow the seed in February/March in a greenhouse[78, 113] (the pre-chilling might not be required for this species). Germination usually takes place within 3 - 4 weeks at 21°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Seedlings are inclined to damp off and so should be watered with care and kept well-ventilated[78]. Cuttings of half-ripe wood, July/August in a frame[11, 113]. Use short side-shoots[78]. Very high percentage[113]. Cuttings of mature wood of the current season's growth, 15 - 20cm long, October/November in a frame[200].

nwatta Requires a sunny position[11, 182]. Prefers a rich loamy soil but succeeds in most well-drained soils[1, 11. 2001. Very tolerant of alkaline soils[200]. Requires a site sheltered from the wind because the leaves are easily damaged[260]. Tolerating temperatures down to about -10°c[184], this species is hardy in Cornwall[11, 166] but not in most parts of Britain[1]. It resprouts freely from the base if cut back by severe weather[200]. A very ornamental plant[1], it hybridizes freely with other members of this genus[200]. Plants flower on the current years growth and to UK zone 8. It is in flower from April to May. The species It is hardy to UK zone 8. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb[105, 161]. No more details are given, but the bulb is rather small, usually less than 25mm in diameter[235].

nrakta Southern N. America - Kansas to Texas. ksacta Prairies and grassy slopes, frequently in rocky areas at elevations of 100 - 800 metres[235, 270, 274].

propta Seed - best sown in a cold frame as soon as it is ripe[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in a frame or greenhouse until large enough to go outdoors. Plant out whilst the plants are dormant in the autumn. Division of offsets when the plant is dormant in late summer.

nwatta Requires a very well-drained rich sandy loam and a sunny position[1, 200]. When the bulbs are planted about 15cm deep, they are generally hardy in Britain[1]. Another report says that plants are hardy to -10°c or more if the drainage is perfect. This species is sometimes included in the genus Bessera[1].

# 8.2.402 Heimia myrtifolia

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Heimia myrtifolia is a deciduous Shrub growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to September. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta An intoxicating and euphoric drink is made by crushing the wilted leaves in water and leaving the liquid in a sunny position for three days to ferment[192]. In larger quantities this can induce hallucinations and produces a vision that is typically overcast in yellow[192].

dwatta The leaves are antispasmodic, hallucinogenic and sedative[192]. An infusion serves to stabilize the blood pressure and relieve anxiety[192].

nrakta S. America - Brazil to Uruguay. ksacta Along the sides of streams[192].

propta Seed - we have no information for this species but suggest sowing the seed in spring in a greenhouse. Prick out the seedlings into individual pots once they are large enough to handle. Grow the young plants on for at least their first winter in a greenhouse and plant out in late spring or early summer. Mulch the roots well in the autumn to protect them from the cold. Cuttings of half-ripe wood, July/August in a

nwatta Easily grown in any well-drained soil in full sun[200]. Especially in the colder areas of the country this plant is best grown against a sunny south or south-west facing wall and given a good mulch of bracken in the winter[200]. The rootstock is fairly hardy in most of Britain, whilst the top growth tolerates temperatures down to about -10 to -15°c[200]. If cut back by severe weather the plant usually grows again from the base[200]. Flowers are produced on the current seasons growth[200]. Plants growing outdoors at Kew Botanical Gardens are cut back by the cold each winter but regrow and flower each year[11]. This species is closely related to H. salicifolia, differing mainly in having smaller flowers[11]. Any pruning is best carried out in early spring by removing excess growth at the base of the nlant[2001

# 8.2.403 Bloomeria aurea

Golden Stars, Common goldenstar 7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasilut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bloomeria aurea is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Bulb[161, 257]. No more details are given, but the bulbs of the closely related B. crocea can be eaten raw at any time of the year[K].

nrakta South-western N. America - California. ksacta Dry flats and hillsides, often in heavy soils and especially in foothill woods, to 1500 metres. in California[71].

propta Seed - sow as soon as it is ripe or February/March in a well-drained compost in the greenhouse. Germination usually takes place within 1 - 3 months at 15°c[134]. Sow the seed thinly so that it can be grown on in the pot without disturbance for the first year, but apply an occasional liquid feed to ensure the plants do not become nutrient deficient. Pot up the small bulbs when they are dormant, putting 2 - 3 bulbs in each pot, and grow them on in a cold frame for another 2 years[134] before planting them out in the autumn when they are dormant. Division of flowering size offsets in the autumn. They are freely produced[200]. The larger bulbs can be planted straight out into their permanent positions if required, whilst it is best to pot up the smaller bulbs and grow them on for a year in a cold frame before planting them out in the autumn.

nwatta Requires a well-drained rich sandy loam and a warm position[1, 138]. Likes plenty of moisture when in growth[200], but plants should be kept quite dry from when the foliage dies down until the autumn[138]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. This species is probably no more than a part of B, crocea[200].

## 8.2.404 Zephyranthes atamasca

Atamasco Lily

7 tlin 10 cyuć 1 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Zephyranthes atamasca is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to July, and the seeds ripen from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The bulb contains toxic compounds[62]. Horses are said to get the staggers (a cerebrospinal disease) from eating the leaves and bulbs[207].

kcakta Edible Parts: RootEdible Uses: Bulb - cooked[2, 22, 46, 61]. It is used as an emergency food when better foods are in short supply[61, 161]. The bulb is up to 3cm long[235]. Caution is advised, see the notes above on toxic-

nrakta Southern N. America - Missouri and Virginia to Florida. ksacta Rich, mixed forests, moist clearings, meadows, moist to wet pastures, coastal plains and piedmonts from sea level to 700 metres[270].

propta Seed - sow spring in a greenhouse. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first year of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of offsets after the plant dies down in late spring or early summer. Larger bulbs can be planted out direct into their permanent positions whilst it is best to pot up the smaller bulbs and grow them on in the greenhouse for a year before planting them out.

nwatta Requires a position in full sun when grown outdoors in Britain and a well-drained moisture retentive soil[1, 42, 2001. It strongly dislikes excessive wet, especially in the winter[200]. Plants require a definite dry resting period in late summer, if they receive water at this time they are excited into growth and can then be killed in cold weather [120].

A very ornamental plant[1], it is hardy to about -5°c and can succeed outdoors in the milder areas of Britain[200]. However, because it is in growth during the winter, it is generally best grown in a cold greenhouse or special bulb frame[K]. Bulbs should be planted about 10cm deep[200].

# 8.2.405 Eminium spiculatum

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Eminium spiculatum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Many plants in this family are poisonous raw, due to the presence of calcium oxylate crystals. If eaten raw, this toxin gives you a sensation as if hundreds of tiny needles are sticking into the mouth, tongue etc. However, it is easily destroyed by thoroughly cooking or drying the plant. Although no specific mention has been seen for this plant it is wise to assume that it is noisonous in its raw state.

kcakta Edible Parts: RootEdible Uses: Root - cooked. Some caution is advised, see the notes above on toxicity.

nrakta S. Europe - Mediterranean to W. Asia. ksacta Dry rocky places[200].

propta Seed - best sown in a greenhouse as soon as it is ripe, though the seed can also be sown in early spring. Prick out the young seedlings into individual pots as soon as they are large enough to handle and grow them on in the greenhouse for at least their first winter, planting out in late summer when the plants are dormant[200]. Division in late summer when the olants are dormant[200].

nwatta Requires a deep light fertile perfectly drained soil in a sunny position[200]. Strongly dislikes wet soils, it also need a period of warm dry weather when it is dormant in late summer in order to promote good flowering the following year[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c so long as the soil is well-drained[200]. It is usually best grown in a bulb frame or cold greenhouse, but can succeed outdoors at the base of a south-facing wall and also in a rock garden in dry summer areas. The flowers are malodorous, attracting flies for pollination[200]. The fruit is developed at the base of the flowering stem, usually below ground, breaking the soil surface to disperse the seed[200].

# 8.2.406 Gynandriris sisyrinchium

Spanish Nut

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.2 m hkuc hmimhtut cyutli kyuctcup hwicli jlutnyikfrip hpa7tli prikl-

wisslip hpa7tmwatli xre7t hjonli

drutta Gynandriris sisyrinchium is a PERENNIAL growing to 0.2 m (0ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista Possibly poisonous[65].

kcakta Edible Parts: RootEdible Uses: CondimentThe root is edible raw or cooked and is also used as a spice[2, 105, 177]. Some caution is advised, see the notes above on toxicity.

nrakta Europe - Mediterranean. ksacta Dry places near the coast[50] and up to 2,000 metres[90].

propta Seed - best sown in a cold frame as soon as it is ripe[1]. Stored seed should be sown as soon as possible in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into

their permanent positions in late spring or early summer, after the last expected frosts. Division.

nwatta Easily grown in a stiff limey soil in full sun[42]. Tolerates some shade[79]. Plants need plenty of moisture whilst in growth in winter and spring, but need a dry soil when they die down in the summer[188]. This species is not very hardy in Britain, tolerating temperatures down to about -5°c[200], and in general does not do well in this country[1]. It requires a summer baking to ripen the roots and ensure good flowering in the following year[200]. It should be planted about 10 - 15cm deep[79]. It is probably best grown in a bulb frame[K]. The flowers usually open in the afternoon and are faded by the morning[90].

## 8.2.407 Callicarpa mollis

It prefers moist soil.

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat m hkuc htut cyutli tcup hwicli jlut hpa7tli flatpriklwis hpa7tmwatli

xre7t hjonli drutta Callicarpa mollis is a deciduous Shrub growing to 2.4 m (7ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade.

kcakta Edible Parts: FruitEdible Uses: Fruit[105, 177, 179]. No further details are given.

nrakta E. Asia - Central and S. Japan, Korea. ksacta Rich woods and thickets. In forests from the lowlands to elevations of 500 metres[275].

propta Seed - sow February in a greenhouse[78]. Only just cover the seed[138]. Germination usually takes place within 1 - 3 months at 18°c[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood 10cm long, July/August in a frame. High percentage[78]. Cuttings of mature wood of the current season's growth with a heel[78] taken in early spring[200].

nwatta Requires a sunny position or light dappled shade[1, 200]. Prefers a highly fertile well-drained loamy soil[1, 200]. Plants are only really hardy in the milder parts of Britain and even then they need the protection of a wall[182, 200]. Requires cross-pollination for good fruit production[182]. Plants in this genus are notably resistant to honey fungus[200].

# 8.2.408 Origanum x hybridum

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc hmimhtut cyutli kyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Origanum x hybridum is a PERENNIAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Edible Uses: CondimentThe aromatic foliage is used as a condiment[177].

nrakta W. Asia - Levant. ksacta Not known

propta Seed - sow in a greenhouse in early spring at 10-13°c and only just cover the seed. Germination usually takes place within 2 weeks. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer. This is a hybrid species and will not breed true from seed. Division in March or October. Very easy, larger divisions can be planted out direct into their permanent positions. We have found that it is better to pot up the smaller divisions and grow them on in light shade in a cold frame until they are well established before planting them out in late spring or early summer. Basal

complaints[4]. Some caution is advised, however, because like all essential oils, it can have a deleterious effect on the body in larger doses[4]. An oleo-resin is exuded from the tree[238]. It can also be obtained from the tree by making incisions in the trunk[4, 152]. This resin contains tannin and is powerfully astringent, it is used internally in the treatment of diarrhoea and bladder inflammation[4, 152, 238], externally it is applied to cuts etc[4, 152]. Treats throat ailments[156].

nrakta Australia - Tasmania, Victoria, southern New South Wales ksacta Often a shelf species in hilly areas, growing on southern and eastern aspects where there is air drainage to lower frost hollows, frequently dominant in areas suited to it; at elevations usually from 300 - 1,500 metres, but to sea level in Tasmania [1658].

propta Seed - surface sow late winter/early spring in a sunny position in a greenhouse[11, 78, 134]. Species that come from high altitudes appreciate 6 - 8 weeks cold stratification at 2c[200]. Pot up the seedlings into individual pots as soon as the second set of seed leaves has developed, if left longer than this they might not move well. Plant out into their permanent positions in early summer and give them some protection from the cold in their first winter. The seed can also be sown in early summer, the young trees being planted in their final positions in late spring of the following year. The seed has a long viability[200].

nwatta Eucalyptus delegatensis is native to the temper-

ate climate of southeastern Australia, where it is found at elevations up to 1,500 metres. Summers are warm and can be dry, with most rainfall occurring in the winter months and a dry season that can be up to 3 months long. Mean annual rainfall is within the range 2.500 - 3.700mm, sometimes as snow; mean maximum of the hottest month is 21c; mean minimum of the coldest month is 0c, and there are generally around 70 - 100 frosts a year[1658]. When dormant, the plant can survive temperatures down to about -12c, but young growth is more tender and can be severely damaged at -1c[418]. Requires a sunny position, succeeding in a wide range of well-drained soils of high to moderate fertility[418]. The soils of the better forests in which it grows are moist but well-drained loams, especially those derived from granites or dolerites, but the mother rock may be a variety of sedimentary deposits in some places[1658]. Prefers a pH in the range 5.5 - 6.5, tolerating 5 - 7[418]. A quick-growing tree that is easy to regenerate[1658]. It responds well to coppicing[1212]. Eucalyptus delegatensis occurs at a higher elevation than any other important timber species in Australia. The natural occurrences of the species are likely to have snow on the ground for several weeks each year 1658 ]. Annual wood production potential is 10 - 25 cubic metres per hectare[418]. Eucalyptus species have not adopted a deciduous habit and continue to grow until it is too cold for them to do so. This makes them more susceptible to damage from sudden cold snaps. If temperature fluctuations are more gradual, as in a woodland for example, the plants have the opportunity to stop growing and become dormant, thus making them more cold resistant. A deep mulch around the roots to prevent the soil from freezing also helps the trees to survive cold conditions[200]. Many members of this genus are remarkably adaptable however, and there can be a dramatic increase in the hardiness of subsequent generations from the seed of survivors growing in temperate zones[200]. The tree has good prospects for planting in cool areas with a fairly high winter rainfall. It is one of the eucalypts resistant to frosts at least as severe as 9c at the time of planting[1658 ]. It has beens introduced into South Africa in Zones E and G on a relatively small scale and showed good height and diameter growth, but did not become a preferred species. Several countries have good specimens but the main commercial plantations are in New Zealand. In New Zealand it is planted both in containers and as bare-rooted planting stock. With adequate root-pruning good seedlings are prepared and planted either by hand or by machine The trees grow vigorously but the leading shoot is attacked each autumn by the fungus Mycosphaerella nubilosa, which results in multiple leaders. One of these becomes the main stem early in the next growing season, but successive attacks of the fungus cause a series of large branches to develop on the trunk. This is not of great significance if the crop is being grown for pulpwood, but is more serious in the case of sawtimber[1658].

# 8.2.465 Tagetes micrantha

Licorice marigold

7 tlin 9 cyuc 0 kcak 3 tcan 1 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis

hpa7tmwatli xre7t hjonli

drutta Tagetes micrantha is a ANNUAL growing to 0.3 m (1ft). See above for USDA hardiness. It is hardy to UK zone 7 and is frost tender. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista We have no information on this species, though other members of the genus have an irritant sap that can cause dermatitis in sensitive people[238].

tcanta CompanionMany members of this genus are widely used in companion planting schemes[238]. Secretions from the roots of growing plants have an insecticidal effect on the soil, effective against nematodes and to some extent against keeled slugs. These secretions are produced about 3 - 4 months after sowing[200]. These root secretions also have a herbicidal effect, inhibiting the growth of certain plants growing nearby. It has been found effective against perennial weeds such as Ranunculus ficaria (Celandine), Aegopodium podagraria Ground elder). Glechoma hederacea (Ground ivy), Agropyron repens (Couch grass) and Convolvulus arvensis (Field bindweed)[200, 238]. An essential oil distilled from the leaves and flowering stems, harvested when the plant is forming seeds, is used as an insect repellent [46, 61]. It is also used in perfumery[238]. Dried plants can be hung indoors as an insect repellent[238]. Dynamic accumu-

dwatta The plant is used as a remedy for stomach complaints, colds and fevers[257].

nrakta Southern N. America - Mexico. An occasional casual in Britain[17]. ksacta Disturbed sites, in open woodlands with scattered pines and junipers. Low areas and where puddles persist along the road.

propta Seed - sow March in a greenhouse. Only just cover the seed. Germination usually takes place within 2 weeks. When they are large enough to handle, prick the seedlings out into individual pots and plant them out after the last expected frosts.

nwatta Requires a well-drained moderately fertile soil in a sunny position[200]. Plants are not very resistant to frosts and need to be grown as half hardy annuals. Removing dead flowers before the seed is formed will extend the flowering season[188]. Most members of this genus are very good companion plants, see 'Other Uses' below for more details[238]. Plants are prone to slugs, snails and botrytis[188].

#### 8.2.466 Buddleia paniculata

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 6 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli nyanhjen hjonli

drutta Buddleia paniculată is a deciduous Shrub growing to 6 m (19ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in July, and the seeds ripen from September to October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees, Lepidoptera (Moths and Butterflies). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. It can tolerate atmospheric pollution.

tcanta Fuel Pioneer Soil stabilization WoodPlants are fairly fast growing and have an extensive root system, they are useful as pioneer species for restocking bare hillsides and preventing soil erosion on the slopes[158]. Wood - moderately hard, close grained. Used only as a fuel[146, 158].

dwatta Astringent Dysentery FebrifugeA decoction of the leaves is used in the treatment of diarrhea and dysentery[272], A decoction of the leaves, combined with the

# 8.2.462 Ligustrum sinense

Chinese Privet

7 tlin 10 cvuc 0 kcak 0 tcan 1 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ligustrum sinense is an evergreen Shrub growing to 3 m (9ft 10in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 3. It is in leaf all year, in flower in July, and the seeds ripen in October. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no reports of toxicity have been seen for this species, at least one member of this genus is recorded as being mildly toxic and it is quite possible that other members of the genus also contain toxins[65].

tcanta Hedge HedgeMuch cultivated as a hedge and screen plant in N. America[227].

dwatta FebrifugeThe bark is used as an antipyretic[266]. nrakta E. Asia - China, Japan. ksacta Thin woods and thickets in lowland and hills all over Japan[58]. Mixed forests, valleys, along streams, thickets, woods, ravines at elevations of 200 - 2600 metres[266].

propta The seed does not require any pre-treatment and can be sown in the spring in a cold frame[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5 - 10cm with a heel, July/August in a frame. Very easy[78]. Cuttings of mature wood. 20 - 30cm in a sheltered outdoor bed in November/December. High percentage[78].

nwatta Landscape Uses:Border, Hedge, Standard, Specimen. A very tolerant and easily grown plant, it succeeds in any soil that is not impoverished or water-logged[11, 182]. Grows well in heavy clay soils. This species has become a problematic invader of native habitats in N. America, becoming the dominant understorev shrub in some areas [274]. This species is notably susceptible to honey fungus[200]. Special Features: Attractive foliage, Not North American native, Invasive, Naturalizing, Attracts butterflies, Attractive flowers or blooms.

# 8.2.463 Clerodendrum bungei

Glory Flower, Rose glorybower, Cashmere Bouquet, Mexican Hydrangea, Glory Bower

7 tlin 9 cvuc 0 kcak 0 tcan 1 dwat 2 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Clerodendrum bungei is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in flower from August to September, and the seeds ripen from September to November. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Anodyne Anthelmintic Antiinflammatory CarminativeA decoction of the leaves is applied externally as an anodyne, anthelmintic, anti-inflammatory, carminative[147, 2181

nrakta E. Asia - China to N. India. ksacta Waste places, hillsides and damp shady roadsides to 2300 metres[147]. Mixed forests on mountain slopes and along the sides of roads, below 2500 metres[266].

propta Seed - best sown as soon as possible in a greenhouse. Germination can be erratic but usually takes place within 20 - 60 days at 20°c[164]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out in late spring or early summer after the last expected frosts. Root cuttings, 6 - 8cm long, December in a greenhouse. High percentage [78]. Division of suckers in the

dormant season. Very easy, they can be planted out direct into their permanent positions if required.

nwatta Landscape Uses: Arbor, Container, Specimen. Succeeds in a sunny position in ordinary garden soil[1, 200] but prefers a fertile humus-rich well-drained soil[164, 200]. The soil must not be allowed to dry out in the growing season[1]. Requires a position sheltered from cold drying winds[1, 200]. Plants are hardy to about -10°c[184], they can be cut to the ground in severe winters but usually resprout from the base, especially if they have been well mulched, they will then flower in late summer[11, 182, 200]. Plants succeed in an open position at Wisley in Surrey[11]. Spreads rapidly by suckers[11]. Flowers are produced on the current seasons growth[200]. They have a delicious scent[245]. The leaves are foetid when crushed[182]. Special Features:Attractive foliage, Fragrant foliage, Not North American native, Fragrant flowers.

# 8.2.464 Eucalyptus delegatensis

7 tlin 11 cvuc 0 kcak 3 tcan 3 dwat 40 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Eucalyptus delegatensis is an evergreen Tree growing to 40 m (131ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. The flowers are pollinated by Bees, Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista Citronellal, an essential oil found in most Eucalyptus species is reported to be mutagenic when used in isolation[269]. In large doses, oil of eucalyptus, like so many essential oils has caused fatalities from intestinal irritation[269]. Death is reported from ingestion of 4 - 24 ml of essential oils, but recoveries are also reported for the same amount[269]. Symptoms include gastroenteric burning and irritation, nausea, vomiting, diarrhoea, oxygen deficiency, weakness, dizziness, stupor, difficult respiration, delirium, paralysis, convulsions, and death, usually due to respiratory failure[269].

tcanta An essential oil is obtained from the leaves. Total quantity of the oil, and its composition, can vary widely from plant to plant, but we have reports that the fresh leaves contain around 1.8 - 3.9% (2.5 - 5.6% dry weight) essential oil. The main components include phellandrene, cymene, pperitone, methyl cinnamate and eudesmol[1659]. The heartwood is pale brown, straw-coloured or pinkish; the 30mm thick band of sapwood is almost white. The wood is opentextured, straight-grained, with conspicuous growth rings. It bends fairly well, is easily worked and polishes well. An excellent timber, it is widely in construction, for purposes such as building framing, flooring, plywood and veneers, furniture, panelling, turnery, handles and pulp for hardboard and paper[1097, 1658]. Eucalypts are culturally important to the Indigenous Australians for a great variety of uses and meanings (Neyland, M. 2010. Eucalyptus delegatensis

dwatta Eucalyptus leaves are a traditional Aboriginal herbal remedy. The essential oil found in the leaves is a powerful antiseptic and is used all over the world for relieving coughs and colds, sore throats and other infections[254]. The essential oil is a common ingredient in many over-thecounter cold remedies[254]. The plant is an aromatic, astringent, tonic herb that sticks to the teeth and turns the saliva red[238]. The report says that the leaves, essential oil and oleo-resin are used[238], but does not specify which properties apply to the different parts of the plant[K]. The leaves and the oil will have very similar properties, the oil being much stronger in its effect since it is distilled from the leaves[K]. Detailed below is how the oleo-resin and oil are commonly used in other species [K]. The essential oil obtained from various species of eucalyptus is a very powerful antiseptic, especially when it is old, because ozone is formed in it on exposure to air. It has a decided disinfectant action, destroying the lower forms of life[4]. The oil can be used externally, applied to cuts, skin infections etc, it can also be inhaled for treating blocked nasal passages, it can be gargled for sore throat and can also be taken internally for a wide range of vest the shoots with plenty of underground stem when they are about 8 - 10cm above the ground. Pot them up into individual pots and keep them in light shade in a cold frame or greenhouse until they are rooting well. Plant them out in the summer.

nwatta Requires a rather dry, warm, well-drained soil in full sun, but is not fussy as to soil type, thriving on chalk[1, 271. Prefers slightly alkaline conditions[200]. Established plants are drought tolerant[190]. This species is not very hardy outdoors in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. A hybrid species, O. dictamnus x O. sipyleum[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 8.2.409 Phlomis lychnitis

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Phlomis lychnitis is a deciduous Shrub growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist

kcakta Edible Parts: Edible Uses: CondimentThe plant is sometimes used to adulterate sage, Salvia officinale 177, 1831.

nrakta S.W. Europe. ksacta Rocky places, garigue and open woods, mainly on calcareous soils[89].

propta Seed - sow spring in a greenhouse and only just cover the seed. Germinates guickly. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring or autumn[200].

nwatta Requires a well-drained dry soil in full sun[187] with shelter from cold winds[200]. Plants are hardy to about -10°c[187]. The plant spreads by means of underground suckers[187]. Plants in this genus are notably resistant to honey fungus[200].

#### 8.2.410 Kinugasa japonica

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Kinugasa japonica is a PERENNIAL growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: FruitEdible Uses: Fruit[200]. No more details are given.

nrakta E. Asia - Japan. ksacta Humus-rich soils in woodlands, N. Japan [58, 200].

propta Seed - best sown in a shaded cold frame as soon as it is ripe[134, 200]. Stored seed should be sown in late winter or early spring. Seed usually germinates within 1 -3 months at 15°c. Another report says that seeds produce a root after the first cold stratification but no shoot is produced until after a second winter[138]. The seedlings are prone to damp off and must therefore be given plenty of fresh air[138]. The young plants need to be overwintered in a cold frame for the first year and can then be planted out in late spring. It is very important that the pots become neither too dry nor too wet[138]. Division with care when the plants die down after flowering[200].

nwatta Prefers a deep well-drained woodland or humusrich soil in a somewhat shady position that remains moist

cuttings of young barren shoots in June. Very easy. Har- in the summer[1, 42]. Prefers a neutral to slightly acid soil[200]. Grows well in open woodland[1]. Succeeds in a sunny position if the soil does not dry out[42]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Any transplanting is best done whilst the plants are in flower[200]. Plants can flower in two years from seed[138].

## 8.2.411 Bromus iaponicus

Japanese Chess, Field brome

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.8 m hkuc hmimhtut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bromus japonicus is a ANNUAL/BIENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

kcakta Edible Parts: Leaves SeedEdible Uses: Leaves[177]. No more details. Seed[177, 179]. No more details are given, but the seed is very small and fiddly to utilize[K]

nrakta S. Europe - Mediterranean, to E. Asia. Introduced and naturalized in most areas of N. America. ksacta Fields and waste places, British Columbia, Alberta and Quebec[204]

propta Seed - sow spring or autumn in situ and only just cover. Germination should take place within 2 weeks. If seed is in short supply it can be surface sown in a cold frame in early spring. When large enough to handle, prick out the seedlings into individual pots and plant them out in early

nwatta Succeeds in a sunny position in most welldrained soils[138, 200].

### 8.2.412 Gladiolus cruentus

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.9 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gladiolus cruentus is a CORM growing to 0.9 m (3ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

kcakta Edible Parts: FlowersEdible Uses: Flowers raw or cooked. Added to salads or used as a boiled vegetable[183].

nrakta S. Africa - Drakensburg Mountains. ksacta Not known

propta Seed - sow early spring in a greenhouse at 15°c[200]. It usually germinates freely[1]. The seed can also be sown as soon as it is ripe in the autumn in a warm greenhouse[200]. Sow the seed thinly so that the seedlings can be grown on in the pot without disturbance for their first year. giving them an occasional liquid feed to ensure they do not become nutrient deficient. Pot up the small bulbs when they are dormant in the autumn, placing about 2 - 3 bulbs in each pot. Grow them on for another year or two in the greenhouse and then plant them out in late spring. Division. Dig up the corms in October, dry them in well ventilated conditions at about 20°c and then store them in a cool but frostfree place over the winter, planting them out about 10cm deep in April[1, 200]. Cormlets harvested when digging up the corms in the autumn can be stored in a similar manner to the corms[200]. Larger cormlets can be planted out in spring, smaller ones may be best grown on for a year in the greenhouse.

nwatta Prefers a sunny sheltered position in a light sandy neutral to slightly acid soil with a pH between 6.5 and 7[1, 200]. Requires a stony gritty loam. This species is not

atures down to between -5 and -10°c[200]. This species is immune to the predations of rabbits[233]. one of the parents of the cultivated garden gladiolas[200].

# 8.2.413 Cynoglossum grande

Pacific Hound's Tongue

7 tlin 10 cyuc 1 kcak 0 tcan 1 dwat 0.8 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Cynoglossum grande is a PERENNIAL growing to 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from April to May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

kcakta Edible Parts: RootEdible Uses: Root cooked[105, 161, 257].

dwatta Poultice Stomachic VDThe grated root has been used as a dressing on inflamed burns and scalds[257]. The root has been used in the treatment of stomach aches and venereal diseases[257].

nrakta Western N. America - British Columbia to California. ksacta Woods[60].

propta Seed - sow autumn, late winter or spring in a greenhouse. The seed usually germinates within 1 - 3 weeks at 20°c. Plant out in mid spring or in the autumn[164]. The seed is best sown in situ according to another report[1].

nwatta Prefers a deep fertile well-drained but moisture retentive soil[200]. Succeeds in well-drained ordinary garden soil[1]. Tolerates light dappled shade[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200].

#### 8.2.414 Sedum sediforme

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasilutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Sedum sediforme is an evergreen Perennial growing to 0.5 m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista Although not poisonous, if large quantities of this plant are eaten it can cause a stomach upset[62, 85].

kcakta Edible Parts: LeavesEdible Uses: Leaves -

nrakta Europe - Mediterranean. ksacta Rocks, walls and stony places, largely on calcareous soils and clay[89].

propta Seed - surface sow in spring in well-drained soil in a sunny position in a greenhouse. Do not allow the soil to dry out. Prick out the seedlings into individual pots when they are large enough to handle. If sufficient growth is made, it is possible to plant them out during the summer, otherwise keep them in a cold-frame or greenhouse for their first winter and plant them out in early summer of the following year[K]. Division is very easy and can be carried out at almost any time in the growing season, though is probably best done in spring or early summer. Larger divisions can be planted out direct into their permanent positions. We have found it best to pot up the smaller divisions and grow them on in a lightly shaded position in a cold frame, planting them out once they are well established in the summer.

nwatta Succeeds in most soils[188] but prefers a fertile well-drained soil in a sunny position[200]. Established plants are very drought tolerant[200]. They grow well in dry soils and can be grown on a wall[200]. This species is not hardy in the colder areas of Britain, it tolerates temperatures down to between -5 and -10°c[200]. A polymorphic plant, it is very variable in size[1]. All members of this genus are said to have edible leaves, though those species, such as this one, that have yellow flowers can cause stomach upsets if they

hardy in the colder areas of the country, it tolerates temperare eaten in quantity[62, 85]. Plants in this genus seem to be

#### 8.2.415 Bloomeria crocea

be eaten raw at any time of the year[257].

Golden Stars, Common goldenstar

hpa7tmwatli xre7t hjonli

7 tlin 10 cyuc 1 kcak 0 tcan 0 dwat 0.3 m hkuc htut cyutli tcup hwicli hrasjlut hpa7tli flatpriklwis

drutta Bloomeria crocea is a BULB growing to 0.3 m (1ft) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers

well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers kcakta Edible Parts: RootEdible Uses: Bulb[177]. It can

tcanta The bulbs can be rubbed on metate into an adhesive and spread on seed gathering baskets to close the interstices[257]. No explanation is given of what metate is. There is a bamboo plant with this common name, but it is not native

nrakta South-western N. America - California. ksacta Dry flats, hillsides, often in heavy soil, chaparral, coastal sage scrub, valley grasslands, oak woodlands from sea level to 1700 metres[71, 270].

propta Seed - sow as soon as it is ripe or February/March in a well-drained compost in the greenhouse. Germination usually takes place within 1 - 3 months at 15°c[134]. Sow the seed thinly so that it can be grown on in the pot without disturbance for the first year, but apply an occasional liquid feed to ensure the plants do not become nutrient deficient. Pot up the small bulbs when they are dormant, putting 2 - 3 bulbs in each pot, and grow them on in a cold frame for another 2 years[134] before planting them out in the autumn when they are dormant. Division of flowering size offsets in the autumn. They are freely produced [200]. The larger bulbs can be planted straight out into their permanent positions if required, whilst it is best to pot up the smaller bulbs and grow them on for a year in a cold frame before planting them out in the autumn.

nwatta Requires a well-drained rich sandy loam and a warm position[1, 138]. Likes plenty of moisture when in growth[200], but plants should be kept quite dry from when the foliage dies down until the autumn[138]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. This genus is closely related to Brodiaea and Nothoscordum species[1,

#### 8.2.416 Aristolochia tomentosa

Dutchman's Pipe, Woolly dutchman's pipe 7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 10 m hkuc hmimhtut cyutli kyuctcup hwicli hrasilutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Aristolochia tomentosa is a PERENNIAL growing to 10 m (32ft) by 1 m (3ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil

pcista We have no specific details for this species but most members of this genus have poisonous roots and stems[179]. The plant contains aristolochic acid, this has received rather mixed reports on its toxicity. According to one report aristolochic acid stimulates white blood cell activity and speeds the healing of wounds, but is also carcinogenic and damaging to the kidneys[254]. Another report says that it is an active antitumour agent but is too toxic for clinical use[218]. Another report says that aristolochic acid has anti-cancer properties and can be used in conjunction with chemotherapy and radiotherapy and that it also increases the

root is alterative, analgesic, anodyne, antibacterial, antiinflammatory, antiseptic, antispasmodic, astringent, carminative, diuretic, emmenagogue, expectorant, febrifuge, hypotensive, nervine and tonic[218, 238]. The most important ingredient medicinally in the root is paeoniflorin, which has been shown to have a strong antispasmodic effect on mammalian intestines, it also reduces blood pressure, reduces body temperature caused by fever and protects against stress ulcers[250]. It is taken internally in the treatment of menstrual disorders, injuries, high blood pressure, premenstrual tension and liver disorders[238]. It should only be used under the supervision of a qualified practitioner and should not be prescribed for pregnant women[238]. The roots are harvested in the autumn from cultivated plants that are 4 - 5 years old and are boiled before being dried for later use[238]. The roots of wild plants are harvested in the spring or (preferably) in the autumn and are sun-dried for later use[238]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta E. Asia - N.W. China. ksacta Sub-alpine meadows and scrub, also on mountain steppe, 2500 - 3500 me-

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250].

nwatta An easily grown plant, it does best in a deep rich soil, preferably neutral or slightly alkaline[1], doing guite well in sun or light shade[1, 200], and seeming to prefer part shade[233]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. Plants are hardy to about -25°c[187]. A very ornamental[1] and longlived plant, lasting 50 years or more in the garden[200]. This species is closely related to P. anomala, differing mainly in having several flowers to a stem[250]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes[54]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1].

#### 8.2.460 Adenostoma fasciculatum

Greasewood

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 3 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Adenostoma fasciculatum is an evergreen Shrub growing to 3 m (9ft 10in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers welldrained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It

cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta Adhesive Basketry Disinfectant Fuel Lighting Soil stabilizationThe wood has been used in basketry[257]. Agum from the plant has been used as a glue[257]. Plants have an extensive spreading root system that helps to bind the soil together. They are planted on slopes and other fragile soils for the prevention of soil erosion[181]. Large roots burn well and have been used for firewood[257]. Branches have been tied together then burnt for use as a torch[257].

dwatta Antirheumatic DisinfectantA decoction of the leaves and branches has been applied externally in the treatment of rheumatism and as a wash for infected, sore or swollen parts of the body[257].

nrakta South-western N. America - California to Mexico. ksacta Poor depleted soils and dry hot slopes in the Chaparrel in Mexico[181]. Dense thickets among the coastal hills of California[200].

propta Seed - we have no information for this species but suggest sowing the seed in a greenhouse in early spring. When large enough to handle, prick the seedlings out into individual pots and grow the plants on for at least their first winter in a greenhouse or cold frame, planting them out in late spring or early summer, after the last expected frosts. Cuttings could be tried in August of half-ripe wood, preferably with a heel, in a frame. Layering.

nwatta Requires a sheltered sunny position in a welldrained soil[182, 200] and protection from cold winds[200]. Plants are not very hardy in Britain and do not withstand exposure to prolonged winter frosts though they succeed outdoors in the milder areas of the country[182, 200]. In colder areas they are best grown against a south or south-west facing wall[200]. The leaves are resinous and catch fire easily[181]. They have a pleasant aroma[200].

## 8.2.461 Nicotiana rustica

Wild Tobacco, Aztec tobacco

7 tlin 10 cvuc 0 kcak 3 tcan 2 dwat 1.5 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Nicotiana rustica is a ANNUAL growing to 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Lepidoptera (Moths and Butterflies). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista All parts of the plant are poisonous[200].

tcanta InsecticideAll parts of the plant contain nicotine. this has been extracted and used as an insecticide. The dried leaves can also be used, they remain effective for 6 months after drying[169]. The leaves have also been dried and then chewed as a stimulant or made into snuff for sniffing, or smoked. This species is more potent than N. tabacum (the species normally cultivated for cigarettes). Dynamic accu-

dwatta Antispasmodic Emetic Narcotic SedativeAll parts of the plant contain nicotine which is a strong narcotic[192]. The leaves are antispasmodic, cathartic, emetic, narcotic and sedative[240, 257]. They are used externally as a poultice and a wash in the treatment of rheumatic swelling. skin diseases and scorpion stings[240].

nrakta S. America - Ecuador to Bolivia, ksacta The original habitat is obscure. Plants are naturalized in Eastern N. America where they grow in waste places, open areas

propta Seed - surface sow in a warm greenhouse about 10 weeks before the last expected spring frosts. The seed usually germinates in 10 - 20 days at 20°c. Keep the soil moist and pot up as soon as the plants are big enough to handle, planting them out after the last expected frosts.

nwatta Prefers a well-drained deep rich moist soil in a sunny position[1, 200]. This plant was formerly cultivated for its use as an insecticide but it has now been largely replaced by N. tabacum[46, 50, 200]. Plants require more than 14 hours daylight per day in order to induce flowering[169].

purgative[240]. They have proved useful in the treatment of rheumatism and syphilis[240]. The bark is febrifuge[240].

nrakta E. Asia - Himalayas from Afghanistan to C. Nepal. ksacta Steep shady rocky ravines, often gregarious, 1800 - 2700 metres[51, 184].

propta Seed - stratification is not necessary but can lead to more regular germination[113]. The seed is best sown in a cold frame as soon as it is ripe[138]. Sow stored seed as early in the year as possible in a cold frame. It usually germinates in 1 - 3 months at 15°c but stored seed can take longer[138]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter, planting them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of short side shoots with a heel, September in a frame [200]. Difficult[182, 200]. Nodal cuttings in spring in a frame. Difficult[200].

nwatta Succeeds in almost any soil that is well-drained[11, 200]. Tolerates light shade and chalky soils[1, 200]. Tolerates a pH range from 5.5 to 7.4[200]. This species is perfectly hardy in much of Britain[11], tolerating temperatures down to about -10°c[184], but it is very slow growing[182]. The foliage is pungently scented, especially when wet[245].

# 8.2.457 Ilex pubescens

 $7 ext{ tlin } 10 ext{ cyuc } 0 ext{ kcak } 0 ext{ tcan } 2 ext{ dwat } 3.5 ext{ m hkuc}$ hmimhtut cyutli tcup hwicli hrasjlutnyik hpa $7 ext{tlin } 10 ext{ tlin } 10 ext{ m}$ hpa $7 ext{tlin } 10 ext{ m}$ hjonli

drutta llex pubescens is an evergreen Shrub growing to 3.5 m (11ft 6in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May, and the seeds ripen from October to November. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

dwatta Antibacterial Antiinflammatory Antitussive Cardiac Expectorant Febrifuge Hypotensive VasodilatorThe root is anti-inflammatory, antitussive, depurative, expectorant and febrifuge[176]. It causes a strong and persistent dilation of the blood vessels, increasing the blood flow to the coronary artery, lowering blood pressure and reducing oxygen consumption of the cardiac muscles[176]. It is used in the treatment of Buerger's disease, angina pectoris, acute myocardial infarction, tonsillitis, acute bronchitis with cough and sputum, hypertension[176]. It has an antibacterial action against both gram positive and negative bacilli[176]. The plant is vasodilator, hypotensive. It has been used successfully in the treatment of severe chest pains due to coronary problems[218].

nrakta E. Asia - S. China. ksacta Evergreen broad-leaf forests, forest margins, shrubby areas, streamsides and road-sides at elevations of 100 - 1000 metres[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a

shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years.

nwatta Succeeds in most soils so long as they are not water-logged[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Another report says that the plant only tolerates temperatures down to about -3°c[260]. Resents root disturbance, especially as the plants get older III. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

## 8.2.458 Datisca cannabina

Acalbir, Akalbir

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 1.8 m hkuc

htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta Datisca cannabina is a PERENNIAL growing to 1.8 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in September, and the seeds ripen in October. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

tcanta DyeA yellow dye is obtained from the leaves, root and stems[46, 61, 145].

dwatta Bitter Diuretic Febrifuge Odontalgic Purgative SedativeThe leaves and flowering stems are bitter, diuretic, febrifuge and purgative[145, 240]. The root is used as a sedative in the treatment of rheumatism[240]. It is also applied to carious teeth[240].

nrakta S. Europe (Crete), to W. Asia. ksacta Banks of streams in rich alluvial soils[50, 200].

propta Seed - sow spring in a greenhouse, only just covering the seed. Germination usually takes place within 1 - 3 weeks at 18°c[164]. When large enough to handle, prick the seedlings out into individual pots and plant them out in the summer. Division in the spring. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the spring

nwatta Requires a good deep soil and a sunny position[1, 200]. Plants can be grown in quite coarse grass, which can be cut annually in the autumn[233]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Give the roots protection from winter frosts by mulching them[200]. At one time this plant was commonly cultivated as a dye plant[46, 61], but with the advent of chemical dyes it has fallen into disuse. Dioecious. Male and female plants must be grown if seed is required.

#### 8.2.459 Paeonia veitchii

7 tlin 10 cyuc 0 kcak 0 tcan 3 dwat 0.8 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Paeonía veitchií is a PERENNIAL growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Analgesic Antibacterial Antiinflammatory Antispasmodic Diuretic Febrifuge SedativeThe whole root is used in Chinese medicine, its name is Chi Shao Yoa[250]. The cellular immunity and phagocytosis function of the phagocytic cells[176].

dwatta Antidote Bitter Diaphoretic Expectorant Febrifuge Odontalgic Stimulant TonicThis species has medicinal activity that is similar to but weaker than A. serpentaria[222], - these activities are listed below[K]. The Virginia snakeroot is attracting increasing interest for its medicinal virtues and as a result is becoming uncommon in the wild. It merits consideration for cultivation in forest areas[222]. It is used in a number of proprietary medicines for treating skin, circulatory and kidney disorders[238]. The plant contains aristolochic acid which, whilst stimulating white blood cell activity and speeding the healing of wounds, is also carcinogenic and damaging to the kidneys[254]. The root is harvested in the autumn and dried for later use[238]. The root is antidote, anti-inflammatory, bitter tonic, diaphoretic, diuretic and stimulant[1, 2, 4, 21, 46, 200]. Traditionally it was chewed in minute doses or used as a weak tea to promote sweating, stimulate the appetite and promote expectoration[4, 222]. The native North Americans considered it to have analgesic properties and used an infusion internally to treat rheumatism, pain - but especially sharp pains in the breast, and as a wash for headaches [257]. This plant should be used with caution, it is irritating in large doses and can cause nausea, griping pains in the bowels etc[4, 21, 222]. It should only be used internally under the supervision of a qualified practitioner[238]. The bruised root is placed in hollow teeth for treating toothache[207]. An extract of the root can be drunk to relieve stomach pains[207]. The boiled root, or a decoction of the whole plant, can be used to treat fevers[213]. The chewed root or crushed leaves was applied to snakebites[207, 213]. This species was the most popular snakebite remedy in N. America[213]. It has also been applied externally to slow-healing wounds and in the treatment of pleurisy[238].

nrakta South-eastern N. America - North Carolina too Florida, west to Texas, Kansas and Illinois. ksacta Moist woods[200] along rich river banks[222]. Thickets and wods, in sandy and silty soils[274].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Pre-soak stored seed for 48 hours in hand-hot water and surface sow in a greenhouse[134]. Germination usually takes place within 1 - 3 months at 20°c[134]. Stored seed germinates better if it is given 3 months cold stratification at 5°c[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer after the last expected frosts. Division in autumn[200]. Root cuttings in winter[200].

nwatta Prefers a well-drained loamy soil, rich in organic matter, in sun or semi-shade[1, 200], but succeeds in ordinary garden soil[134]. Plants are hardy to at least-10°c[200]. A fast-growing climbing plant, attaching itself by means of twining around other plants, it has been recommended for covering pergolas[200]. Most species in this genus have malodrous flowers that are pollinated by flies[200].

#### 8.2.417 Paeonia mascula

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat m hkuc hmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli fvifxre7t hionli

drutta Paeonia mascula is a PERENNIAL growing to 1 m (3ft 3in) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower in May. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

dwatta Antispasmodic Antitussive TonicThe root is antispasmodic and tonic[4, 46, 61]. A tea made from the dried crushed petals of various peony species has been used as a cough remedy, and as a treatment for haemorrhoids and varicose veins[250].

nrakta N.W. Africa. Naturalized in Britain. ksacta Bushy places in meadows and hills[89]. Oak, pine and beech forest, often amongst bracken, or on rocky limestone slopes that are north-facing[187].

propta Seed - best sown as soon as it is ripe in a cold frame[250]. When sown fresh, the seed produces a root about 6 weeks after sowing with shoots formed in the spring[200]. Stored seed is much slower, it should be sown as soon as possible in a cold frame but may take 18 months or more to germinate[200]. The roots are very sensitive to disturbance, so many growers allow the seedlings to remain in their pots for 2 growing seasons before potting them up. This allows a better root system to develop that is more resilient to disturbance[250]. If following this practice, make sure you sow the seed thinly, and give regular liquid feeds in the growing season to ensure the plants are well fed. We usually prick out the seedlings into individual pots as soon as they are large enough to handle, and then grow them on in a cold frame for at least two growing seasons before planting them out when they are in growth in the spring[K]. Division with great care in spring or autumn. Each portion must have a leaf bud. If the lifted root is stood in shade for several hours it becomes less brittle and easier to divide[200]. Divisions that have several buds will usually flower in the second year, but those that only have one or two buds will take a number of years before they have grown sufficiently to flower[250]. nwatta Requires a deep rich soil, preferably neutral or

slightly alkaline[1], doing quite well in sun or light shade[1, 200]. Plants are tolerant of a wide range of soil conditions, but will not survive if the soil becomes waterlogged or is too dry[250]. This species is lime tolerant[200]. Plants grown on sandy soils tend to produce more leaves and less flowers, whilst those growing on clay take longer to become established but produce better blooms[250]. The sub-species P. mascula mascula succeeds in dry soils, its roots are subject to slug damage in moist soils[187]. The sub-species P. mascula hellenica. Tzanoudakis. comes into growth early in the year and may require protection from late frosts[187]. Plants are generally hardy to about -15°c[187], though some forms, especially the sub-species P. mascula hellenica, might need frost protection[250]. A very ornamental[1] and longlived plant, living for 50 years or more in the garden[200]. A polymorphic species, there are at least 5 recognised subspecies[200, 250]. This species was cultivated as a medicinal plant in the Middle Ages[250]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. A very greedy plant inhibiting the growth of nearby plants, especially legumes. A polymorphic species, there are a number of sub-species[187]. Strongly resents root disturbance, taking some time to recover after being divided[1]. Peony species are usually self-fertile, though they will also hybridise with other species if these flower nearby at the same time[250]. Plants take 4 - 5 years to flower from seed[200]. They generally breed true from seed[1].

## **8.2.418** Vinca major

Greater Periwinkle, Bigleaf periwinkle, Myrtle, Large Periwinkle, Big Periwinkle

7 tlin 9 cyuc 0 kcak 0 tcan 3 dwat m hkuc

pcimhmimhtut cyutli hgatkyuctcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Vinca major is an evergreen Shrub growing to 0.5 m (1ft 8in) by 1 m (3ft 3in) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 4 and is not frost tender. It is in leaf all year, in flower from April to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista Large quantities of the plant are poisonous[19,

tcanta BasketryThe stems are used in basket making[7]. A very good ground cover for covering steep banks and shady places, spreading rapidly once established and forming a dense cover within 2 years[11, 28, 31, 190, 200]. It is less dense on dry or exposed sites[197]. Plants are best spaced about 60cm apart each way[208].

dwatta Astringent Bitter Detergent Homeopathy Hypotensive Purgative Sedative Stomachic Tonic VasodilatorThe plant is astringent, bitter, detergent, sedative, stomachic and tonic[4, 7, 21, 53, 165, 238]. It contains the alka-

loid 'vincamine', which is used by the pharmaceutical industry as a cerebral stimulant and vasodilator[238]. It also contains 'reserpine', which reduces high blood pressure[238]. It is used internally in the treatment of excessive menstruation, abnormal uterine bleeding, vaginal discharge and hardening of the arteries[238]. It should not be given to patients with constipation[238]. It is applied externally to vaginal discharge, nosebleed, sore throat and mouth ulcers[238]. The plants are cut when flowering and dried for later use[238]. The fresh flowers are gently purgative, but lose their effect on drying[4]. A homeopathic remedy is made from the fresh leaves[4]. It is used in the treatment of haemorrhages[4].

nrakta C. and S. Europe, N. Africa. Naturalized in Britain. ksacta Copses and hedgerows in S. England[17].

propta Seed - we have no information on this species but suggest sowing the seed in a cold frame as soon as it is ripe if possible. Sow stored seed in late winter in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in spring just before active growth commences[78], or in autumn[1]. Larger divisions can be planted out direct into their permanent positions. We have found that it is best to pot up smaller divisions and grow them on in light shade in a greenhouse or cold frame until they are growing away well. Plant them out in the summer or the following spring. Cuttings of mature wood of the current seasons growth, 5 - 10 cm long, October in a cold frame. Roots quickly. High percentage[78].

nwatta Landscape Uses:Border, Container, Erosion control, Ground cover, Massing, Specimen. A very easily grown plant, it succeeds in almost any soil[200] but prefers those that are on the richer side[17]. Grows well in heavy clay soils. Plants are very shade tolerant but they do not flower so well in deep shade[11, 28, 31]. They grow well under deciduous trees[187], and in such a situation can succeed in dry soils[190]. Established plants are drought tolerant[190]. A very ornamental[1] and polymorphic plant[200], there are some named forms selected for their ornamental value[187]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233]. This species rarely if ever sets seed in Britain[4]. It spreads rapidly by long trailing stems that root at their tips and leaf nodes, it can be invasive[4, 238]. Once it is established it will swamp out smaller plants[4]. Special Features: Attractive foliage, Not North American native, Naturalizing, Attractive flowers or blooms.

#### 8.2.419 Narcissus tazetta

Bunchflower Daffodil, Cream narcissus 7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 0.5 m hkuc htut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Narcissus tazetta is a BULB growing to 0.5 m (1ft 8in) by 0.1 m (0ft 4in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from January to February. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers moist soil

tcanta EssentialAn essential oil obtained from the flowers is used in perfumery[171].

dwatta Analgesic Antiphlogistic Cancer Demulcent Emetic PoulticeDemulcent[174, 178]. Used in the treatment of boils and mastitis[174]. The root is emetic[240]. It is used to relieve headaches[240]. The chopped root is applied externally as an antiphlogistic and analgesic poultice to abscesses, boils and other skin complaints[218]. The plant has a folklore of effectiveness against certain forms of cancer. This might be due to benzaldehyde changing to laetrile-like compounds or to lycorine changing to lycobetaine-like compounds in the body[218].

nrakta Europe to E. Asia. ksacta Fields, meadows and garigue, especially in damp places, in the Mediterranean [89].

propta Seed - best sown as soon as it is ripe in a cold frame. A short stratification will improve the germination of

stored seed. Sow the seed thinly so that the seedlings can be left undisturbed in the pot for their first two years of growth. Give them an occasional liquid feed in the growing season to ensure they do not become nutrient deficient. When the plants become dormant in the summer, pot up the small bulbs placing 2 - 3 bulbs in each pot. Grow them on for another one or two years in the greenhouse before planting them out when they are dormant in late summer. Division of bulbs after the leaves die down in early summer[1]. Larger bulbs can be replanted immediately into their permanent positions, or can be stored in a cool place and then be planted out in the autumn. It is best to pot up the smaller bulbs and grow them on for a year before planting them out when dormant in the autumn.

nwatta Prefers a deep rather stiff soil but succeeds in most soils and situations[1]. Grows well in heavy clay soils. Prefers an alkaline soil with a pH between 7 and 8[200]. Best grown in a warm sunny corner with shelter from cold winds[245]. The dormant bulbs will withstand soil temperatures down to at least -5°c[214]. A polymorphic species[200]. Cultivated for its essential oil[171]. The flowers are very powerfully scented[245]. The sub-species N. tazetta chinensis. Roemer, is used in Japanese medicine[174].

#### 8.2.420 Fabiana imbricata

Pichi

7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 2.5 m hkuc htut cyutli tcup hwicli hras hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Fabiana imbricata is an evergreen Shrub growing to 2.5 m (8ft) by 2.5 m (8ft). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

dwatta Cholagogue Diuretic Tonic UrinaryThe dried leaves and twigs are cholagogue, a valuable terebinthic diuretic and tonic[4]. It is largely used in the treatment of acute urinary bladder catarrh, giving very favourable results where urinary irritation where irritation is caused by gravel[4]. It is contra-indicated where there is organic disease of the kidneys[4].

nrakta S. America - Chile. ksacta Not known

propta Seed - sow in a well-drained sandy soil in the greenhouse(200). When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Greenwood cuttings, rooted with gentle bottom heat, summer in a cold frame[200].

nwatta Succeeds in a sunny position in a light welldrained soil[200]. Plants are not very hardy in Britain, growing best in areas that receive little or no frost[200]. The cultivar 'Violacea' is generally faster growing and is somewhat hardier than the type, tolerating temperatures down to about -5°c[200].

## 8.2.421 Desfontainia spinosa

Taique

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 2.5 m hkuc hmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Desfontainia spinosa is an evergreen Shrub growing to 2.5 m (8ft) by 1.5 m (5ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from August to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

dwatta Miscellany NarcoticThe leaves are narcotic and have been used medicinally in Chile[192]. More research needs to be carried out into the medicinal virtues of this plant[192]. The sub-species D. spinosa hookeri is usually employed[192].

and moist[11]. Strongly resents dryness at the roots during the growing season[125]. Requires a sheltered position when grown in the colder areas of the country[200]. This species is hardy to about -10°c[184], succeeding outdoors in the milder areas of Britain south and west of London[11]. The leaves and young shoots are very resinous[11]. The honey-like perfume of the flowers pervades the air for some considerable distance[245]. Hybridizes with other members of this genus[200]. A good bee plant[156, 166]. Some named forms have been selected for their ornamental value[184].

## 8.2.454 Asplenium ceterach

Scale Fern

7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 0.2 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlut hpa7tli lwisslip hpa7tmwatli hjonli

drutta Asplenium ceterach is a FERN growing to 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. The seeds ripen from April to October. Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although we have found no reports of toxicity for this species, a number of ferns contain carcinogens so some caution is advisable[200]. Many ferns also contain thiaminase, an enzyme that robs the body of its vitamin B complex. In small quantities this enzyme will do no harm to people earling an adequate diet that is rich in vitamin B, though large quantities can cause severe health problems. The enzyme is destroyed by heat or thorough drying, so cooking the plant will remove the thiaminase[172].

dwatta Antitussive DiureticThe whole plant is antitussive and diuretic[7]. It is widely used in the Mediterranean to treat gravel in the urine and is also used with other mucilaginous plants to treat bronchial complaints[7]. The taste is very bitter and needs to be sweetened with other herbs such as liquorice[7]. The plant is harvested from late spring to sumer and can be dried for later use[7]. Some caution should be employed in its use since it has not been fully tested[7].

nrakta Central and southern Europe, including Britain, east to the Himalayas and Caucasus. ksacta Limestone rocks and mortared walls[17].

propta Spores - best sown as soon as they are ripe on the surface of a humus-rich sterilized soil. Keep the compost moist, preferably by putting a plastic bag over the pot. Germinates in springf1]. Spring sown spores germinate in 1 - 3 months at 15°c134]. Pot on small clumps of plantlets as soon as they are large enough to handle and grow them on in light shade in a cold frame or greenhouse. Keep them humid until they are well established. When they are at least 15cm tall, plant them out into their permanent positions in late spring or early summer.

nwatta A calcicole plant, it requires a freely draining but moist alkaline soil[1]. It tolerates full sun but prefers a position with at least part-day shade[200] and also grows in deep shade[219]. Plants can be grown in old brick walls[219]. A very ornamental plant[1]. Members of this genus are rarely if ever troubled by browsing deer[233].

# 8.2.455 Cypripedium acaule

Nerve Root, Moccasin flower, Ladyslipper Orchid, Pink Lady's Slipper

7 tlin 11 cyuc 0 kcak 0 tcan 3 dwat 0.4 m hkuc

hmim cyutli tcup hwicli hrasjlutnyik hpa7tli frusflatprik hpa7tmwatli xre7t hjonli

drutta Cypripedium acaule is a PERENNIAL growing to 0.4 m (1ft 4in) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 5. It is in flower from May to June. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils and can grow in very acid soils. It can grow in semi-shade (light woodland). It prefers moist soil.

pcista Contact with the fresh plant can cause dermatitis in sensitive people[1, 21]. Hairs on the leaves can cause a rash similar to poison ivy rash in some people[213].

dwatta Antispasmodic Kidney Nervine Sedative Tonic UrinaryThe root is antispasmodic, nervine, sedative, tonic[207, 222]. It is said to be the equivalent of Valerian, Valeriana officinalis, in treating nervous complaints, sleeplessness etc[207]. The roots have also been used in the treatment of menstrual disorders, stomach aches, kidney and urinary tract disorders and venereal disease[257]. An infusion of the dried tuber is used, the tubers are harvested in the autumn[213]. The active ingredients are not water-soluble[222].

nrakta Eastern N. America - Nova Scotia to Nebraska, south to Mississippi and Alabama. ksacta Usually found in the higher and dryer parts of coniferous woods, often in a thin layer of pine needles over rocks[230], it is also sometimes found in bogs and wet places[213, 230].

propta Seed - surface sow, preferably as soon as it is ripe, in the greenhouse and do not allow the compost to dry out. The seed of this species is extremely simple, it has a minute embryo surrounded by a single layer of protective cells. It contains very little food reserves and depends upon a symbiotic relationship with a species of soil-dwelling fungus. The fungal hyphae invade the seed and enter the cells of the embryo. The orchid soon begins to digest the fungal tissue and this acts as a food supply for the plant until it is able to obtain nutrients from decaying material in the soil[200]. It is best to use some of the soil that is growing around established plants in order to introduce the fungus, or to sow the seed around a plant of the same species and allow the seedlings to grow on until they are large enough to move. Division with care in early spring, the plants resent disturbance[200]. Remove part of the original rootball with the soil intact[200]. Division is best carried out towards the end of the growing season, since food reserves are fairly evenly distributed through the rhizome[230]. Small divisions of a lead and two buds, or divisions from the back (older) part of the rhizome without any developed buds, establish quickly using this method[230]. Replant immediately in situ[230].

nwatta Landscape Uses:Container, Woodland garden, Requires a position in semi-shade on a damp acid soil that is rich in humus[200]. Plants grow well in a woodland garden or shady border[230]. Orchids are, in general, shallow-rooting plants of well-drained low-fertility soils. Their symbiotic relationship with a fungus in the soil allows them to obtain sufficient nutrients and be able to compete successfully with other plants. They are very sensitive to the addition of fertilizers or fungicides since these can harm the symbiotic fungus and thus kill the orchid[230]. Resents root disturbance[200]. A very ornamental plant[207], it is guite difficult in cultivation and plants will often flower well in their first year then disappear[230]. This is possibly because the plants are sold bare-rooted and do not have the necessary fungal symbiant they need in order to thrive[230]. Only buy pot-grown plants in order to try and ensure that the symbiant is present[K]. The plants are subject to damage by slugs[200]. Special Features:North American native, Wetlands plant.

### 8.2.456 Buxus wallichiana

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hjonli

drutta Buxus wallichiana is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Bees, flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Hedge Hedge WoodPlants can be grown as a hedge, they are very tolerant of pruning but are slow growning[188]. Wood - hard, fine grained, durable. Used for engraving, fine carving, mathematical instruments etc. It is at least equal in quality to B. sempervirens[11, 51, 61, 145, 150]

dwatta Bitter Diaphoretic Febrifuge PurgativeThe wood is diaphoretic[240]. The leaves are bitter, diaphoretic and

in the treatment of abdominal distension, shortness of breath etc[176, 238]. They are harvested in the summer and can be used fresh or dried[238]. The stem bark is antiseptic, antispasmodic, aphrodisiac, appetizer, diuretic, expectorant, hypotensive, stomachic and tonic[46, 61, 109, 147, 174, 176, 218]. The bark is used internally in the treatment of abdominal distension, loss of appetite, gastro-enteritis, vomiting, diarrhoea, asthma and coughs with acute phlegm[147, 174, 176, 218, 238]. The bark is harvested in the autumn and dried for later use[238]. It does not store well so stocks should be renewed annually[238]. The plant is digestive and stomachic[218]. Extracts of the plant contain bactericidal compounds and an essential oil, they are effective against salmonella[218].

nrakta E. Asia - W. China. ksacta Alpine and hilly areas[147]. Forests at elevations of 300 - 1500 metres[266].

propta Seed - best sown as soon as it is ripe in a cold frame. Stored seed must be kept cold over the winter and should be sown in late winter in a cold frame[200]. The seed usually germinates in the spring but it can take 18 months. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in light shade in a cold frame or greenhouse for at least their first winter. They can be planted out into their permanent positions when they are more than 15cm tall, though should be well mulched and given some protection from winter cold for their first winter or two outdoors. Layering in early spring[2001.

nwatta Best grown in a warm position in a moderately rich free soil of an open texture[1]. The branches are brittle so a sheltered position is required[200]. Very tolerant of atmospheric pollution[200]. Hardy to about -10°c[200]. The fleshy roots are easily damaged and any transplanting is best done during a spell of mild moist weather in late spring[182].

# 8.2.452 Cedrus deodara

Deodar, Deodar cedar 7 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 33 m hkuc htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli hionli

drutta Cedrus deodara is an evergreen Tree growing to 33 m (108ft) by 10 m (32ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from October to November, and the seeds ripen from October to December. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate strong winds but not maritime exposure. It cannot tolerate atmospheric pollution.

tcanta Shelterbelt WoodA fairly wind-tolerant tree, it can be used in shelterbelt plantings[200]. Wood - moderately hard, durable, aromatic, fine and even grained. Resistant to termites, it is used for construction, furniture, boats etc[51, 61, 145, 158, 272]. A valuable timber, but a poor fuel, producing a lot of smoke as it burns[51, 272].

dwatta Antidote Astringent Carminative Diaphoretic Diuretic Dysentery Skin TB UrinaryThe heartwood is carminative, diaphoretic, diuretic and expectorant[240, 272]. A decoction of the wood is used in the treatment of fevers, flatulence, pulmonary and urinary disorders, rheumatism, piles, kidney stones, insomnia, diabetes etc[240, 254]. It has been used as an antidote to snake bites[240, 243]. The plant yields a medicinal essential oil by distillation of the wood, it is used in the treatment of phthisis, bronchitis, blennorrhagia and skin eruptions[4, 158, 240]. A resin obtained from the wood is used externally to treat bruises, skin diseases and injuries to joints[272]. The bark is astringent. It has proved useful in the treatment of fevers, diarrhoea and dysentery[240, 243]. In Ayurvedic medicine the leaves are used in the treatment of tuberculosis[254]. An oil obtained from the seed is diaphoretic[272]. It is applied externally to treat skin diseases[272].

nrakta E. Asia - Afghanistan to Nepal. ksacta Forms forests in the drier areas of the Himalayas at 1800 - 3000 metres[51, 81].

propta Seed - collect the cones in winter and keep in a warm room until they open[1]. Sow immediately in a cold frame[78]. One report says that a short cold stratification of one month improves germination rates[113]. Keep the seed pot moist, but be careful because the young seedlings are very prone to damp off, keep them well ventilated[113]. Prick out the seedlings into individual pots when they are large enough to handle. Grow them on in a cold frame for their first winter and plant them out into their permanent positions in late spring or early summer. Give them some protection from winter cold for their first winter or two outdoors[K]. Cuttings of terminal shoots can be tried in a frame in November but they are very difficult[113].

nwatta Landscape Uses:Espalier, Specimen Thrives on most soils, being very tolerant of dry sites and of drought when it is established[81, 200]. Succeeds in very chalky soils[200]. Prefers a rich loam or a sandy clay in full sun[1]. Succeeds in warm dry areas with less than 40cm of rain a year, but also in areas with cool summers and up to 200cm of rain[200]. Dislikes atmospheric pollution[11]. Plants are fairly wind tolerant[200]. This species is the least hardy of the genus and does not always succeed outdoors in Britain[11] although some clones are hardy down to zone 5 and grow well in this country[200]. The hardiest forms come from the west of its range[81]. Trees thrive best in the cooler and moister areas of Britain[11]. Small trees less than 50cm tall establish much more quickly and better than taller trees, those that are more than 2 metres tall are difficult to establish[200]. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Plants are said to live for up to 600 years in the wild[227]. New growth takes place from May to the end of September and can exceed 1 metre per year, slowing down as the tree gets larger and virtually ceasing by the time the tree is 20 metres tall[185]. This species is sometimes cultivated for timber in some parts of S. Europe[50]. Small male cones are formed on the lower branches of trees, whilst the larger female cones are formed on higher branches[238]. These female cones persist on the tree for 2 - 3 years before breaking up[238]. Trees are notably susceptible to honey fungus[200]. The whole plant is aromatic[245]. Special Features: Attractive foliage. Not North American native. Inconspicuous flowers or

#### 8.2.453 Eucryphia lucida

eatherwood

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 10 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatprik hna7tmwatli xre7t hionli

drutta Eucryphia lucida is an evergreen Tree growing to 10 m (32ft) by 4 m (13ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist

tcanta Hedge HedgeCan be grown as a hedge[157]. dwatta Antiseptic StypticAntiseptic, styptic[152].

nrakta Australia - Tasmania. ksacta Forests, often along river banks, at low altitudes[11, 184].

propta Seed - sow February in a greenhouse. The seed should be stored cool and dry over the winter. Germination is usually good[78]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 6 - 8cm with a heel, June/July in individual pots in a frame. Roots in 5 - 6 weeks. A variable percentage succeed[78]. Layering in late summer. Takes 16 months. High percentage[78].

nwatta Requires an open but sheltered position and a light moist lime-free soil[11, 184]. Succeeds in any free open loamy soil[1]. Prefers its base in the shade with its canopy in the light[200]. Requires plenty of light if it is to flower freely, tolerating almost full sun if the soil is cool

nrakta S. America - Growing in the Andes from Colombia to southern Chile. ksacta Cool mountain cloud forests in the north of its range, descending to sea level in the south[11].

propta Seed - surface sow in spring in a greenhouse. Do not allow the compost to become dry. Grow on the seedlings in a bright filtered light[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Requires humid conditions and bottom heat at 16°c[200]. Overwinter in a cold frame and grow on for another year before planting out[200]. Division of suckers in the dormant season[202].

nwatta Requires a humus-rich moisture-retentive acid soil in a sheltered position in partial shade[200]. Grows well in sandy soils as long as there is plenty of humus present[245]. Intolerant of alkaline soils and of waterlogging[202]. Dislikes drought[200]. Plants like growing with their roots in the shade but their stems reaching up into the light[245]. This species is not fully hardy in Britain, plants tolerate temperatures down to about -10°c when sheltered from cold drying winds[200]. They grow best along the west coast of the country, especially in Scotland and N. Ireland[11]. The sub-species D. spinosa hookeri.(Dun.)Reiche. is usually employed for its medicinal virtues[238]. There is at least one named variety selected for its ornamental value[200]. The flowers are softly honey-scented[245]. A slow-growing plant[202]. Any pruning to retain shape is best done in the spring[200].

# 8.2.422 Cupressus funebris

Chinese Weeping Cypress, Mourning-cypress 7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 25 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli frusflatpriklwis hpa7tmwatli hjonli

drutta Cupressus funebris is an evergreen Tree growing to 25 m (82ft 0in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to May. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very acid soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

tcanta WoodWood - hard, tough, white, durable, close grained. Used for general construction, agricultural implements etc[61, 109].

dwatta AntiperiodicThe leaf is antiperiodic[218]. It is used in the treatment of bleeding piles, excessive menstrual flow etc[218]. A decoction of fruiting branches is used in the treatment of colds[218].

nrakta E. Asia - China. ksacta Forms woods on mountain slopes and ravines, especially in limestone areas, from sea level to 1100 metres[109].

propta Seed - sow late winter in a cold frame and only just cover the seed[164]. Three weeks cold stratification can improve germination rates[164]. The seed usually germinates in 1 - 2 months at 20°c. The seedlings are very subject to damping off so should be watered with care and kept well-ventilated[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can store for several years[113]. Cuttings of almost ripe wood, September in a frost-proof frame[1]. April/May is the best time to take cuttinus[113].

nwatta Thrives in a well-drained loamy or peaty soil[11]. Very tolerant of hot dry conditions[81]. Tolerates poor sandy soils[81] but is then more subject to insect damage in a succession of dry seasons[11]. Requires a sunny position[81]. Prefers a pH of 6 or lower[200]. Somewhat tender in Britain, at least in the north of the country[81], it also seems to be short-lived[185]. Plants do not succeed at Kew[11]. Cultivated as a timber crop in China[61]. Cones can remain closed on the tree for a number of years, opening after the heat of a forest fire to scatter their seeds which then germinate and

grow rapidly in the ashes of the fire[200]. Plants are subject to injury by the wind[11, 81]. Trees are notably susceptible to honey fungus[200]. The crushed foliage has the scent of grass[185].

### 8.2.423 Helichrysum stoechas

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 0.5 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Helichrysum stoechas is a PERENNIAL growing to  $0.5\,\mathrm{m}$  (1ft 8in) by  $1\,\mathrm{m}$  (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

dwatta Deobstruent Diaphoretic Emollient Expectorant-The stem tops and the flowers are deobstruent and expectorant[4]. They have been used in the treatment of colds[4] but their use is now considered to be obsolete[238]. The flowers have been used as diaphoretics and discutients[4].

nrakta S. and W. Europe. ksacta Dry banks, rocks and sands.

propta Seed - sow February/March in a greenhouse. The sed usually germinates in 2 - 3 weeks at 20°c. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, 5cm with a heel, June/July in a frame. Roots in 4 weeks. Good percentage[78].

nwatta Requires a light well-drained soil in a sunny sheltered position[1, 200]. Intolerant of excessive moisture[1]. Established plants are drought resistant[190]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to about -10°c[200]. An aromatic plant with beautiful foliage, there are several named varieties, selected for their ornamental value[200]. Members of this genus are rarely if ever troubled by browsing deer[233].

## 8.2.424 Lobelia tupa

Devil's Tobacco

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Lobelia tupa is a PERENNIAL growing to 2 m (6ft) by 1 m (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from September to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista The whole plant is poisonous[200]. It contains the alkaloid lobeline which has a similar effect upon the nervous system as nicotine[274]. Even smelling this plant has been known to cause sickness[274].

dwatta Narcotic OdontalgicA juice pressed from the leaves is used in the treatment of toothache[192, 238]. The plant is smoked as an intoxicant[192, 200, 238].

nrakta S. America - Chile. ksacta Wooded slopes, in the open and amongst shrubs[192].

propta Seed - best sown as soon as it is ripe in the autumn in a greenhouse[200]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Division in the spring[200]. Plants can also be divided and potted up in the autumn and kept in a cold frame over the winter to protect against losses in severe winters[200].

nwatta Best grown in full sun or in an open position in light shade with some shelter from the wind[200]. Requires a permanently moist fertile loamy soil[200]. This species is

hardy to about -10°c, but in areas with mild maritime winters plants can be induced into early growth and this growth is more susceptible to frost damage[200]. Hybridizes freely with other members of this genus[200].

## 8.2.425 Grindelia camporum

Gumplant, Great Valley gumweed, Bract gumweed 7 tlin 10 cvuc 0 kcak 0 tcan 3 dwat 1.2 m hkuc htut cyutli hgatkyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Grindelia camporum is a ANNUAL/PERENNIAL growing to 1.2 m (4ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate

pcista Large doses used medicinally can irritate the kidnevs[165].

tcanta Adhesive DyeYellow and green dyes are obtained from the flowering heads and pods[168]. Aromatic. A possible substitute for wood rosin, used in the manufacture of adhesives etc[160]. This report probably refers to the resin that covers the flower buds.

dwatta Antiasthmatic Antiinflammatory Antispasmodic Eczema Expectorant Homeopathy SedativeGumplant was used by the native North American Indians to treat bronchial problems and also skin afflictions such as reactions to poison ivy[254]. It is still used in modern herbalism where it is valued especially as a treatment for bronchial asthma and for states where phlegm in the airways impedes respiration[254]. In addition, it is believed to desensitize the nerve endings in the bronchial tree and slow the heart rate, thus leading to easier breathing[254]. The herb is contraindicated for patients with kidney or heart complaints[254]. The dried leaves and flowering tops are antiasthmatic, antiinflammatory, antispasmodic, expectorant and sedative[4, 61, 165, 238]. The principal use of this herb is in the treatment of bronchial catarrh, especially when there is an asthmatic tendency, it is also used to treat whooping cough and cystitis[4, 61, 238]. The active principle is excreted from the kidneys, and this sometimes produces signs of renal irritation[4, 238]. Externally, the plant is used to treat burns, poison ivy rash, dermatitis, eczema and skin eruptions[61, 238]. The plant is harvested when in full bloom and can be used fresh as a poultice or dried for infusions etc[238]. A homeopathic remedy is prepared from the leaves and flowering stems[4]

nrakta Western N. America. ksacta Dry banks, rocky fields and plains, low alkaline ground in California[71].

propta Seed - sow autumn or spring in a cool greenhouse and only just cover the seed. Prick out the plants into individual pots when they are large enough to handle and plant them out into their permanent positions in early summer.

nwatta Succeeds in any well-drained soil in full sun[200]. Does well on dry sandy banks and in poor soils[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. All parts of the plant have a balsamic odour[238].

#### 8.2.426 Papaver argemone

Prickly Poppy, Long pricklyhead poppy 7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 0.4 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Papaver argemone is a ANNUAL growing to 0.4 m (1ft 4in) by 0.2 m (0ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to July, and the seeds ripen from August to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, beetles. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clav) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista This plant is toxic to mammals, though the toxicity is low[76]. The seed is not toxic[76].

dwatta DiaphoreticAn infusion or syrup made from the petals is used as a sudorific[240].

nrakta Central and southern Europe, including Britain. ksacta A common weed of light soils in the south of Britain, becoming rare in the north[17].

propta Seed - sow spring in situ[200].

nwatta Prefers a well-drained sandy loam in a sunny position[1, 200]. Does not do well on wet clay soils but succeeds in most other soils[115]. Plants usually self-sow freely when growing in suitable conditions so long as the soil surface is disturbed[238]. When growing in cereal fields, poppies decrease the yields of nearby cereal plants[18, 20]. Members of this genus are rarely if ever troubled by browsing deer or rabbits[233].

## 8.2.427 Escallonia rubra macrantha

7 tlin 10 cvuc 0 kcak 3 tcan 0 dwat m hkuc

htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Escallonia rubra macrantha is an evergreen Shrub growing to 3.5 m (11ft) by 3 m (9ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from June to October. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil. The plant can tolerate maritime exposure.

tcanta Hedge HedgeVery tolerant of extreme maritime exposure, making a very good windbreak hedge[75]. Tolerant of regular and severe pruning, it can regenerate from the base if cut back by frost[200].

nrakta S. America. - Chile. Plants occasionally self-sow in Ireland[17]. ksacta Not known

propta Seed - we have no details on this plant but suggest sowing the seed in early spring in a cold frame. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a frame. Either put the cuttings in individual pots or pot them up as soon as they start to root. Easy[K]. Cuttings of mature wood in winter. Very easy, just plant the cuttings direct into their final positions, about 95% usually take[29, K]. Keep them moist in a dry spring.

nwatta Prefers an open sunny position and a soil that is not too rich, an ordinary sandy loam will suffice[11]. Succeeds in dry soils. Tolerates lime[200]. A fast-growing plant, it is very tolerant of maritime exposure[184]. A polymorphic species, there are some named varieties. This species is only hardy in the milder areas of Britain, tolerating temperatures down to about -10°c[184]. Plants resent root disturbance and should be placed in their final positions as soon as possible[200]. The leaves and the flowers have a pungent

#### 8.2.428 Hedera nepalensis

1456

7 tlin 10 cvuc 0 kcak 0 tcan 2 dwat 15 m hkuc

pcimhmimhtut cyutli hgattcuphja7n hwicli hyishrasjlutnyikfrip hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Hedera nepalensis is an evergreen Climber growing to 15 m (49ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay and nutritionally poor soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no

fused with E. gunnii to which it is closely allied but from which it is well distinguished by the stalked, urn-shaped fruits on a long common-stalk. Flowers are white in small clusters. Fruit is urn shaped (urceolate) 15 x 9 mm. Can be coppiced. Very hardy tolerating down to -14C to -16C. Tolerates difficult growing conditions including intermittently waterlogged soils and exposed locations. Generation length

#### 8.2.449 Iris foetidissima

Stinking Gladwin, Stinking iris, Gladwin Iris 7 tlin 10 cvuc 0 kcak 0 tcan 2 dwat 1 m hkuc pcimhmimhtut cyutli hgatkyuctcuphia7n hwicli hrasilutnyik hpa7tli flatpriklwisslip hpa7tmwatli fyifxre7t hjonli

drutta Iris foetidissima is an evergreen Perennial growing to 1 m (3ft 3in) by 1.5 m (5ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 6 and is not frost tender. It is in leaf all year, in flower from May to July, and the seeds ripen from October to February. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry moist or wet soil and can tolerate drought. The plant can tolerate maritime

pcista The roots of this plant are toxic to grazing mammals[100]. Plants can cause skin irritations and allergies in some people[238].

tcanta A good ground cover plant, succeeding in dense shade and in dry soils[197]. Rather slow to spread though, needing weeding for the first year or two[197]. Plants should be spaced about 60cm apart each way[208].

dwatta Anodyne Antispasmodic CatharticStinking gladwin has a long history of medicinal use, though it can be rather strong in its action and so is little used nowadays[244]. The root is anodyne, antispasmodic and cathartic[4, 61]. A decoction of the roots acts as a strong purge, it has also been used as an emmenagogue and for cleaning eruptions[4]. The powdered or infused dried root is beneficial in the treatment of fainting, nervous complaints and to relieve pains and cramps[4, 244]. The plant has been used as a cure for ringworm[240].

nrakta Western Europe, including Britain, from France south and east to N. Africa, Italy and Greece. ksacta Open woods, hedgebanks and shady places, usually on calcareous soils[4, 17, 28]. It is often also found on sea cliffs[17].

propta Seed - best sown as soon as it is it is ripe in a cold frame[4]. Stored seed should be sown as early in the year as possible in a cold frame, it may take 18 months to germinate. Prick out the seedlings into individual pots when they are large enough to handle and grow them on in the greenhouse or cold frame for their first year. Plant out into their permanent positions in late spring or early summer. Division, best done in July after flowering. Very easy, larger clumps can be replanted direct into their permanent positions, though it is best to pot up smaller clumps and grow them on in a cold frame until they are rooting well. Plant them out in the

nwatta Landscape Uses:Border, Rock garden, Specimen. An easily grown and very tolerant plant, it succeeds in most positions in any good soil in sun or partial shade[79, 233]. Succeeds in dense shade. Prefers a moist soil[4] but succeeds in dry soils and, once established, is drought tolerant[190]. Thrives in a bog garden[188]. Requires a well-drained soil containing some lime[1] and succeeds on pure chalk[233]. Established plants are tolerant of considerable neglect and can survive dense weed competition[K]. The evergreen leaves are not very hardy, being killed back by cold winds around -15°c[187], though the rootstock is much hardier and the plant soon recovers in spring. A good plant for woodland edges[24]. Plants often self-sow[208, K]. There are some named forms, selected for their ornamental value[190]. The crushed leaves emit a strong odour which, at a distance, resembles hot roast beef[4]. On closer acquaintance the scent becomes disagreeable[4]. Members of this genus are rarely if ever troubled by browsing deer or

rabbits[233]. Special Features: Flowers have an unpleasant odor, Attractive flowers or blooms.

## 8.2.450 Bursaria spinosa

Christmas Bush, Sweet Bursaria

7 tlin 10 cyuc 0 kcak 3 tcan 2 dwat 4.5 m hkuc

htut cyutli tcup hwicli jlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Bursaria spinosa is an evergreen Shrub growing to 4.5 m (14ft 9in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower in August. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. It is noted for attracting wildlife. Suitable for: medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist

tcanta Hedge Hedge Weather protection WoodLeaves contain the coumarin 'aesculin' which is used in the treatment of lupus by irradiation and as an ultraviolet radiation screen in suntan lotions[152]. Plants can be grown as a hedge in mild climates[167]. Wood - tough, hard, close grained, easily worked. Used for tool handles, cabinet mak-

dwatta SkinSkin. The leaves contain the coumarin 'aesculin' - this is used in the treatment of lupus by irradiation and as a screen from ultra-violet light in suntan lotions[152].

nrakta Australia - New South Wales, Tasmania, Victoria. ksacta Forests and open places, but avoiding arid areas[152], in loamy soils, stony hills and on riverbanks[154], probably at its best near the coast[167].

propta Seed - sow spring in a greenhouse. It does not require pre-treatment. When large enough to handle, prick the plants out into individual pots. Grow on the young plants for at least the first winter in a greenhouse and plant out in late spring or early summer. Consider giving the plants some protection from winter cold for at least their first winter outdoors. Cuttings of half-ripe wood, July/August in a frame[219]. They require a little bottom heat if they are to root well[245].

nwatta Requires a well-drained moisture retentive soil in full sun[200]. This species only succeeds outdoors in Britain in the mildest areas of the country[11, 182]. Plants are hardy to at least -7°c in Australian gardens[157], though this cannot be translated directly to British gardens due to our cooler summers and longer, colder and wetter winters. They require a warm south or south-west facing wall in Britain, succeeding in areas where frosts are light and short lived[200]. A good bee plant[167], the flowers are sweetly fragrant[219, 245]. Very ornamental[1].

### 8.2.451 Magnolia officinalis

1465

7 tlin 10 cyuc 0 kcak 0 tcan 3 dwat 20 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Magnolia officinalis is a deciduous Tree growing to 20 m (65ft) by 12 m (39ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from May to June, and the seeds ripen from August to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Beetles. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil. It can tolerate atmospheric pollution.

tcanta WoodWood - fine grained. It is said to be a useful

dwatta Antibacterial Antiseptic Antispasmodic Aphrodisiac Appetizer Digestive Diuretic Emmenagogue Expectorant Ophthalmic Stomachic TonicHou Po has been used in Chinese herbal medicine for at least 2.000 years. The aromatic, pungent and warming bark is used in the treatment of various disorders of the digestive system[254]. Ophthalmic[46, 61, 109, 174]. The flowers are an aromatic digestive tonic[238]. A decoction of the flower buds is an esteemed emmenagoque in China, their use is therefore contraindicated for pregnant women[218]. The flowers are used

plants are at least two years old. Plant them out into their permanent positions in early summer and give them some protection from winter cold for at least their next winter. Cuttings of half-ripe wood, July/August in a frame[200].

nwatta Landscape Uses:Arbor, Container, Woodland garden. Succeeds in most soils[182]. Requires a warm sheltered position in full sun or light shade in a well-drained moisture retentive moderately fertile soil[200]. Rich soils discourage flowering by encouraging excessive growth[200]. This species is not very hardy in Britain, succeeding outdoors only in the mildest areas of the country and even then usually requiring the protection of a wall[166, 182]. Plants can tolerate temperatures down to about -10°c if the wood has been thoroughly ripened[200]. A very ornamental plant, the flowers are sweetly fragrant[222] emitting a honey-like aroma[245]. This species is the state flower of South Carolina[238]. A climbing plant, supporting itself by twining around other plants and often ascending to the tops of lofty trees in its native habitat[4]. Special Features: Attracts birds, North American native, All or parts of this plant are poisonous, Wetlands plant, Extended bloom season in Zones 9A and above, Fragrant flowers, Attractive flowers or blooms.

# 8.2.447 Mirabilis nyctaginea

Wild Four O'clock Plant, Heartleaf four o'clock 7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 1 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Mirabilis nyctaginea is a PERENNIAL growing to Im (3ft 3in). See above for USDA hardiness. It is hardy to UK zone 8 and is frost tender. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista One report says that the plant is considered poisonous, but gives no details[222].

dwatta VulneraryThe chewed root is used as a poultice for wounds, burns, sores, sprains etc[207, 222, 257]. A tea made from the roots is also used to treat burns, fevers and to expel worms[213, 222, 257]. A tea made from the leaves or the roots is used in the treatment of bladder ailments[222]. Caution is advised in the use of this plant internally, see notes above on toxicity.

nrakta N. America - Wisconsin to Mexico. ksacta Prairies and rich soil[222]. Often found in calcareous clay soils[274].

propta Seed - sow spring in a greenhouse. When they are large enough to handle, prick the seedlings out into individual pots and plant them out in early summer, after the last expected frosts. The seed remains viable for several years[196]. Division in spring as the plant comes into growth[200].

nwatta Requires a fertile well-drained soil in full sun or part-day shade[200]. Plants flower in their first year from seed and, although they are not very hardy in Britain, they can either be grown as half-hardy annuals or the tubers can be harvested in the autumn and stored overwinter in a cool frost-free place in much the same manner as dahlias[200]. Members of this genus are rarely if ever troubled by browsing deer[233]

# 8.2.448 Eucalyptus urnigera

Urn tree

7tlin 9 cyuc 0 kcak 3 t<br/>can 3 dwat 15 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa<br/>7tli flatpriklwis hpa7tmwatli hjonli

drutta Eucalyptus urnigera is an evergreen Tree growing to 15 m (49ft) by 12 m (39ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 7. The flowers are pollinated by Birds. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semishade (light woodland) or no shade. It prefers moist soil. It cannot tolerate atmospheric pollution.

pcista Citronellal, an essential oil found in most Eucalyptus species is reported to be mutagenic when used in isolation[269]. In large doses, oil of eucalyptus, like so many essential oils has caused fatalities from intestinal irritation[269]. Death is reported from ingestion of 4 · 24 ml of essential oils, but recoveries are also reported for the same amount[269]. Symptoms include gastroenteric burning and irritation, nausea, vomiting, diarrhoea, oxygen deficiency, weakness, dizziness, stupor, difficult respiration, delirium, paralysis, convulsions, and death, usually due to respiratory failure[269].

tcanta An essential oil is obtained from the leaves. Total quantity of the oil, and its composition, can vary widely from plant to plant, but we have reports that the fresh leaves contain around 1.8 - 3.9% (2.5 - 5.6% dry weight) essential oil. The main components include phellandrene, cymene, pperitone, methyl cinnamate and eudesmol[1659]. The heartwood is pale brown, straw-coloured or pinkish; the 30mm thick band of sapwood is almost white. The wood is opentextured, straight-grained, with conspicuous growth rings. It bends fairly well, is easily worked and polishes well. An excellent timber, it is widely in construction, for purposes such as building framing, flooring, plywood and veneers, furniture, panelling, turnery, handles and pulp for hardboard and paper[1097, 1658]. A handsome dense foliaged screening tree and good garden specimen that is a superior ornamental tree to E. gunnii due to the attractive foliage and bark. Eucalyptus urnigera does not have any commercial use as a timber tree in Tasmania.

dwatta Eucalyptus leaves are a traditional Aboriginal herbal remedy. The essential oil found in the leaves is a powerful antiseptic and is used all over the world for relieving coughs and colds, sore throats and other infections[254]. The essential oil is a common ingredient in many over-thecounter cold remedies[254]. The plant is an aromatic, astringent, tonic herb that sticks to the teeth and turns the saliva red[238]. The report says that the leaves, essential oil and oleo-resin are used[238], but does not specify which properties apply to the different parts of the plant[K]. The leaves and the oil will have very similar properties, the oil being much stronger in its effect since it is distilled from the leaves[K]. Detailed below is how the oleo-resin and oil are commonly used in other species[K]. The essential oil obtained from various species of eucalyptus is a very powerful antiseptic, especially when it is old, because ozone is formed in it on exposure to air. It has a decided disinfectant action, destroying the lower forms of life[4]. The oil can be used externally, applied to cuts, skin infections etc, it can also be inhaled for treating blocked nasal passages, it can be gargled for sore throat and can also be taken internally for a wide range of complaints[4]. Some caution is advised, however, because like all essential oils, it can have a deleterious effect on the body in larger doses[4]. An oleo- resin is exuded from the tree[238]. It can also be obtained from the tree by making incisions in the trunk[4, 152]. This resin contains tannin and is powerfully astringent it is used internally in the treatment of diarrhoea and bladder inflammation[4, 152, 238], externally it is applied to cuts etc[4, 152]. Treats throat ailments[156].

nrakta An endemic Tasmanian alpine eucalypt of the subgenus Symphomyrtus. ksacta The dominant eucalypt species at altitudes from 600 to 1,000 metres (1,969 to 3,281 ft) on moist but well drained dolerite slopes and talus. Typically, it is found below the range of E. coccifera (snow gum) and above the mixed and wet sclerophyll forests of the lower slopes although it will grow within both vegetation types.

propta Seed - surface sow late winter/early spring in a sunny position in a greenhouse[11, 78, 134]. Species that come from high altitudes appreciate 6 - 8 weeks cold stratification at 2c[200]. Pot up the seedlings into individual pots as soon as the second set of seed leaves has developed, if left longer than this they might not move well. Plant out into their permanent positions in early summer and give them some protection from the cold in their first winter. The seed can also be sown in early summer, the young trees being planted in their final positions in late spring of the following year. The seed has a long viability[200].

nwatta A small to medium-sized fast growing tree endemic to Tasmania where it only occurs at mid to high altitudes. Prefers sun to light shade and well-drained soil, light moisture. Most reports say it is hardy to USDA Zone 8 although we have found references that it grows in zone 9. Flowering period: Late summer This species has been conshade. It prefers moist or wet soil and can tolerate drought. It can tolerate atmospheric pollution.

pcista Although no specific mention has been seen for this species, the following notes are for the closely related Hedera helix and quite possibly are relavent here[K]. The plant is said to be poisonous in large doses[7, 10, 65, 76] although the leaves are eaten with impunity by various mammals without any noticeable harmful affects. The leaves and fruits contain the saponic glycoside hederagenin which, if ingested, can cause breathing difficulties and coma[274]. The sap can cause dermatitis with blistering and inflammation. This is apparently due to the presence of polyacetylene compounds[274].

dwatta Cathartic Diaphoretic Skin StimulantThe leaves and the berries are said to be cathartic, diaphoretic and stimulant[243]. A decoction of the plant is used to treat skin diseases[272].

nrakta E. Asia - Himalayas. ksacta Moist stones and tree stems at elevations of 1600 - 3000 metres in Nepal[272].

propta Seed - remove the flesh, which inhibits germination, and sow the seed in spring in a cold frame[113]. Four weeks cold stratification will improve germination[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the cold frame for their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Cuttings of half-ripe wood, July/August in a shady position in a frame. Good percentage[78]. Cuttings of mature wood, 12cm long, November in a cold frame[78]. Layering. Plants often do this naturally.

nwatta Ivv is a very easily grown plant that dislikes waterlogged, very dry or very acid soils but otherwise succeeds in all soil types[1, 17, 238]. It grows well in heavy clay soils. Prefers some lime in the soil. Tolerates very dense shade[24. 31], though it may not flower in such a position[K]. This species is not hardy in all parts of Britain, tolerating temperatures down to about -5 to -10°c[200]. Ivy is a rampant climbing plant, clinging by means of aerial roots and often trailing on the ground in woods and hedges[186]. It is of benefit rather than harm when growing on a wall because it keeps the wall dry and acts as an insulation[11, 24]. It does not damage the structure of a wall. Similarly, it does not harm large trees when climbing into them, though it can shade out smaller and ailing trees[200]. It is not a parasitic plant, but instead obtains all its nutrient from the sun and the soil[186]. This species is notably resistant to honey fungus[200].

# 8.2.429 Abies religiosa

Sacred Fir

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 40 m hkuc pcimhmimhtut cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatprik hpa7tmwatli hjonli

drutta Abies religiosa is an evergreen Tree growing to 40 m (131ft 3in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, and the seeds ripen from October to November. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and can grow in heavy clay soil. Suitable pH: mildly acid and neutral soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Paint WoodAn oleo-resin is obtained from the tree (probably from the trunk)[46, 61]. It is balsamic and is used in medicines and in paints[46, 181]. Wood - light, soft, not very durable. Used for pulp, construction, furniture etc[46, 181]

dwatta BalsamicBalsamic.

nrakta South-western N. America - Mexico ksacta Mountains of N.W. Mexico at elevations of 2400 - 3000 metres[11].

propta Seed - sow early February in a greenhouse or outdoors in March[78]. Germination is often poor, usually taking about 6 - 8 weeks[78]. Stratification is said to produce a more even germination so it is probably best to sow the seed in a cold frame as soon as it is ripe in the autumn[80, 113]. The seed remains viable for up to 5 years if it is well stored[113]. When large enough to handle, prick the seedlings out into individual pots and grow them on for at least their first winter

in pots. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. Alternatively, if you have sufficient seed, it is possible to sow in an outdoor seedbed. One report says that it is best to grow the seedlings on in the shade at a density of about 550 plants per square metre[78] whilst another report says that they are best grown on in a sunny position[80].

nwatta Prefers a good moist but not water-logged soil[1]. Grows well in heavy clay soils. Plants are very shade tolerant, especially when young, but growth is slower in dense shade[81]. Intolerant of atmospheric pollution[1]. Prefers slightly acid conditions down to a pH of about 5[200]. Prefers growing on a north-facing slope[200]. Requires a sheltered position, trees are susceptible to wind damage[11]. Trees are tender in most parts of Britain[1, 11], they tolerate temperatures down to about -5 to -10°c[200]. There are trees in Kent and Hampshire that are 12 metres tall[11]. Grows best in the Perthshire valleys of Scotland and other areas with cool wet summers[11]. Growth from young trees has proved to be very vigorous in Britain, 60cm in its first year has been recorded and 70 cm in its third year from seed[185]. New growth takes place mainly between July and October 1851. Trees should be planted into their permanent positions when they are quite small, between 30 and 90cm in height. Larger trees will check badly and hardly put on any growth for several years. This also badly affects root development and wind resistance[200]. Plants are strongly outbreeding, self-fertilized seed usually grows poorly[200] They hybridize freely with other members of this genus[200]

## 8.2.430 Acourtia microcephala

Sacapellote

7 tlin 10 cvuc 0 kcak 0 tcan 1 dwat m hkuc

htut cyutli kyuctcup hwicli hyishrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Acourtia microcephala is a PERENNIAL growing to 1.4 m (4ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

dwatta A decoction of the plant has been used to bring about a very quick passage of the bowels[257].

nrakta South-western N. America - California. ksacta Dry sunny slopes[257].

propta Seed - sow spring in a greenhouse in a gritty welldrained compost, and only just cover the seed. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter, being careful not to over-water. Plant out in late spring or early summer. Division in the spring.

nwatta Requires a freely draining gritty soil, preferably of fairly low fertility, and a position in full sun[200]. Dislikes winter wet. Plants are not very hardy outdoors in Britain, though they should succeed in the milder areas of the country, especially if given the additional protection of a wall. They are hardy to about -10°c, so long as they are not too wet[257]. Excess moisture, especially in the winter, is the main cause of death.

## 8.2.431 Daphne odora

Winter Daphne, Fragrant Daphne 7 tlin 9 cyuc 0 kcak 0 tcan 2 dwat 1.5 m hkuc

hmimhtut cyutli tcup hwicli jlutnyik hpa7tli flatprik hpa7tmwatli xre7t hjonli

drutta Daphne odora is an evergreen Shrub growing to 1.5 m (5ft) by 1.5 m (5ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from January to March. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid and neutral soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant are poisonous[200]. Skin contact with the sap can cause dermatitis in some people[65, 200].

tcanta Pot-pourriThe flowers are very fragrant, they are put in sachets and used for pot-pourri. They are also used to perfume water[46, 61]. The cultivar 'Aureo-marginata' can be used as a ground cover when planted about 1 metre apart each way[208].

dwatta Anodyne Antiphlogistic Antispasmodic Depurative OphthalmicThe flowers and the stems are anodyne, antiphlogistic, antispasmodic, depurative and ophthalmic[147]. A decoction is used in the treatment of backache, myalgia, skin diseases, poor vision etc[147, 218]. A decoction of the leaves is used in the treatment of laryngitis and sore throats[218]. A decoction of the roots and leaves is used in the treatment of sore throat and caked breast[218].

nrakta E. Asia - W. China, Japan. ksacta In the shade of upland trees around 1000 metres[147].

propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at 20°c followed by 12 - 14 weeks at 3°c. Germination may still take another 12 months or more at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood, 7 - 10cm long at a node or with a heel, July/August in a frame. Lavering

nwatta Landscape Uses:Border, Container, Foundation, Ground cover, Massing, Rock garden, Specimen. Prefers a cool, lime-free well-drained friable soil[1] and some shelter from cold winds[166]. Succeeds in full sun or semishade[219]. This species is not generally hardy in Britain[1] but succeeds outdoors in Devon and Cornwall[11], tolerating temperatures down to about -5°c[200]. The cultivar 'Aureomarginata' is hardy to about -13°c when grown in a very well-drained soil and it succeeds outdoors at Wislev[200]. Plants can be difficult to establish[208]. A very ornamental plant, a number of named forms have been developed for their ornamental value[182]. The flowers are powerfully fragrant with a spicy undertone[245]. Plants seldom set fruit in British gardens[219]. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible[188]. This species is often affected by virus diseases. Some virus-free clones have been produced. their name is normally followed by the letters FKV (free of all known virus)[184]. Special Features: Not North American native, All or parts of this plant are poisonous, Fragrant flowers, Attractive flowers or blooms.

## 8.2.432 Ballota nigra

Black Horehound

7tlin 10 cyuc 0 kcak 0 tcan 3 dwat 0.9 m hkuc pcimhmimhtut cyutli tcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ballota nigra is a PERENNIAL growing to 0.9 m (3ft) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 8 and is not frost tender. It is in flower from June to October. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Antianxiety Antiemetic Antispasmodic Stimulant VermifugeBlack horehound has a long history of herbal use, though is not widely employed in modern herbalism because of its unpleasant flavour[238, 268]. Nonetheless, it does have a range of medicinal virtues, being especially effective in its action as an antiemetic[254]. In the past it was often used for treating problems connected with the respiratory system, convulsions, low spirits and the menopause, but present day authorities differ over whether it was effective in these

applications[254]. The whole plant is antiemetic, antispasmodic, expectorant, stimulant and vermifuge[4, 165, 238]. It is taken internally in the treatment of nervous dyspepsia, travelling sickness, morning sickness in pregnancy, arthritis, gout, menstrual disorders and bronchial complaints[238, 254]. The plant is harvested as it comes into flower and is dried for later use[238]. It should not be stored for longer than a year[238]. The fresh herb is sometimes used to make a syrup[238].

nrakta Most of Europe, including Britain, south and east from Scandanavia to N. Africa and E. Mediterranean ksacta Waste ground, hedgerows, woods and shady places, preferring nitrogen-rich, moist, rather loose soil [13, 268].

propta Seed - sow spring or autumn in a greenhouse. The seed usually germinates in 3 - 6 weeks at 15°c[134]. Prick out the seedlings into individual pots when they are large enough to handle and plant them out into their permanent positions in the summer or following autumn. Division in spring. Larger divisions can be planted straight into their permanent positions whilst smaller clumps are best potted up and kept in a cold frame until they are growing away well.

nwatta Prefers a well-drained soil in full sun or partial shade[134, 238]. Avoids acid soils in the wild but tolerates a pH down to 5 in cultivation[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. This species is widely grown in herb gardens, but little employed because of its strong flavour[238]. Its essential oil is used to adulterate the oil of white horehound (Marrubium vulgare)[238]. The leaves emit a most unpleasant smell when bruised, somewhat like stale perspiration[245]. Plants can self-sow freely when well-sited[238]. There is at least one named variety selected for its ornamental value[238]. The whole plant has an offensive odour[4].

## 8.2.433 Cupressus sempervirens

Italian Cypress

7 tlin 11 cyuc 0 kcak 0 tcan 2 dwat 30 m hkuc

htut cyutli hgatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Cupressus sempervirens is an evergreen Tree growing to 30 m (98ft) by 5 m (16ft) at a medium rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from January to February. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

pcista Poisonous[76]. No more details.

tcanta Cosmetic Essential WoodAn essential oil is distilled from the shoots. It is used in perfumery and soap making[1, 46, 61]. The leaves contain about 2% essential oil whilst the wood contains about 2.5%[240]. An infusion of the wood is used in footbaths to combat perspiration of the feet[7]. Wood - fragrant, very hard and durable. A popular wood for building uses, cabinet making and wardrobes, especially since it retains its fragrance, repels moths and is impervious to woodworm[1, 7, 11, 89].

dwatta Anthelmintic Antipyretic Antirheumatic Antiseptic Aromatherapy Astringent Balsamic Vasoconstrictor VulneraryThe cones and young branches are anthelmintic, antipyretic, antirheumatic, antiseptic, astringent, balsamic and vasoconstrictive[7, 46, 240]. They are harvested in late winter and early spring, then dried for later use[7]. Taken internally, it is used in the treatment of whooping cough, the spitting up of blood, spasmodic coughs, colds, flu and sore throats[254]. Applied externally as a lotion or as a diluted essential oil (using an oil such as almond), it astringes varicose veins and haemorrhoids, tightening up the blood vessels[254]. A foot bath of the cones is used to cleanse the feet and counter excessive sweating[254]. The extracted essential oil should not be taken internally without professional quidance[254]. A resin is obtained from the tree by making incisions in the trunk[7]. This has a vulnerary action on slowhealing wounds and also encourages whitlows to come to a head[7]. An essential oil from the leaves and cones is used in aromatherapy. Its keyword is 'Astringent' [210].

used as a strewing herb in churches etc[4]. The flowering stems, once the flowers have been removed for use in potpourri etc, can be tied in small bundles and burnt as incense sticks[245].

dwatta Antiasthmatic Antiseptic Antispasmodic Digestive ExpectorantFrench lavender has similar medicinal properties to common lavender (L. angustifolia). It yields more essential oil than that species but is of inferior quality[254]. The flowers, and the essential oil derived from them, are antiasthmatic, antiseptic, antispasmodic, digestive and expectorant[4, 44, 61, 238]. It is used internally to alleviate nausea[238]. Externally, the essential oil is used as an antiseptic wash for wounds, ulcers, sores etc and as a relaxing oil for massage[238, 254].

nrakta S.W. Europe. ksacta Dry hills, garigue and open woods on limestone and granite soils[89].

propta Seed - sow spring in a greenhouse and only just 15°c. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse or cold frame for their first winter, planting them out in late spring after the last expected frosts. Cuttings of half-ripe wood 7 - 10cm with a heel, July/August in a frame. Usually very east, a high percentage will root within a few weeks[78]. Grow them on in the greenhouse for their first winter and plant them out in late spring after the last expected frosts. Cuttings 7cm with a heel succeed at almost any time of the year[1]. Layering.

nwatta Succeeds in almost any soil so long as it is welldrained and not too acid[1, 200]. Prefers a sunny position in a neutral to alkaline soil[1, 200], growing well on chalk[11]. When grown in rich soils the plants tend to produce more leaves but less essential oils[4]. Grows well in a hot dry position[166]. Established plants are drought tolerant[190]. When growing for maximum essential oil content, the plant must be given a very warm sunny position and will do best in a light sandy soil, the fragrance being especially pronounced in a chalky soil[245]. Hardy to between -5 and -10°c[184], it is often killed in severe winters in Britain[11]. Plants are not very long-lived and soon become straggly unless pruned. Any trimming of the plant is best done in spring and should not be done in the autumn since this can encourage new growth that will not be very cold-hardy[200]. Polymorphic[200]. A good bee plant, also attracting butterflies and moths[30]. The flowering spike has showy infertile flowers to attract insects at the top of the stem and small fertile flowers beneath[190]. A good companion for most plants[54], growing well with cabbages[14].

## 8.2.445 Edgeworthia chrysantha

Oriental paperbush

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Edgeworthia chrysantha is a deciduous Shrub growing to 2 m (6ft) by 2 m (6ft). See above for USDA hardness. It is hardy to UK zone 8 and is frost tender. It is in flower from February to April, and the seeds ripen from May to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

tcanta Paper StringA high-class paper is made from the bark[1, 11, 58, 61]. The bark fibres are used[61]. The stems are harvested in spring or early summer, the leaves are removed and the stems steamed until the fibres can be stripped. The outer bark is removed from the inner by peeling or scraping. The fibres are cooked for 2 hours with soda ash and then beaten with mallets or put through a blender. The paper is off white in colour[189]. The stems are extremely supple and can be tied in knots[11, 182].

dwatta OphthalmicThe sliced root is used as a remedy for eye diseases[218].

nrakta E. Asia - China. ksacta Forests and streamsides, at elevations of 300 - 1600 metres in Ichang Province[109, 200].

propta Seed - best sown as soon as it is ripe in a cold frame. Place the pot in a plastic bag to keep it moist[175].

The seed might germinate in the spring, though it could take another 12 months. Stored seed usually requires 8 - 12 weeks warm stratification at 20°c followed by 12 - 14 weeks at 3°c[175]. Germination can still take 12 months or more at 15°c[175]. Prick out the seedlings into individual pots as soon as they are large enough to handle, and grow on in a greenhouse for at least a year before planting out in late spring or early summer[175]. Consider giving the plants some protection from the cold for their first winter outdoors. Cuttings in spring. Cuttings of half-ripe wood, July/August in a frame[200].

nwatta Succeeds in any soil in sun or part shade[175, 184, 200], growing well in light woodland[200]. Prefers a well-drained soil with plenty of moisture in the growing season[1, 200]. This species is hardy to about -15°c according to one report[184], though others say that it is only hardy in the milder areas of Britain[1, 11]. It succeeds on a wall at Kew[K] and as a free-standing shrub in Cornwall[11]. The plant is frost hardy, but the flowers are susceptible to frost damage[188]. The plant is best grown on a south or west-facing wall[188]. Plants resent root disturbance and should be put into their permanent positions as soon as possible[188]. This species is cultivated in Japan for the paper that can be made from the bark[1, 11, 109]. The stems are harvested every second year[61]. This species is very closely related to and scarcely distinct from E. gardneri and E. papyrifera[200]. The flowers diffuse a pronounced clove-like perfume and will scent the air to some distance on a calm day[245].

## 8.2.446 Gelsemium sempervirens

False Jasmine, Yellow Jessamine, Evening Trumpetflower, Carolina Iasmine

7 tlin 9 cyuc 0 kcak 0 tcan 4 dwat 3 m hkuc

hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hionli

drutta Gelsemium sempervirens is an evergreen Climber growing to 3 m (9ft 10in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 9. It is in leaf all year, in flower from May to July. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista All parts of the plant usually contain toxic alkaloids[200]. Eating just one flower has reportedly been lethal to children[207, 222]. The plant can also cause skin allergies in some people and it is possible that the plant toxins can be absorbed through the skin, especially if there are cuts[238].

dwatta Analgesic Antispasmodic Diaphoretic Febrifuge Homeopathy Hypnotic Mydriatic Nervine Sedative VasodilatorThe roots are analgesic, antispasmodic, diaphoretic, febrifuge, hypnotic, mydriatic, nervine, sedative and vasodilator[46, 165, 192, 222, 238]. A powerful depressant of the central nervous system, deadening pain and reducing spasms[222]. It is said to suspend and hold in check muscular irritability and nervous excitement with more force and power than any known remedy. Whilst it relaxes the muscles, it also relieves all sense of pain[4]. It is used internally in the treatment of neuralgia, migraine, sciatica, toothache, severe pain (especially in terminal illnesses or accidents) and meningitis[238]. Externally it has been used as a folk remedy for cancer[222]. The root is best harvested in the autumn and dried carefully for later use[4]. Extreme care is advised with the use of this plant, it should only be used under the supervision of a qualified practitioner[238]. Excessive doses cause respiratory depression, giddiness, double vision and death[238]. It should not be prescribed for patients with heart disease, hypotension or myasthenia gravis[238]. See also the notes above on toxicity. The fresh root is used to make a homeopathic remedy[232]. It is used in the treatment of a variety of complaints, including fevers, flu and

nrakta South-eastern N. America - Florida to Texas and north to Arkansas and S. Virginia. ksacta Along sea coasts[166] in dry to wet woods, thickets and sands[43].

propta Seed - sow spring in a warm greenhouse[200]. Prick out the seedlings into individual pots when they are large enough to handle and grow on in the greenhouse until

sharp pains in the breast, and as a wash for headaches[257]. This plant should be used with caution, it is irritating in large doses and can cause nausea, griping pains in the bowels etc[4, 21, 222]. It should only be used internally under the supervision of a qualified practitioner[238]. The bruised root is placed in hollow teeth for treating toothache[207]. An extract of the root can be drunk to relieve stomach pains[207]. The boiled root, or a decoction of the whole plant, can be used to treat fevers[213]. The chewed root or crushed leaves was applied to snakebites[207, 213]. This species was the most popular snakebite remedy in N. America[213]. It has also been applied externally to slow-healing wounds and in the treatment of pleurisy[238].

nrakta South-eastern N. America - Connecticut to Florida, west to Texas and Ohio. ksacta Rich dry woods, usually on calcareous soils[21, 43].

propta Seed - best sown in a greenhouse as soon as it is ripe in the autumn. Pre-soak stored seed for 48 hours in hand-hot water and surface sow in a greenhouse[134]. Germination usually takes place within 1 - 3 months at 20°c[134]. Stored seed germinates better if it is given 3 months cold stratification at 5°c[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for their first winter. Plant out in late spring or early summer after the last expected frosts. Division in autumn[200]. Root cuttings in winter[200].

nwatta Prefers a well-drained loamy soil, rich in organic matter, in sun or semi-shade[1, 200], but succeeds in ordinary garden soil[134]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Most species in this genus have malodorous flowers that are pollinated by flies[200]. The flowers of this plant are sometimes cleistogomous[235].

## 8.2.442 Ardisia crenata

Coralberry, Hen's eyes, Spiceberry 7 tlin 10 cyuc 0 kcak 1 tcan 1 dwat 2 m hkuc hmim cyutli tcup hwicli hrasjlutnyikfrip hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Ardisia crenata is an evergreen Shrub growing to 2 m (6ft) by 2 m (6ft) at a slow rate. See above for USDA hardiness. It is hardy to UK zone 7. It is in leaf all year, in flower from June to July, and the seeds ripen from September to December. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in heavy clay soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland). It prefers moist soil.

tcanta Landscape Uses: Container. Used as an ornamental plant in shady conditions.

dwatta Anodyne Depurative FebrifugeThe root is anodyne, depurative, febrifuge[147, 218]. It is used to stimulate blood circulation[147].

nrakta E. Asia - China, Japan, Korea, India. ksacta Woods in low mountains, C. and S. Japan[58]. Forests, hill-sides, valleys, shrubby areas, dark damp places at elevations of 100 - 2400 metres[266].

propta Seed - best harvested when it is ripe in the winter and sown immediately in a greenhouse[1]. Sow stored seed as early in the year as possible. When large enough to handle, prick the seedlings out into individual pots and grow them on in a shady part of the greenhouse for at least their first winter. Plant out into their permanent positions in late spring or early summer, once the plants are 20cm or more tall. Cuttings of half-ripe wood in summer[200]. Grow on in cool, shaded humid conditions until well rooted[200].

nwatta Prefers a well-drained humus rich soil in partial shade in a position sheltered from cold drying winds[200]. We are not sure if this plant is hardy outdoors in Britain. One report says that it is hardy in zone 7 (tolerating temperatures down to between -10 and -15°c) but then goes on to suggest that it needs an essentially frost-free climate and is often grown as an indoor pot plant in Britain[200]. This species is closely related to A. pseudocrispa, from which it differs in having crenate leaves with a distinct marginal vein[266]. There has been some confusion between this species and A. crispa, the name Ardisia crispa was misapplied by de Candolle to Ardisia crenata[266]. Special Features: Attractive foliage, Not North American native, Invasive, Fragrant flowers.

## 8.2.443 Crinum asiaticum

Asian Poison Bulb

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 1.2 m hkuc htut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Crinum asiaticum is a BULB growing to 1.2 m (4ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil.

pcista The bulb is said to be poisonous[270].

dwatta Emetic PoulticeThe bulb contains alkaloids, notably lycorine and crinamine[283]. A poultice made from the heated, pounded, fresh bulb is used to relieve osteodynia and rheumatism[283]. The juice of the fresh bulb is used as an emetic, whilst it is also instilled in the ear to treat otis[283]. A poultice of the heated, pounded, fresh leaves is used to treat contusions, sprains, fractures, luxations etc[283]. A decoction of the dried leaves is used as a wash in the treatment of haemorrhoids[283].

nrakta E. Asia - China, Burma, Vietnam. ksacta Introduced and locally naturalised in wet places in Florida and Louisiana[270].

propta Seed - best sown as soon as it is ripe, placing 2 - 3 seeds in individual pots in a greenhouse. Do not cover the seed. Sow stored seed April/May in a warm greenhouse. Once they have germinated, you can thin each pot to just one plant if required, though we have not found this to be necessary. Give an occasional liquid feed to ensure that the plants do not suffer nutritional deficiencies. Grow them on in the greenhouse for at least their first 2 years, planting them out into their permanent positions in the spring. Division of offsets in April/May or in September. When divided in the spring, the bulbs can be planted out direct into their permanent positions, if done in September, however, they should be potted up and overwintered in the greenhouse.

nwatta Prefers a deep, well-drained but moisture-retentive fertile soil that is rich in organic matter[200]. The bulbs must have sufficient moisture during the growing season[200]. Plants are not very cold hardy, tolerating occasional lows down to about -5°c[200]. In regions at the limits of their cold hardiness, they are best given the protection of a south or southwest facing wall. Plant the bulbs shallowly, with the neck of the bulb at soil level, and give a protective mulch of bracken or compost in the winter[200]. A robust and very variable species[270]. Bulbs are sensitive to transplanting and can take several years to become established. After this, they will usually reproduce rapidly from offsets to produce the overcrowded conditions that stimulate them to flower freely[200].

#### 8.2.444 Lavandula stoechas

French Lavender

7 tlin 10 cyuc 0 kcak 4 tcan 2 dwat 0.8 m hkuc

htut cyutli hgatkyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Lavandula stoechas is an evergreen Shrub growing to 0.8 m (2ft 7in) by 0.8 m (2ft 7in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to August, and the seeds ripen from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths and Butterflies). It is noted for attracting wildlife. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerates strong winds but not maritime exposure.

tcanta Essential Incense Pot-pourri RepellentAn essential oil is obtained from the flowers - used in soap making, perfumery, medicinally etc[46, 61]. When growing the plant for its essential oil content, it is best to harvest the flowering stems as soon as the flowers have faded[245]. The aromatic leaves and flowers are used in pot-pourri, as an insect repellent in the linen cupboard etc[89, 148, 238]. They are also

nrakta S. Europe to W. Asia. ksacta Rocky mountainous areas, usually near the coast, in S. Europe[45, 89].

propta Seed - sow late winter in a cold frame and only just cover the seed[164]. Three weeks cold stratification can improve germination rates[164]. The seed usually germinates in 1 - 2 months at 20°c. The seedlings are very subject to damping off so should be watered with care and kept well-ventilated[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can store for several years[113]. Cuttings of almost ripe wood, September in a frost-proof frame[1]. April/May is the best time to take cuttings[113].

nwatta Landscape Uses:Border, Screen, Specimen. Thrives in a deep well-drained loamy or peaty soil[11]. Established plants are very tolerant of hot dry conditions and drought[81]. Tolerates poor sandy soils[81] but is then more subject to damage by white-scale insects in a succession of dry seasons[11]. Plants are not very happy when growing on chalky soils but they thrive on limestone[200]. Requires a sunny position[81]. This species is somewhat tender in Britain especially when young and at least in the north of the country[81], it grows best in the south and the west[11]. Trees are probably much hardier than has been supposed. No trees were reported as killed by the very severe winter of 1962 - 3, even some trees east of Edinburgh survived without damage. A healthy tree at Cambridge botanical gardens was 6 metres tall in 1989[K]. Growth can be guite vigorous, especially in young trees, with many averaging 60cm a year[185]. Growth slows and almost comes to a halt when the tree is 12 - 15 metres tall[185]. New growth takes place from mid-May to mid-October[185]. Plants are subject to injury by the wind[1, 11]. Trees are notably susceptible to honey fungus[200]. The seed takes two summers to mature[227]. Mature cones can remain unopened on the tree for a number of years[81]. They open after the heat of a forest fire to scatter their seeds which then germinate and grow away quickly in the ashes of the fire[200]. Plants are resentful of root disturbance, any transplanting should be done in April or September when the roots are in active growth[11, 81]. A very variable plant[11]. Special Features: Not North American native, Inconspicuous flowers or blooms.

## 8.2.434 Agalinis tenuifolia

Slenderleaf False Foxglove

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc

hmimhtut cyutli hgatkyuctcup hwicli hrasjlut hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Agalinis tenuifolia is a PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to August. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy) and medium (loamy) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil and can tolerate drought.

pcista  $\overline{\text{The}}$  plant is said to be poisonous to cattle and sheep[274].

dwatta An infusion of the plant has been used in the treatment of diarrhoea[257].

nrakta N. America. ksacta Moist open areas and low woods in Texas[274].

propta Seed -

nwatta Requires a well-drained soil, preferably on the dry side[257]. Grows well in a woodland garden[257]. This species is not very hardy outdoors in Britain, tolerating temperatures down to between -5 and -10°c[257]. A semi-parasitic plant, thus making it very difficult to establish in cultivation[200]. We are not sure which species it parasitizes[257].

# 8.2.435 Daphne bholua

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 2 m hkuc pcimhmimhtut cyutli kyuctcup hwicli jlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli drutta Daphne bholua is an evergreen Shrub growing to 2 m (6ft) by 1.5 m (5ft). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from January to April. The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, flies, Lepidoptera (Moths and Butterflies). Suitable for: medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in full shade (deep woodland) semi-shade (light woodland) or no shade. It prefers dry or moist soil. It can tolerate atmospheric pollution.

pcista All parts of the plant are poisonous[76]. Skin contact with the sap can cause dermatitis in some people[200].

tcanta Fibre PaperA very good quality paper is made from the inner bark[11, 46, 51, 61, 272]. It is one of the principle sources of hand made paper in Nepal[272]. The fibre in the inner bark can be used to make rope[146, 272].

dwatta Anthelmintic FebrifugeThe juice of the roots, combined with molasses, is used in the treatment of fevers and intestinal problems[272]. A decoction of the bark is used to treat fevers[272]. The powdered seeds are anthelmintic[272].

nrakta E. Asia - Himalayas - Uttar Pradesh to S.W. China. ksacta Clearings in oak and rhododendron forests and shrubberies to 3100 metres[51]. Moist shady places under trees at elevations of 1000 - 3200 metres in Nepal[272].

propta Seed - best sown in a greenhouse as soon as it is ripe with the pot sealed in a polythene bag to hold in the moisture. Remove this bag as soon as germination takes place[164]. The seed usually germinates better if it is harvested 'green' (when it has fully developed but before it dries on the plant) and sown immediately. Germination should normally take place by spring, though it sometimes takes a further year. Stored seed is more problematic. It should be warm stratified for 8 - 12 weeks at 20°c followed by 12 - 14 weeks at 3°c. Germination may still take another 12 months or more at 15°c[164]. Prick out the seedlings into individual pots as soon as they are large enough to handle. Grow the plants on in the greenhouse for their first winter and then plant out in spring after the last expected frosts. Cuttings of half-ripe wood with a heel, June/July in a frame[214]. Division of suckers[214]. Layering.

nwatta Prefers a cool lime-free well-drained sandy loam and a sunny position[1, 11]. Succeeds in neutral soils[11] and tolerates partial shade[200]. Plants also succeed in quite deep shade[219]. At least some forms, especially the sub-species D. bholua glacialis.(see below) tolerate alkaline soils[184]. Flowers well when grown in dry shade[184]. Likes plenty of moisture in the growing season[11]. Grows well in London, tolerating atmospheric pollution[184]. Said to be hardy to about -5°c[200], plants succeed outdoors in southern England, but are defoliated in severe winters[11]. Plants at higher altitudes in its native range are often deciduous whilst plants from lower altitudes are evergreen but less hardy[166]. A very variable and very ornamental species[1, 200], the cultivars 'Ghurka' (deciduous) and 'Jacqueline Postill' (evergreen) are more hardy than the type[182, 200]. One report says that the cultivar 'Ghurka' is part of the deciduous sub-species D. bholua glacialis. (W.W.Smith. and Cave.)Burtt. and that it can tolerate temperatures down to about -10°c[184]. The flowers are fragrant[272]. Because it flowers in the winter, this species seldom produces much seed in Britain unless it is hand-pollinated[214]. Plants often sucker and form clumps in the wild[214]. Plants are resentful of root disturbance and should be planted into their permanent positions as soon as possible[188].

#### 8.2.436 Gentiana crassicaulis

1459

7 tlin 10 cyuc 0 kcak 0 tcan 3 dwat 0.4~m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli xre7t hjonli

drutta Gentiana crassicaulis is a PERENNIAL growing to 0.4 m (1ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower in August, and the seeds ripen in September. The species is hermaphrodite (has both male and female organs) and is pollinated by Bumblebees, butterflies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow

in semi-shade (light woodland) or no shade. It prefers moist soil.

dwatta Analgesic Antiinflammatory Antipyretic Antirheumatic Diuretic HypotensiveThe roots of gentian species contain some of the most bitter compounds known and make an excellent tonic for the whole digestive system, working especially on the stomach, liver and gall bladder[238]. The root is analgesic, anti-inflammatory, antipyretic, antirheumatic, diuretic, febrifuge, hypoglycaemic and hypotensive[176, 218, 238]. The root is used internally in the treatment of arthritis, allergic inflammations, low-grade fever in chronic diseases, jaundice and hepatitis[176, 218, 238]. The root is harvested in the autumn and dried for later use.

nrakta E. Asia - W. China. ksacta Damp patches in mountainous regions[239]. Wastelands, grasslands, roadside slopes, alpine meadows, scrub, forest margins and forests at elevations of 2100 - 4500 metres[266].

propta Seed - best sown as soon as it is ripe in a light position in a cold frame[200]. It can also be sown in late winter or early spring but the seed germinates best if given a period of cold stratification and quickly loses viability when stored, with older seed germinating slowly and erratically [200, 239]. It is advantageous to keep the seed at about 10°c for a few days after sowing, to enable the seed to imbibe moisture[239]. Following this with a period of at least 5 - 6 weeks with temperatures falling to between 0 and -5°c will usually produce reasonable germination[239]. It is best to use clay pots, since plastic ones do not drain so freely and the moister conditions encourage the growth of moss, which will prevent germination of the seed[239]. The seed should be surface-sown, or only covered with a very light dressing of compost. The seed requires dark for germination, so the pots should be covered with something like newspaper or be kept in the dark[239]. Pot up the seedlings into individual pots as soon as they are large enough to handle and grow on in light shade in the greenhouse for at least their first winter. The seedlings grow on very slowly, taking 2 - 7 years to reach flowering size[239]. When the plants are of sufficient size, place them out into their permanent positions in late spring or early summer. Division in March[111]. Most members of this genus have either a single tap-root, or a compact root system united in a single root head, and are thus unsuitable for division[239]. Cuttings of basal shoots in late spring[238].

nwatta In general, gentians require a moist well-drained soil in a sheltered position, a certain minimum of atmospheric humidity, high light intensity but a site where temperatures are not too high[239]. They are therefore more difficult to grow in areas with hot summers and in such a region they appreciate some protection from the strongest sunlight[200, 239]. Most species will grow well in the rock garden[200]. This species is easily grown in most soils and usually produces an abundance of fertile seed[239]. A moisture loving plant, preferring to grow with full exposure to the sun but with plenty of underground moisture in the summer, it grows better in the north and west of Britain[1]. This species is not very hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. Closely related to G. tibetica[266]. Plants are intolerant of root disturbance[200].

## 8.2.437 Hyoscyamus aureus

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat 0.6 m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hjonli

drutta Hyoscyamus aureus is a BIENNIAL/PERENNIAL growing to 0.6 m (2ft). See above for USDA hardiness. It is hardy to UK zone 8. The species is hermaphrodite (has both male and female organs). Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It cannot grow in the shade. It prefers dry or moist soil.

pcista All parts of the plant are very toxic[7, 10, 19, 65, 76, 200]. Symptoms of poisoning include impaired vision, convulsions, coma and death from heart or respiratory failure[238].

dwatta AnodyneThe whole plant is analgesic[148]. Caution is advised, see notes above on toxicity.

nrakta S. Europe to W. Asia. ksacta Cliffs, old walls and ruins to 1200 metres[187].

propta Seed - best sown as soon as it is ripe, older seed rapidly loses viability[200]. Either sow in situ or pot up the seedlings whilst still small because plants produce a long taproot and older plants resent root disturbance[200].

nwatta Prefers a hot dry position[200] in a wall or rock crevice[187]. Succeeds in a well-drained fertile soil, preferably of an alkaline nature, in full sun[200]. Grows well in maritime areas[200]. Plants are possibly hardy to about -10°c[187], they are unlikely to succeed in the colder areas of Britain. Self-sows freely, it can be grown in wild informal areas of the garden[200].

#### 8.2.438 Marah macrocarpus

Chilicothe, Cucamonga manroot

7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat m hkuc htut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli fyifxre7t hjonli

drutta Marah macrocarpus is a PERENNIAL CLIMBER growing to 5 m (16ft 5in) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from July to September. The species is hermaphrodite (has both male and female organs) and is pollinated by Insects. The plant is self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil.

tcanta Dye Paint Parasiticide SoapA red dye is obtained from the seed[61]. It can be mixed with iron oxide and turpentine to make a paint[257]. The root is used to make a detergent lather[257].

dwatta Parasiticide Purgative SkinThe root is purgative[61, 257]. The seed is made into a paste and used as a treatment on pimples and skin sores[257]. The oil from the seed is rubbed into the scalp to treat diseased scalps and hair roots[257]. The plant juices can be used as a parasiticide, rubbed onto areas of skin affected by ringworm[257].

nrakta South-western N. America - California. ksacta Dry places below 900 metres[71].

propta Seed - sow early spring in pots of rich soil in a greenhouse. Germination usually takes place within 1 - 2 weeks at  $20^{\circ}$ c. Put 2 or 3 seeds in each pot and thin to the best plant. Grow on fast and plant out after the last expected frosts.

nwatta Prefers a sunny position in a well-drained rich soil with abundant moisture[1, 175]. Succeeds in ordinary garden soil[175]. Plants are found in dry soils in the wild so this suggests that they will be better off in a dry soil in this country[K]. A perennial plant, it is not very hardy in Britain, tolerating temperatures down to about -5°c, and is perhaps best grown as an annual. A climbing plant, supporting itself by means of tendrils[219].

### 8.2.439 Cupressus macrocarpa

Monterey Cypress

7 tlin 10 cyuc 0 kcak 0 tcan 1 dwat m hkuc

htut cyutli ngatkyuctcup hwicli hyishrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli hjonli

drutta Cupressus macrocarpa is an evergreen Tree growing to 25 m (82ft) by 25 m (82ft) at a fast rate. See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from April to June. The species is monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and is pollinated by Wind. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pft: mildly acid, neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought. The plant can tolerate maritime exposure.

tcanta Hedge Hedge Shelterbelt WoodA good fast growing hedge for the milder areas of Britain, tolerating maritime exposure[11, 29, 75]. It can be trimmed so long as it is not cut back into old wood. Wood - heavy, hard, strong, closegrained and very durable[82]. Used for general construction[50, 61].

dwatta AntirheumaticA decoction of the foliage has been used in the treatment of rheumatism[257].

nrakta South-western N. America - California. ksacta Cliffs by the shore in just 2 small locations in California[11, 821.

propta Seed - sow late winter in a cold frame and only just cover the seed[164]. Three weeks cold stratification can improve germination rates[164]. The seed usually germinates in 1 - 2 months at 20°c. The seedlings are very subject to damping off so should be watered with care and kept well-ventilated[113]. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. The seed can store for several years[113]. Cuttings of almost ripe wood, September in a frost-proof frame[1]. April/May is the best time to take cuttings[113].

nwatta Thrives in a well-drained loamy or peaty soil[11]. Very tolerant of hot dry conditions[81]. Tolerates poor sandy soils[81] but is then more subject to insect damage in a succession of dry seasons[11]. Requires a sunny position[81]. Plants are not happy when growing on chalk, but they thrive on limestone[200]. Very tolerant of maritime exposure[11. 75, 82] but plants are not very wind firm in shallow soils[166]. Young trees require staking when planted in very exposed positions[75]. This species is somewhat tender in Britain, especially when young and at least in the north of the country Established trees, however, will tolerate occasional temperatures down to about -10°c and are hardy in most British winters[11, 81, 260]. A tree is 25 metres tall at Kew (1988) but in general they grow better in the western maritime zone[11]. The variety 'Lutea' is hardier than the type and is also more tolerant of wind and salt spray as well as of trimming[185]. New growth takes place from May to September and can be very vigorous when young with new shoots 1 metre long and increases in girth of 5cm or more a year even in old trees[185]. Trees in a very exposed maritime position at Rosewarne in N. Cornwall were 12 metres tall after 30 years[75]. Resents root disturbance, it is best planted out when the roots are in active growth in early autumn or spring[81]. Often planted for shelter and ornament, and also occasionally for timber in W. and S. Europe[50]. The cones ripen in their second year [82]. They can remain closed on the tree for a number of years, opening after the heat of a forest fire to scatter their seeds which then germinate and grow quickly in the ashes of the fire[200]. The crushed leaves have a strong scent of lemon verbena[185]. Trees are notably susceptible to honey fungus[200].

#### 8.2.440 Ilex purpurea

7 tlin 10 cyuc 0 kcak 0 tcan 2 dwat 12 m hkuc hmimhtut cyutli tcup hwicli hrasjlutnyik hpa7tli flatpriklwis hpa7tmwatli nyanhjen hjonli

drutta llex purpurea is an evergreen Tree growing to  $12 \, \mathrm{m}$  (39ft 4in). See above for USDA hardiness. It is hardy to UK zone 8. It is in leaf all year, in flower from May to June, and the seeds ripen from September to December. The species is dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required). and is pollinated by Bees. The plant is not self-fertile. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.

pcista Although no specific reports of toxicity have been seen for this species, the fruits of at least some members of this genus contain saponins and are slightly toxic. They can cause vomiting, diarrhoea and stupor if eaten in quantity[274].

dwatta Cancer Carminative Skin TonicThis plant is commonly used in Chinese herbalism, where it is considered to be one of the 50 fundamental herbs[218]. It is reported to have antitumor properties[218]. An extract of the leaves is made into a solution and used for treating burns, ulcers in the lower extremities etc[218]. The ashes of the leaves are used as a dressing for skin ailments and poisoned wounds[218]. Seed is carminative and tonic[218].

nrakta E. Asia - China, Japan. ksacta Evergreen broadleaf forests, forest margins on mountain slopes at elevations of 500 - 1000 metres in China[266].

propta Seed - best sown as soon as it is ripe in the autumn in a cold frame. It can take 18 months to germinate. Stored seed generally requires two winters and a summer before it will germinate and should be sown as soon as possible in a cold frame. Scarification, followed by a warm stratification and then a cold stratification may speed up the germination time[78, 80]. The seedlings are rather slow-growing. Pot them up into individual pots when they are large enough to handle and grow them on in light shade in a cold frame for their first year. It is possible to plant them out into a nursery bed in late spring of the following year, but they should not be left here for more than two years since they do not like being transplanted. Alternatively, grow them on in their pots for a second season and then plant them out into their permanent positions in late spring or early summer. Give them a good mulch and some protection for their first winter outdoors. Cuttings of almost ripe wood with a heel, August in a shaded position in a cold frame. Leave for 12 months before potting up. Layering in October. Takes 2 years[78].

nwatta Succeeds in most soils so long as they are not water-logged[200]. This species is not hardy in the colder areas of the country, it tolerates temperatures down to between -5 and -10°c[200]. According to another report, the plant is only hardy to about -3°c[260]. Resents root disturbance, especially as the plants get older[11]. It is best to place the plants into their permanent positions as soon as possible, perhaps giving some winter protection for their first year or two[K]. Plants are very tolerant of pruning and can be cut right back into old wood if required[188]. Dioecious. Male and female plants must be grown if seed is required.

## 8.2.441 Aristolochia serpentaria

Virginia Snakerog

7 tlin 10 cyuc 0 kcak 0 tcan 3 dwat 0.5 m hkuc hmimhtut cyutli kyuctcup hwicli hrasjlutnyik hpa7tli flatpriklwisslip hpa7tmwatli xre7t hionli

drutta Aristolochia serpentaria is a PERENNIAL growing to 0.5~m (1ft 8in) by 0.5~m (1ft 8in). See above for USDA hardiness. It is hardy to UK zone 8. It is in flower from June to August. The species is hermaphrodite (has both male and female organs) and is pollinated by Flies. Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: mildly acid, neutral and basic (mildly alkaline) soils and can grow in very alkaline soils. It can grow in semi-shade (light woodland) or no shade. It prefers dry or moist soil.

pcista We have no specific details for this species but most members of this genus have poisonous roots and stems[179]. The plant contains aristolochic acid, this has received rather mixed reports on its toxicity. According to one report aristolochic acid stimulates white blood cell activity and speeds the healing of wounds, but is also carcinogenic and damaging to the kidneys[254]. Another report says that it is an active antitumour agent but is too toxic for clinical use[218]. Another report says that aristolochic acid has anti-cancer properties and can be used in conjunction with chemotherapy and radiotherapy and that it also increases the cellular immunity and phagocytosis function of the phagocytic cells[176].

dwatta Antidote Antiinflammatory Bitter Diaphoretic Diuretic Expectorant Febrifuge Odontalgic Stimulant Tonic-The Virginia snakeroot is attracting increasing interest for its medicinal virtues and as a result is becoming uncommon in the wild. It merits consideration for cultivation in forest areas[222]. It is used in a number of proprietary medicines for treating skin, circulatory and kidney disorders[238]. The plant contains aristolochic acid which, whilst stimulating white blood cell activity and speeding the healing of wounds, is also carcinogenic and damaging to the kidnevs[254]. The root is harvested in the autumn and dried for later use[238]. The root is antidote, anti-inflammatory, bitter tonic, diaphoretic, diuretic and stimulant[1, 2, 4, 21, 46, 200]. Traditionally it was chewed in minute doses or used as a weak tea to promote sweating, stimulate the appetite and promote expectoration[4, 222]. The native North Americans considered it to have analgesic properties and used an infusion internally to treat rheumatism, pain - but especially